1910.

NEW ZEALAND.

WAIHOU AND OHINEMURI RIVERS

(REPORT OF COMMISSION APPOINTED TO INQUIRE INTO SILTING OF); TOGETHER WITH MINUTES OF EVIDENCE AND EXHIBITS.

Presented to both Houses of the General Assembly by command of His Excellency.

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COMMISSION.

PLUNKET, Governor.

To all to whom these presents shall come, and to William Ferguson, Esq., of Wellington, civil engineer; Frederick Robert Flatman, Esq., of Geraldine, farmer; Edwin Mitchelson, Esq., of Auckland, merchant; and Charles Ranken Vickerman, of Wellington, civil engineer.

WHEREAS by a Proclamation, dated the twenty-fifth day of March, eighteen hundred and ninety-five, the Waihou and Ohinemuri Rivers, in the Hauraki Mining District and the Auckland Land District, were, in accordance with the Mining Act then in force, duly proclaimed as watercourses into which tailings, waste water, and mining *débris* from mining claims in their vicinity might be discharged: And whereas it is now claimed that by the operation of the said Proclamation landowners in the vicinity of these rivers are injuriously affected, and that the navigation of the said rivers is impeded:

Now, therefore, I, William Lee, Baron Plunket, the Governor of the Dominion of New Zealand, in pursuance of all powers and authorities in anywise enabling me in that behalf, do hereby appoint you, the said

WILLIAM FERGUSON,
FREDERICK ROBERT FLATMAN,
EDWIN MITCHELSON, and
CHARLES RANKEN VICKERMAN

to be a Commission to inquire and report as to—

(1.) Whether any and what lands are injuriously affected by the operation of the said Proclamation;

(2.) Whether the navigation of the said rivers is, or is likely to be, seriously impeded from the same cause;

(3.) What, if any, remedial measures can be adopted without injury to any other persons, corporations, or interests;

(4.) What proportion of the cost of carrying out your recommendations should be a charge against the revenue derived by any local bodies from the mines interested in the use of the said watercourses;

(5.) And generally to report your opinion on all matters arising out of or touching the premises.

And with the like advice and consent I do further appoint you, the said William Ferguson, to be Chairman of the said Commission.

And for the better enabling you to carry these presents into effect, you are hereby authorized and empowered to make and conduct any inquiry under these presents at such place or places in the said Dominion as you may deem expedient, with power to adjourn from time to time and from place to place as you think fit, and to examine in such manner as may be allowed by law any person or persons that you may think capable of affording you any information in the premises; and you are also hereby empowered to examine all such books, documents, papers, maps, plans, or records as you judge likely to afford you the fullest information on the subject of this commission, and to inquire of and concerning the premises by all other lawful ways and means whatsoever; and also to use the evidence taken in the course of any previous inquiry touching the premises.

And, using all diligence, you are required to report to me under your hands and seals your opinion resulting from the said inquiry in respect of the several matters and things inquired into by you under or by virtue of these presents within one month from the date hereof, stating in such report what steps (if any) it would, in your opinion, be expedient to adopt under the circumstances which you find to exist, and in what manner effect should be given to such recommendations.

And it is hereby declared that this commission shall continue in full force and virtue although the inquiry be not regularly continued from time to time by adjournment, and that you, or any two of you, shall and may from time to time proceed in execution hereof, and of every power, matter, and thing herein contained.

As witness the hand of His Excellency the Governor this fourteenth day of May, nineteen hundred and ten.

R. McKenzie,
Minister of Mines.

REPORT.

To His Excellency the Right Honourable John Poynder, Baron Islington, Governor and Commander-in-Chief in and over His Majesty's Dominion of New Zealand and its Dependencies.

May it please Your Excellency,—

The commission intrusted to us directed our attention to inquire into and report on the following matters:—

Reference.

(1.) Whether any and what lands are injuriously affected by the operation of the sludge-channel Proclamation of the 25th day of March, 1895;

(2.) Whether the navigation of the Waihou and Ohinemuri Rivers is, or is likely to be, seriously impeded from the same cause;

(3.) What, if any, remedial measures can be adopted without injury to any persons, corporations, or interests;

(4.) What proportion of the cost of carrying out any recommendations we may make should be a charge against the revenue derived by any of the local bodies from the mines interested in the use of the said watercourses;

(5.) And generally to report our opinion on all matters arising out of or touching the premises.

Having now concluded our investigations and inquiries, we have the honour to submit to Your Excellency our report on the several matters referred to us. The time for presenting our report was extended by His Excellency the Administrator of the Government, Sir Robert Stout, K.C.M.G., for one month, to 14th July, 1910.

Sitting, Auckland.

On receipt of the commission of the 14th May, 1910, the Commissioners proceeded to Auckland, and, as previously publicly advertised in the newspapers, attended at the Departmental Buildings there on Tuesday, the 17th, and Wed-

nesday, the 18th May, at 10 a.m. each day, to meet persons interested in this important inquiry, and generally to arrange for the taking of such evidence as should be voluntarily tendered.

On our assembling there on the 17th May we found that five of the principal interests concerned had arranged to be represented by counsel, as follows :—

Interests represented at Inquiry.

Mr. T. Cotter and Mr. T. A. Moresby for the Ohinemuri County Council and River Board.

Mr. R. McVeagh and Mr. E. Clendon for the Waihi Borough Council.

Mr. M. Myers and Mr. C. J. Tunks for various mining companies.

Mr. A. Hanna for the Waihi-Paeroa Gold-extraction Company (Limited).

Mr. F. H. Mueller for the Ohinemuri River-silting Association.

Mr. Hanna also appeared for the Karangahake Miners' Union.

At a later date Mr. A. Bruce, Secretary to the Thames Harbour Board, appeared for that body, and for the Thames County Council and the Thames Borough Council.

The representation by counsel of various public interests at first appeared to the Commissioners to be unnecessary, and it was pointed out by them that they did not look on the inquiry as a judicial one, in which the evidence must be subject to close sifting and cross-examination, but rather that the evidence was to be voluntarily given, and that the Commissioners would personally visit the places affected, and endeavour to form their own judgment from personal observation as well as from the evidence obtainable.

However, as the principals pressed that counsel might be permitted to appear, urging the importance of the interests concerned, and stating that they hoped to place the evidence in a clearer manner before the Commission by the assistance of counsel than they could do without, no further objection was made by the Commission.

By the general wish of those attending, and with the approval of the Commission, it was then arranged that Paeroa should be made the chief centre at which the Commission should sit for the taking of evidence, and that other places, as the Thames, could be visited as required.

Sittings, Paeroa.

The Commission then adjourned on Wednesday, having intimated that they would sit in the Courthouse at Paeroa on Monday, the 23rd May, at 10 a.m., to take evidence, and that in the meantime the Commissioners would visit the rivers and districts concerned, so as to make themselves familiar with the local conditions. Advertisements were inserted in the local papers, inviting all interested persons to attend and to give such voluntary evidence as they desired.

Visits to Thames, Waihou River, and Waihi.

The Commissioners accordingly left for the Thames by steamer on Thursday, the 19th May, inspected the Thames Harbour the same day, and proceeded by train to Paeroa that evening; next day the Commissioners spent in a launch on the Lower Waihou River, and examined its banks and the adjacent lands from the Junction down as far as Hikutaia; returning in the launch, which drew some 3 ft. of water, from the Junction up to the Ohinemuri Railway Wharf at Paeroa at high water. On Saturday, the 20th May, the Commissioners went by early train to Waihi, returning to Paeroa by the road, and examined the batteries at Waihi, Waikino, and Karangahake, and the Ohinemuri River generally between Waihi and Paeroa.

Local visits.

Many other visits were made during the time the Commission sat at Paeroa, from the 23rd May to the 3rd June, to special places referred to in the evidence,

including Netherton; the Rotokohu Swamp; the Upper Waihou; the Awaiti Lagoon; the drains south of Te Aroha, near Shaftesbury; the Upper Waihou River, from Te Aroha to Paeroa; the Ohinemuri River, between Paeroa and the Junction; the site of proposed diversion cuts in the Waihou and Ohinemuri Rivers; the Komata Creek and Komata Reefs battery; and various damaged farms, and other places.

Nomenclature.

In this report that portion of the River Waihou lying above its point of junction with the River Ohinemuri will be called the "Upper Waihou." The term "Junction" will be applied to the existing confluence of the Rivers Upper Waihou and Ohinemuri, at a point about four and a half miles by the waters of the Ohinemuri River below the Paeroa–Te Aroha Traffic Bridge, in the Township of Paeroa, and being only some one and a third miles by roadway from the same bridge. The term "Lower Waihou" will be applied to the river below the Junction to its mouth, where it debouches at Opani Point into the Hauraki Gulf.

Thames sitting.

To meet the convenience of witnesses at the Thames, the Commission held a day's sitting at the Courthouse there, on Saturday, the 28th May, chiefly so as to enable the local fishermen to give evidence on the alleged injury done to the fishing industry by the presence of mining tailings and slimes in the Thames River, as the lower reach of the Lower Waihou is locally called.

Auckland sitting.

On the 3rd June the Commission concluded taking evidence at Paeroa late in the afternoon, and left by night boat for Auckland, and continued there taking evidence at the Departmental Buildings and consulting till the 10th June, when, no further evidence being offered, and counsel having given addresses, the Commission adjourned to Wellington to consider and prepare its report.

Witnesses.

Evidence was given by some ninety-two witnesses. Of these, thirty or more were settlers and Maoris interested in the lands more or less affected by the floods; and in several cases these witnesses represented and spoke on behalf of adjacent owners.

Six witnesses gave evidence at the Thames relative to the fishing industry.

Evidence was given at Paeroa and at Auckland by county and borough officials; by the managers and officers of mines now discharging tailings into the Ohinemuri River; by independent civil and mining engineers on the subject of the rivers, their watersheds, rainfalls, and floods; by analytical chemists and others on the samples of silt and other materials submitted to them; by mining experts on proposed schemes for remedying the injuries caused by the present method of disposing of the tailings; and others.

Full particulars of this evidence, and of the various exhibits, some ninety-seven in number, will be found in the copy of the evidence and list of exhibits attached to this report.

In order to receive the large amount of evidence tendered in the short time at the disposal of the Commission, it was necessary to sit for long hours during the day, on holidays, and on several occasions in the evening, and to make the visits of inspection in the early morning before the usual time for sitting.

Public evidence.

The evidence of witnesses was taken in public by examination by counsel generally, and by such further examination by the Commissioners as they desired.

The Commission also had informal conferences with counsel, with mining experts, and others, for the purpose of both shortening the proceedings and of determining conclusions which would be of an acceptable character to all the varied interests concerned, as well as to the Commissioners themselves.

We have much pleasure in placing on record our appreciation of the valuable information and assistance given us by counsel; by the witnesses; by officers of the Government, of the local bodies, and of the mining companies respectively; and by those private individuals and professional men who tendered their evidence.

A great amount of interest has been taken by the local public in the inquiry, and a large number of persons attended every sitting. Full and accurate reports have appeared in the Auckland newspapers and the local Press.

Personal investigation by Commission.

The Commissioners, as far as was practicable, personally visited every locality and farm mentioned by the witnesses, and satisfied themselves as to the accuracy or otherwise of the statements volunteered by the farming representatives as to the damage incurred through the floods, and they had conversations with numerous persons who did not give formal evidence. They desire to place on record their appreciation of the accuracy with which the evidence as a whole was given, and to point out that, although the evidence was not given on oath, there did not appear to the Commissioners to be any desire to overstate grievances.

Prior inquiry.

The Commissioners had before them the evidence given in 1907 before the Goldfields and Mines Committee of the House of Representatives (published as Parliamentary Paper I.–4A), as well as various departmental reports bearing on the subject of their commission and cognate questions.

River characteristics.

The following are the characteristics of the Rivers Waihou and Ohinemuri. The main river, the Upper Waihou, has a northerly course, rising near Lichfield, some sixty miles to the south of its junction with the Ohinemuri. It drains the western side of the main Te Aroha and Tauranga range of mountains and the flats adjacent to the river—in all, about 280,000 acres. The rainfall on this area is moderate, amounting to about 40 inches yearly. Floods in this river, before the bush was cleared off and drains were made through the flats and swampy lands of its basin, used to take three or more days to reach the Junction. Since settlement has taken place on these upper areas the bush has been cut down, and the swamps and the low-lying grounds drained to a considerable extent by very many miles (possibly amounting in all to hundreds of miles) of drains. The rain-waters, instead of taking weeks to gradually soak out of the bush, swamps, and lagoons, now come down more quickly and in much greater volume, and therefore more rapidly fill the river-bed than formerly. The sectional area and inclination of the river, which may or may not have been sufficient in a state of nature to unwater the district without serious flooding, is now quite insufficient to provide for the more rapid discharge caused by these operations of man in deforesting and draining the country. Not only have the works of settlement caused the rain-waters to come off more quickly, but the cutting of drains in the light soil existing in a large portion of the basin of the Upper Waihou has tended to rapidly carry into the river large quantities of light volcanic and pumiceous sands and silt, which have tended to block this watercourse, and raise its ordinary level in relation to the surrounding lands.

Willow-planting.

As Nature tried to reproduce a section of sufficient area to carry off the flood-waters by the erosion of the river-banks, the settlers, seeing their lands on the river-banks being cut away, tried to protect their losses by the planting of large masses of willows. These willow plantations have not been kept within any reasonable bounds, and have resulted in a reduction of the naturally too small cross-section of the river. The river is choked, both on the banks and in places in the bed, by masses of willow trunks and branches, with the result that

the normal flow of the river is retarded to a serious degree by the contraction of the channel, so that the ordinary level of the stream is raised, and insufficient room is left for the additional waters brought down in times of flood; also by the presence of the willows the velocity of the flow is decreased, with the sequel that the flood-waters rise to greater heights than they would have done in a natural state. The floods therefore overflow the banks at all low places, and, by backing up the artificial drains and creeks, flow over the adjacent lands, which in many cases are below the level of the lands of the actual river-bank.

Overflow Awaiti Lagoon.—Netherton floods.

There is an overflow to a serious extent at a swamp on the west side of the river, some couple of miles south of the Tirohia Railway-station: the waters top the low bank, and run across the low lands into the Awaiti Lagoon and Creek, which are tributary to the Piako River. When the Piako is in flood—which probably occurs at the same time as the Upper Waihou is in flood—these surplus waters, being unable to drain to the Piako, flow over low-lying lands at the back of Netherton, flooding these lands, and finally find their way into the Lower Waihou near Netherton. These floods, were they of short duration, would be of but little detriment to the farming lands covered, as any silt they may bear would be of an alluvial character, and not likely to do harm to the lands flooded; but, owing to the increasing frequency in numbers, the matter is a serious one to the farmers affected, and must be provided for.

Synchronous floods.

The floods in the Upper Waihou sometimes occur in conjunction with those in the Ohinemuri, when caused by easterly weather; but the Upper Waihou floods are often the result of westerly and northerly rains, which do not affect the Ohinemuri so much.

Ohinemuri watershed.

The Ohinemuri River, which is the only important affluent of the Waihou, has a comparatively small watershed of about 90,000 acres, contained in a basin in which it rises, and in which the Townships of Waihi and Waikino are situated. It flows in a generally westerly direction, having a rapid fall from Waihi through the gorge in the main range of hills known as Karangahake (where the Talisman and Crown Mines are situated), and debouches below Mackaytown into the flat lands on which Paeroa partly stands, and thence has an extremely tortuous course until it joins the Upper Waihou at the Junction.

Waihi basin.—Excessive rainfall.—March, 1910, flood.

The basin in which Waihi lies has an exposure principally to the eastward, and Mr. H. B. Devereux, the Meteorological Observer at Waihi, in his evidence, in giving the mean annual rainfall at 83½ inches, explained that this unusually large fall—more than double that of the adjacent plains through which the Waihou flows—was due to moisture-laden winds from the east, or Pacific Ocean, striking the high lands surrounding the Waihi basin, causing a sudden condensation, and deposit of rain with great rapidity. The rainfall observations show that at times it is quite torrential in character—as, for instance, the fall immediately prior to the heavy Ohinemuri flood of the 30th March last, when 14 inches of rain was recorded as having fallen in sixteen consecutive hours at Waihi. The Ohinemuri, at the eastern mouth of the Karangahake Railway Tunnel, then rose to some 14 feet higher than was shown by any previous record, and swept down from its upper reaches large volumes of mining tailings which had been the accumulation of many years, flooding the Township of Paeroa, and covering lands to a height and extent that had previously been unknown, leaving on fertile lands a considerable volume of tailings and slimes.

Ohinemuri willows.

Like the Upper Waihou, the banks of the Ohinemuri have been permitted to be overgrown with willows, with similar detrimental results; but, whilst the Upper Waihou has only had to carry down a moderate amount of sands in

its bed, the Ohinemuri has been laden as a sludge-channel by exceedingly large volumes of mining tailings, the greater portion of which has been deposited in its bed from Mackaytown to a point some six miles lower down, and which point is about three miles up from the Junction.

Deposit of tailings.

Below this point, so far as the evidence shows, there has been no serious deposit of tailings in the mid-stream bed of the Ohinemuri, but successive floods and freshes have deposited tailings and slimes to a very considerable extent on the banks of the Ohinemuri down to the Junction, and on the banks of the Lower Waihou for very many miles below the Junction, as well as upon the flooded lands.

Natural floods.

It is clear that, whilst both the Waihou (Upper and Lower) and Ohinemuri Rivers have always been subject to considerable floods, being only laden with good alluvial deposit, they did no permanent harm to any lands that were flooded; but, owing to the restriction of the waterway by growth of willows, and to its reduced section by the deposit of artificial sands on its bed and banks, the River Ohinemuri, and the Lower Waihou to a lesser extent, are now incapable of carrying off the volumes that they ought to convey; with the result that the freshes and floods are becoming more numerous, and of a higher and more disastrous character; and, being now laden with injurious mining slimes and sands, there has been caused a material loss to the owners of flooded lands. It is also probable that, as the settlement of the river-flats has increased materially since the rivers have been used for sludge-channel purposes, and as the values of the lands have increased so largely through the growth of the dairying industry, the effect of the floods is more noticed than it used to be when the population was sparser.

Tidal limits.—Extent of tailings, Waihou.

The Ohinemuri River for about two miles above Paeroa Township, and the Upper Waihou for some five or six miles above the Junction, are tidal. At and below the Junction there has been considerable shoaling in the Waihou River, largely due to artificial works, and the Lower Waihou shows the presence of mining-silts on its banks to a greater or less extent as far north as the mouth of the Hikutaia Creek, near the northern limit of the Ohinemuri County. The Lower Waihou is in many places materially narrowed and pinched in consequence of the deposit of artificial sands; and the navigable channel has in places become narrower from the deposit of sands, though not necessarily of mining origin.

Limits of Ohinemuri boundary.

Within the boundaries of the Ohinemuri County—that is, from about one mile below the mouth of the Hikutaia Creek for about twelve miles up to the Junction, and up to a point near Te Aroha about eighteen miles above the Junction—the Lower and Upper Waihou Rivers, and the whole of the Ohinemuri River, are nominally under the control of the Ohinemuri County Council, acting as a River Board.

Limits of Thames County jurisdiction and Thames Harbour Board

From the northern boundary of the Ohinemuri County, for a distance of about five and a half miles, down to the southern limit of the Thames Harbour District, there is, so far as we could ascertain, no local authority having jurisdiction over the river, unless it be the Thames County Council. For the balance of its run to the Hauraki Gulf the Waihou River—which seems here to be, by general consent, called the Thames River—is within the jurisdiction of the Thames Harbour Board. The banks of the Lower Waihou, and of its tributary, the Komata Creek, are burdened with a growth of willows, but not to so serious an extent as in the Upper Waihou or Ohinemuri Rivers.

Reference Clause 1.

Sludge-channel Proclamation, 1895.

1. The first reference made to us is to ascertain whether any and what lands are injuriously affected by the operation of the Proclamation of the 28th March, 1895, declaring the Ohinemuri and Waihou Rivers to be watercourses into which tailings, waste water, and mining *débris* might be discharged.

We are satisfied that material damage has been done to lands in the Township of Paeroa, and to farming lands, and to lands capable of being used for farming purposes, adjacent to the banks of the Ohinemuri and Lower Waihou Rivers and the Komata Creek, and adjacent to portions of the banks of the Upper Waihou, and that this damage is directly due to the deposit in the Ohinemuri River of mining silts and slimes under the sanction of the Proclamation.

Damage by tailings.—Recent floods detrimental.

It is admitted that mining *débris* and sand tailings had been deposited in the rivers prior to the date of the Proclamation, but it does not appear that the amount so deposited had been sufficient to materially affect the flow of the streams. Your Commissioners are satisfied that since the Proclamation the large quantities of tailings turned into the streams, especially into the Ohinemuri, have so reduced the available section of the watercourses that the rivers are, and have been for some time past, incapable of carrying off flood-waters to the extent that the rivers were capable of providing for before that date; also that, whereas prior to 1895 the River Ohinemuri was to all intents and purposes a clean stream, only carrying down in times of flood alluvial material that when spread on flooded lands would not be of a harmful, and might be of a beneficial, character, the floods of recent years, owing to the choking of the flow of the river by mining deposits, are of greater frequency and magnitude, and being heavily charged with mining tailings and slimes, are very detrimental to the flooded lands and to the stock pasturing thereon.

Upper Waihou floods.

With the exception of the deposit of mining sands on the river-banks where low-lying on the western side of the Waihou, and where the mining sands have been carried up creeks and drains from the river when in flood and deposited on the adjacent lands, we find that the damage by floods, when existing on the lands on the western bank of the Waihou, from the section known as Ngararahi (about two miles above the Junction) as far down the river as Turua, about six miles from the northern boundary of the Ohinemuri County, only results indirectly, and to a small extent, from the raising of the river-bed by silt. The floods are caused by the waters of the Upper Waihou, which at times of freshes have overflowed its western bank at points some seven miles above the Junction into the low-lying swamp lands that are supposed to be drained by the Awaiti Creek to the Piako, and at the same or other times by overflows at points to the south of Ngararahi. These flood-waters flow out of the river into the low-lying swampy bush land, run at slow speed parallel to, and over the lands at the back of, the river-bank, and then flood settled lands from Netherton to Turua when returning to the Lower Waihou.

Watershed, Waihou and Piako Rivers.

It is clear that the absence of a defined watershed for a portion of the distance between the Waihou and Piako Rivers is a very serious matter, and one that must, in the interests of settlers in both districts, be attended to. An exceptional flood might materially alter the face of the country by making a permanent channel, turning part of the Waihou waters into the tributaries of the Piako River.

Volume of tailings.—Fine grinding to slimes.

Since 1895 large and increasing volumes of sand, tailings, and slimes have been discharged into the upper reaches of the Ohinemuri, amounting at the present time to about 550,000 tons annually. At first the sands discharged were comparatively coarse, but with the gradual adoption of tube mills during the

past six years the tailings are now ground to a slime—that is, to such a degree of fineness that the discharges from the Grand Junction, Waihi, and Waikino reduction-works are ground so that more than 90 per cent. will pass through an 80-mesh standard laboratory screen. The evidence of the mine-managers makes it clear that it pays the companies to grind finely, and that the commercial tendency is towards still finer grinding.

Slimes to be compulsory.

The Talisman Company have nearly completed the erection of tube mills, and the Commissioners are satisfied that they are justified in recommending that grinding to slimes should be compulsory, and that any restriction to the use of the river as a sludge-channel for slimes only would be commercially in the interests of the mining companies. It may therefore be assumed that there will in future be no large volume of coarse sands discharged into the river, and that the problem to be solved is the disposal of the large volumes of tailings existing on the banks and in the bed of the River Ohinemuri, and the disposal of the slimes to be made by the ore-reduction works in the future. So far as the Commissioners are aware, the Crown Mines Company, at Karangahake, are the only reduction-works at which tube mills and very fine grinding have not yet been adopted.

Waihi-Paeroa Gold-extraction Company (Limited).

Large volumes of coarse sands discharged from Waihi had accumulated in the river-bed above Waikino, and the Waihi-Paeroa Gold-extraction Company erected and worked a plant for some eighteen months for the purpose of grinding these coarse sands to slime, and for treating them for the gold contained therein; but the March flood of this year swept away the deposit in the upper reaches of the Ohinemuri to such an extent that work has been suspended, and the plant is being removed to and re-erected on the lower reaches of the Ohinemuri, near Paeroa, and upon a much larger scale, in order to grind to slimes and obtain the gold from the tailings in some nine miles of river claims lying between Mackaytown and the Junction.

Ohinemuri sand-deposits.

From Mackaytown down the river there are large deposits of sand tailings, estimated by the Waihi-Paeroa Gold-extraction Company as amounting to 2,200,000 tons, of which 60 per cent. of those in the bed of the stream are estimated to be too coarse to pass a 60-mesh screen. At and below Mackaytown large volumes of sands have been thrown upon the lands adjacent to the river-bed, as the river there debouching from the gorge lost its high velocity in flood-time, and, expanding over the low-lying flooded lands, deposited the silt and heavy material which it had previously held in suspension.

Deposits in bed of River Ohinemuri.

Below Mackaytown, through the Paeroa Township, down to a point in the river about three miles above the Junction, and some half-mile below the elbow known as Pereniki's Bend, the bed of the river has been raised to the extent of several feet by the deposition of the coarse tailings thereon; in other words, the travel of the artificial sands has for a distance of some six miles shoaled the river, leaving a depth of barely three feet of water, whilst below this shoaling there is at present a depth of eleven feet in the mid-stream of the Ohinemuri down to the Junction, with many holes of much greater depth. Though there does not appear to be any large deposit of tailings in the mid-stream bed of the Ohinemuri, from about three miles above the Junction, or in the Lower Waihou, there are large deposits on both banks of the Ohinemuri, and in places on the banks on the Lower Waihou, and in shoalings in the lower river.

Ohinemuri meanders.—Floods at Paeroa.

Owing to the tortuous course of the Lower Ohinemuri, to its reduced sectional area through the deposition of sands and from the effect of willows, the river is quite unable to carry off even moderate floods, with the result that its

flood-waters have on the northern side overflowed its banks above the traffic-bridge, covering valuable agricultural land, and, finding its way into the Township of Paeroa, has left deposits of silt and slimes.

Floods opposite Paeroa.

On the southern side the river also overflows above the traffic-bridge, spreads over a wide extent of country, and in the March flood there was extensive damage done to the ballasting of the railway-lines to Waihi and Te Aroha. The flood-water finally runs across country, and finds relief by flowing into the Upper Waihou for some distance above the Junction.

Floods below Paeroa.

In addition, the floods top the banks in all low places in the Ohinemuri between Paeroa and the Junction, and also back up the natural creeks and artificial drains, with the result that there has been laid on the fertile river-bank lands deposits varying in thickness from a thin film up to several feet of sands, and these deposits extend over a considerable area, and over more or less of the whole flooded area there is a coating of fine mining slimes.

Tailings carried to sea.

No doubt, in addition to the material deposited upon the riverine lands, there have been large quantities of sands and of slimes, especially during the recent March flood, swept down the river and out to sea.

Slimes carried in suspension.

The evidence tends to prove that slimes will not deposit to any serious extent in any current where the velocity does not fall below half a foot per second, or, say, one-third of a mile per hour. As in normal conditions the velocity of the Ohinemuri and Lower Waihou exceeds that speed, it appears to be tolerably certain that the finely ground slimes are now, and have been for some years past, carried out to sea. The evidence on this point is confirmed by the Commissioners' own observations on the material in suspension in the river-waters, and by the absence to any serious extent of deposits of slimes, except in spots where, through the existence of willows or from other reasons, comparatively slack water exists.

Harm caused by slimes.—Damage to cattle.

The substitution of the finely ground slimes for the coarse sands has brought with it the evil that now the flood-waters are heavily charged with a fine muddy material, which is washed over the whole area of the lands flooded, and is deposited on, and clings like a white wash to, the grasses and vegetation; whereas when the grinding was of a coarser character the tailings were deposited to a much greater thickness, but over a more limited area of land, being dropped as soon as the flood-waters lost the velocity needed to carry the heavy sands forward, which they did shortly after topping the river-banks. The farmers find that the fine slimes adhere to the leaves; that if the flood is followed by sunshine the grasses wither rapidly; and that, even if the flood is followed by rains, the slimes are not fully washed off the vegetation. The result has been that following each flood in recent years the cattle refuse to eat the pasturage, and if compelled to do so the cows in milk rapidly fall off and go dry, resulting in a considerable reduction in the dairy returns; and in some cases the farmers have been left without pasturage for their cattle, and have after floods had to sell their stock at a loss. Young cattle, it was alleged, lost their lives through eating slime-covered grass.

Cyanides present in rivers.

Though the settlers have been deprived of the use of the Ohinemuri and Lower Waihou for watering their stock, owing to their silt-laden condition, and although there appeared at times to be a faint chemical smell in the river-water, the Commissioners do not think that the farmers have suffered to any serious extent by the presence of cyanides or other poisonous material in the rivers, except so far that no fish are now found in the Ohinemuri or in the upper reaches of the Lower Waihou.

Damage to lands.

The Commissioners divide the classes of damage to lands into three groups —(*a*) the lands completely destroyed; (*b*) the lands seriously affected; (*c*) the lands temporarily affected, but not permanently injured to any serious extent.

Total destruction of land.

The (*a*) class of lands, totally destroyed, includes those lands on which there is a deposit of mining tailings and silt of so great a thickness as to render the lands of little or no use. This thickness, after careful personal examination, the Commission fix at three inches and upwards.

Partial destruction of land.

The (*b*) class of lands, seriously affected, are, in the estimation of the Commission, those areas where the thickness of deposit is less than three inches, in which case it is believed that the silt can be ploughed in and the land resown.

Temporary damage to land.

The (*c*) class of lands is where the deposit of sands or of slimes has been less than three-quarters of an inch in thickness. It appears certain that these lands, though reduced in value to some extent, have not been permanently injured, as the grasses will break through, and in time, by the action of earthworms and other natural causes, the slimes will be disseminated through the surface soil.

Agricultural Department: Report *re* silts.

Attention is drawn to a very valuable report by Mr. B. C. Aston on "Ohinemuri Silt Investigation," as published by the Chemistry Division of the New Zealand Department of Agriculture, and appearing in the annual report for 1909. From this report the Commissioners are confirmed in their view that there can be no nutritious properties in tailings, which consists for the most part of finely comminuted quartz, having no manurial value. On heavy clay lands the presence of fine quartz sand might have a beneficial effect, but there is naturally quite enough sands in the affected lands, and the application of more from successive floods is a matter to be deplored and prevented.

Land-areas affected.

At the suggestion of the Commissioners, the Ohinemuri County Council, who throughout the inquiry held a neutral position, employed Mr. C. R. Bellingham to visit and schedule the whole of the affected areas, and the results of his investigation are given in the return (Exhibit No. 60) appended hereto, and summarized as follows:—

Survey District.	Block Number.	Total Area of Holding.	Area totally destroyed.	Area affected deleteriously.
		Acres.	Acres.	Acres.
Waihou	VII and VIII	2,139	..	1,779
,, ...	XI and XII	843	..	843
,, ...	XII	3,324	137	2,955
,, ...	XVI	1,266	110	1,070
Ohinemuri	IX	518	..	518
,, ...	XIII	1,886	124	342
		9,976	371	7,507

The Commissioners have not had the time at their disposal to fully check this return or to have an independent one made, but are satisfied that it may be assumed to be approximately correct. The 371 acres given as totally destroyed probably corresponds with class (*a*); but they are not able to assess what portion of the 7,507 acres would belong to classes (*b*) or (*c*).

Survey of affected lands.

The Commissioners recommend that Your Excellency should forthwith appoint some competent person, who should proceed to this district and prepare from personal observation and approximate measurements a return giving particulars of the three classes of lands affected, so that if the recommendations of

the Commissioners as to the granting of compensation, as set out hereunder, are given effect to, there will be a definite basis upon which such compensation may be assessed. In compiling such a return it will be desirable, for reasons hereinafter appearing, that all lands situated within an average distance of 1½ chains of the river-bank should be separately scheduled.

Compassionate compensation.

The Commissioners are given to understand that legally the owners and occupiers of land who have been injuriously and permanently affected by the deposit of mining tailings thereon have no claim whatever on the State for compensation; but they are of opinion that, apart from the legal aspect, there is every reason why some compensation should be granted for the permanent damage done to the lands. The landowners at the time of the Proclamation in 1895 could not have foreseen its wide-reaching and disastrous effect. Even had the farmers possessed sufficient prescience to have then estimated the possible effects of the Proclamation, it is fairly certain that they could not have persuaded any Compensation Court that the results which have followed its issue would have occurred, and would not have obtained any compensation commensurate to the loss that has been suffered.

Source of compensation.

The Commissioners are of opinion that, although the compensation, if any, which might have been awarded in 1895 would have been nominally paid by the State, any compensation that may now be given should be chargeable to the district as a portion of the scheme set out hereunder.

Scale of compensation.

The Commissioners recommend that in respect to all lands which may be placed in Class (*a*), as permanently destroyed (and lying more than 100 feet from the river-bank), there should be paid compensation, as a compassionate allowance, such sum as may be determined by a Stipendiary Magistrate as having been the value of the lands in 1895, together with full compensation for any permanent improvements carried out on the lands since that date.

Scale of compensation, partial loss.

That in respect to lands which may be placed in Class (*b*), as being seriously affected by the tailings left by floods, there should be paid a compensation of, say, £2 per acre, being a sum sufficient, in the estimation of the Commission, to deep-plough the area affected, and to sow the lands with grasses of a character suited to the condition of the land when the silt is mixed therein.

No compensation, temporary loss.

It is not proposed that any compensation should be made for the damage to lands that may be placed in Class (*c*), as temporarily affected. The Commissioners recommend that one-half of the proved loss to farmers through the 1907 to 1910 floods be paid as compensation for the loss of, and depreciation of, stock, and for the falling-off in the milk-supply. The Commissioners are of opinion that these losses would to some, though not to the same full, extent have been incurred if the floods had been of a natural character, and not silt-bearing.

The Commission advise that no compensation should be given on lands to any landowner or tenant who took up his lands subsequently to the year 1905, as the Commission is of opinion that any person then taking up land did so with a full knowledge of the risk he ran from the deposit of silt.

Contributory negligence.

The Commissioners are also of opinion that in most cases contributory negligence has been shown by the farmers in not providing their drains with proper flood-gates, in not cutting down the willows, and in not trying, by the erection of stop-banks, to limit the evils of the floods.

The Commissioners recommend that powers should be given to a Stipendiary Magistrate to assess the compensation to be awarded, and to determine what proportion shall be payable to the occupiers, and what to the owners or other interested persons.

Reference Clause 2.

Effect of tailings on navigation.

2. The second reference made to the Commission is to determine whether the navigation of the Rivers Ohinemuri and Waihou has been, or is likely to be, seriously impeded as a result of the Proclamation of the rivers as sludge-channels.

Your Commissioners are of opinion that the navigation of the Ohinemuri and part of the Lower Waihou Rivers has been seriously affected by the deposit of mining tailings in the rivers under the Proclamation.

Extent of navigation, 1895, Ohinemuri.

Prior to 1895 the River Ohinemuri was navigable up to the Town of Paeroa, and for small craft for some two miles above it, where there was then a rise and fall of tide of from 3 to 4 feet, and a depth sufficient to permit craft drawing up to 7 feet to come up on the top of the tide. This depth has now decreased, and this old navigation head has less than a foot of water, with a rise of tide of from 2 to 3 feet only.

Vessels to Paeroa.—Junction Wharf.—Te Puke Wharf.

Prior to the Proclamation, steamers such as the "Paeroa" and "Ohinemuri," drawing loaded from 7 feet 6 inches to 8 feet, used to trade to Paeroa and berth at the Wharf Street and other wharves. Subsequently, owing partly to the silting of the river and partly to the commercial necessity of getting up and down on the one tide, the steamers deserted the town wharves, and lay at a wharf in the Ohinemuri immediately above the Junction. About seven years ago the Junction Wharf was deserted, and the steamers of the Northern Steamship Company, "Waimarie" and "Taniwha," which are twin-screw vessels specially built for the trade, and drawing not more than 7 feet to 7 feet 9 inches loaded, now berth as a terminus at Te Puke Wharf, at a point some two miles by road, and about seven miles by river, below the Township of Paeroa.

Shoaling, Lower Waihou.

The master of one of these vessels is of opinion that the channel in the Lower Waihou up to Te Puke may have shoaled some 6 inches, whilst the master of the other does not see much change in the depth, though he states that the Lower Waihou shows more shoals after freshes, but that so far these have been swept away. Both masters and other witnesses testified to the pinching of the river by the deposition of tailings on the banks, and it is also clear from the evidence that, whilst the action of the twin screws of the steamers has so far, by churning up the bottom, enabled the navigation to be kept open without serious difficulty, the bottom is becoming harder, which your Commission attributes to the deposition of fine mining silts and slimes in the interstices of the natural coarser sands of the river bottom.

Shoaling, Junction to Te Puke.

Since the twin-screw steamers ceased, about the beginning of 1903, to use the Junction Wharf, that portion of the Lower Waihou between the Junction and Te Puke has both shoaled and narrowed materially, and is not now navigable by steamers of the class which used to readily navigate it.

Upper Waihou sands.—Artificial drainage, Gordon, Shaftesbury.—Navigation, Upper Waihou.

In addition to the mining silt, there has been a large factor affecting the navigation of both the Upper and Lower Waihou Rivers in the large volume of light sands discharged into the Upper Waihou above Te Aroha through the drainage and the settlement of the flat lands in the upper reaches of the river. Mr. J. E. Thomson, licensed surveyor, gave evidence that in the district lying between the Gordon Settlement and Te Aroha he estimated that a volume of sand exceeding a million cubic yards had been scoured out of artificially made drains into the Waihou, being a volume sufficient to fill the dry-weather bed of the river for a length of some seven miles. The Commission personally investigated this

matter, and visited Coleman's drain, near Shaftesbury, where an ordinary small drain had been eroded to such an extent that the roadway had to be carried across it by a bridge of three spans of 20 feet, and its bottom had sunk to a depth of some 20 feet below the original level of the country. This huge volume of sand has been swept into and down the Waihou River, which has in its upper reaches sufficient velocity to sweep it onward. There does not appear to be any evidence that there has been serious diminution in the depth for navigation purposes in the Upper Waihou until within a short distance of the Junction. Bathers describe the sandy bottom in the Upper Waihou as being alive, and always moving onwards.

Waihou sands sold in Auckland.—Hardening effect of tailings on bottom.

In the various samples taken from the bottom of the river, from above the Junction right down to its mouth, there is shown a large predominance of the volcanic sands. From banks deposited where the river has widened out at a point about one mile and a half below the Hikutaia Stream, there has been removed for more than thirty years, by means of scows and cutters, enormous volumes of this volcanic sand for sale, for building purposes, in the Auckland market. It therefore appears that the rivers have so far, assisted to a limited extent by man, been able to carry down and dispose of the sands from the Upper Waihou district without affecting navigation, but the addition of the finer sands and slimes from the mining-works to the coarser and lighter natural Waihou sands is, in the opinion of the Commission, having, and will have, an increasingly detrimental effect. The finer artificial sands are filling up the interstices in the coarser and loose-lying natural sands, causing them to compact, and rendering them more difficult to move under the action of the current.

Hardening of shoals, Thames Harbour.

The fishermen gave evidence of the increasing hardness of the bottom in the lower reaches, and in the Thames Harbour, on what is known as the bar. Captain Bayldon, the Harbourmaster, confirmed this increased hardening of the bed of the sea in the Thames Harbour, and pointed out that, whilst some years since vessels could be relied on to force their way through a depth of, say, 2 to 3 feet of soft silt on this bar, and that, if stranded on the bottom, vessels would sue and settle some 6 feet into the bottom at low water, that in recent times he cannot force vessels through the shallows, and that vessels now, when stranded, only settle to perhaps half the previous depth. The evidence, beyond the hardening effect, does not disclose any serious reduction during the past thirty or thirty-five years in the navigable depth in the channel through the Thames Harbour to the Waihou River, although there have been some changes in its direction.

Foreshore shoals, Thames.

There has been serious shoaling on the foreshore opposite the Township of the Thames; but this is entirely due to local causes, and, in our opinion, the changes there have not contributed to any reduction of depth or hardening of the bottom of the navigable channel used by vessels entering or leaving the Waihou or Thames Rivers.

Thames Harbour dredging probable.

Although there has been no serious change yet, still it is clear than an extension seawards of the shoals may be expected, caused by the detritus brought down by the rivers settling in the estuary, and probably it will not be many years distant before dredging must be resorted to in order to maintain the present depths in the Thames Harbour, and in the channel required for navigation both within and without the mouth of the Thames River.

River-dredging required.

The Commissioners are also satisfied that dredging is now, or will shortly be, required in the reaches of the river from the Te Puke Wharf down to Hikutaia, a distance of some ten miles. Throughout this distance tailings are showing freely on the banks, and to a slight extent in the bed, of the river. The

Commissioners satisfied themselves that slimy tailings were present in the sand-banks below Hikutaia, from which sand is removed for sale in Auckland. The evidence of the settlers who daily traverse the river, often at low tide, on their journeys in oil-launches with their milk to and from the Netherton Creamery, is conclusive that the river is reducing in width, that the deposits of tailing-sands cause them difficulty in approaching and lying at their jetties, and that there is in places some deposit on the bottom, with consequent loss of depth and of available section to discharge freshes.

Junction to Te Puke.

Above Te Puke Wharf, for a distance of some two miles, to the Junction, the River Waihou has materially narrowed, and is only used now by shallow-draught scows and punts towed by small steamers and oil-launches. The change of the terminus of the Auckland steamers from the Junction Wharf to Te Puke, some seven years ago, has had a detrimental effect upon the river, owing to the absence of the scouring action of the twin propellers upon the loose bottom. An attempt was made to divert the current of the Upper Waihou over to the eastern bank at the Junction by the construction of a groyne from an island that had formed about some sunken willows; but the result has not been successful, and, aided by the large quantities of tailings brought down the Ohinemuri, the sands have deposited, forming shallows for some half-mile below the Junction, and making a bank at a place where. at the mouth of the Hape Creek, the deep-water channel used to exist.

Junction.—Willows removal.

The mining tailings show largely on the Junction Island, and on the shoals, and to a very considerable extent upon the banks, which have made out in some places to an extent exceeding 30 feet, encroaching on the waterway of the river to that extent. Samples taken from the mid-channel show, however, that where there is the maximum run of water the bottom is composed of the natural Waihou sands, with but little addition of mining sands. This portion of the river at and below the Junction is also much burdened with the growth of willows. For some quarters of a mile on the eastern bank of the river, a little below the Junction, the Ohinemuri County Council, as a River Board, has cut down some of the willows with very beneficial results, affording an example of the advantage to be gained by trimming and removing the willow trees and branches.

Upper Waihou navigation.—Tidal effect, Junction – Upper Waihou.—Danger of diversion, Waihou to Piako.

The navigation of the Upper Waihou, from the Junction up to and above Te Aroha, is confined to small launches or tug-boats drawing light-draught barges. Apart from the serious encroachment on the navigable width by the willows here, there appears to have been little change, and any change that there may have been, except for a short distance above the Junction, cannot be attributable to the mining operations. The rise and fall of the tide at the Junction is about 3 feet, and the effect of the tide is now felt to some extent about five or six miles up the Upper Waihou. It is probable that the bed of the river has risen somewhat, raising the normal watel-level, and the retardation caused by the growth of willows is so serious that, unless some active steps are taken, there is a possibility that some day, in place of the flood-waters only as at present, a large portion of the river-waters may be diverted into the western swamps, and an alteration or diversion of its course might seriously affect the navigation of the Upper Waihou.

Reference Clause 3.

Remedial measures.

3. The third matter referred to the Commission was to ascertain what, if any, remedial measures can be adopted without injury to any other persons, corporations, or interests.

Sludge-channel restriction.—Willows removed, dredging, stop-banks, diversion.

We recommend that the use of the rivers as sludge-channels should be restricted in future as set out herein, and that the rivers be cleared from all growth of willows, be dredged, and stop-banks formed, with culverts and flood-gates where required, and that the course of the rivers be shortened by river-diversions.

Tree-planting.

Also, we recommend that the high-lying lands of the watersheds, where they have been denuded of trees for mining or other purposes, should be reafforested.

Disposal of tailings: Sundry schemes.

The question as to whether it would be possible to dispose in future of the mining tailings in some other method than by permitting them to be cast into the rivers has met with very serious consideration, and your Commissioners have reluctantly arrived at the conclusion that the adoption of any one or more of the schemes suggested would not be in the interests of the Dominion, as involving such an increased cost in the production of the gold as might, and probably would, react in the direction of preventing the mining of low-grade ores, which at present are capable of being worked at a small profit, but only in conjunction with ore of a higher grade.

Existing reduction-works.

The position, so far as the adoption of any scheme of disposal of tailings other than by the rivers, is somewhat complicated by the fact that the reduction-works are not concentrated in one district. There exists at present, and working, two at Waihi Township, one at Waikino, two at Karangahake in the valley of the Ohinemuri, and one upon the Komata Creek. There are also other batteries in the district which it is understood are not at present in operation.

The following are some of the many suggestions that have been made and inquired into by your Commission:—

Discharge of tailings to sea.

That the reduction-works at Waikino, being the largest of the works existing at present, should be removed to Waihi, or to some point overlooking the Pacific Ocean above the Waihi Beach, so that the tailings therefrom and from the Waihi works could be discharged outside the watershed, leaving the material from the works at Karangahake to be dealt with under a separate scheme. The tailings from the Komata Reefs Company's works must be dealt with quite separately in any case, being in a different watershed. As the works were placed at Waikino, rather than at Waihi, in order to obtain water-power and a sufficient supply of the water required for the operations, it would evidently be necessary to pump the water required in the reduction processes as well as to compensate for the loss of water-power. This idea has been dismissed because of its great expense.

Stacking tailings.—Pumping tailings.—Pipes: Open channels.—Railway carriage of tailings.—Cutting-nature of slimes.

That the tailings should either be stacked on lands adjacent to Waihi or on lands adjacent to Paeroa, or be turned into the sea on the Waihi Beach or the Tauranga side of the coastal range, being taken to one or other or all of these places by either pumping with water through closed pipes, by pumping or by other method of elevation to such heights that the water-carried sands would flow down by gravity, or by railway carriage. The slimes and fine tailings, although to the touch they feel smooth, were shown under the microscope to be composed of sharp particles of quartz, and ample evidence was adduced to show that the wear-and-tear caused by these cutting-edges made it practically impossible to adopt any system of pumping or conveyance economically for any distance through wooden, cast-iron, or steel pipes, or open channels. Apart from the practicability of water carriage, the working cost of these various schemes amounted to from 2s. to 3s. per ton of ore, which seemed to your Commissioners to be quite prohibitive.

The scheme of handling the tailings with as little moisture as possible, some 30 per cent., by discharge into railway-wagons and by haulage to Waihi Flats, or to the Waihi Beach, or to the Rotokohu Swamp, near Paeroa, was also considered, and the estimates varied from 2s. 6d. to 3s per ton according to the method adopted. The evidence given showed that, so far as it is known, there has been no case where slimes so finely ground as those which have to be dealt with in this district have been stacked; and the mining evidence all pointed to the proposition of stacking slimes on waste ground as being very difficult of practical attainment.

Settling-basin scheme.

Other schemes were suggested having for their object the formation of a series of settling-basins of large area in the valley of the river above Paeroa. These schemes do not commend themselves to your Commissioners, as, apart from expense, though the slimes might settle under normal conditions, there would be no certainty that in times of flood the accelerated velocity of the stream would not pick up the deposited slimes again, and carry them over the face of the country.

Stope-filling.

It was also suggested that the slimes might be returned to the mines and used for refilling the stopes from which the material originally came. This proposal does not commend itself to your Commissioners as being in any respect feasible.

Revoking Proclamation.

Your Commissioners therefore advise that the mining industry be permitted to still discharge the tailings into the River Ohinemuri under amended conditions, and that the Proclamation should be revoked and a fresh one issued containing the new conditions; but that such Proclamation should be issued under the authority of an Act of Parliament, so that no application for compensation can be made thereunder.

Restriction of use of watercourse to discharge of slimes.—Definition of "slimes."

It is advised that after a period of six months, which ought to be ample time in which the necessary additions to the plant can be made to the mills, it should be illegal for any gold-reduction works or other mining project to discharge into the River Ohinemuri any material that has not been ground in tube mills or other appliances approved by the Department of Mines to a fineness sufficient that 95 per cent. of the whole shall be capable of passing through an 80-mesh standard screen; that an 80-mesh standard screen should be defined as one having apertures with an inscribed diameter not greater than 0·0062 inch, or 0·0157 millimeter. The cost of any special inspection deemed necessary by the Mines Department ought to be borne by the mining companies in proportion to the tonnage milled.

Effect of slimes on rivers.

It is believed that when the rivers are freed from willow-growth and are brought by dredging, cleaning, and shortening, as recommended herein, to a condition of moderately good discharge, the fine slimes and tailings discharged from Waikino under the conditions of grinding recommended will at times of ordinary flow probably pass out to the sea in a period of about fifty hours. As under the new *régime* of the river there ought to be no slack spots where the slimes can be deposited, it follows that in flood times, even if the floods did top the stop-banks proposed, the flood-waters would contain so little slimes in proportion to their bulk that but slight harm would accrue to any flooded area. We base this proposal upon the evidence produced by the mining experts that water with a velocity of half a foot per second will carry forward slimes of this degree of fine grinding in suspension, and without deposit to any appreciable extent. This evidence is confirmed by the fact that although for the past three years the process of fine grinding has been increasing, and the greater proportion of the ore is thus milled at present, there is not existing in the bed or on the banks of the Ohinemuri and Lower Waihou Rivers any such very large masses of slimes as would have been present had the contention been false.

Deposit of mining *débris* to be restricted.

Under the Proclamation it is permitted to place mining *débris* or mullock taken out of the mines in the river. So far as the Waihi and the Komata Reefs Mines are concerned, no harm will be done by the cancellation of the permission to cast such material into the watercourse, as there is ample land obtainable in the neighbourhood of the mines on which to stack such material; but in the case of the mines situated in the Karangahake Gorge there is no land available for such stacking, and stacking would consequently involve an excessive expenditure.

The Commissioners therefore recommend that mining *débris* should only be permitted to be placed in positions from whence it might be carried into the River Ohinemuri under a special permit to be issued by the District Inspector of Mines, whose duty it would be, before issuing such a permit, to satisfy himself that the material cannot be otherwise economically disposed of.

Komata Creek: Defiance of Proclamation.

The Commission desires to draw attention to the fact that the Komata Creek has been used as a sludge-channel by the discharge into it of tailings and mining *débris*, notwithstanding that the Komata and Tarariki Creeks were specially exempted under the Proclamation of 1895. In this Proclamation the Komata Creek is described as a tributary of the Ohinemuri River, whereas it flows into the Lower Waihou, and it is understood that advantage has been taken of this erroneous description to avoid the exemption provided in the Proclamation. The Commission recommends that in the proposed new Proclamation the use of the Komata Creek as a sludge-channel should be restricted to the company now discharging its tailings therein, and that the same degree of fine grinding should be required as for tailings to be discharged into the Ohinemuri.

Repeal of Proclamation.

The Commissioners therefore recommend that the Proclamation making the Waihou and its tributaries, other than the Ohinemuri and Komata, a watercourse for the reception of mining *débris*, tailings, and slimes, should be repealed, except in so far as existing mines are now using them; that if any other mines in its watershed should desire to utilize the river or its tributaries, permission be specially given, after careful investigation and on special conditions, particularly as to fine grinding.

Stop-banks.—Flood-gates.

The Commission recommends that wherever the river-banks of the Lower and Upper Waihou as far as Te Aroha, and the river-banks of the Lower Ohinemuri and of all tributary creeks to those rivers, are at any point below a level of 4 feet above the level of the highest-known flood, then there should be made artificial stop-banks having a crest-level of not less than 4 feet above that of such highest-known flood. These stop-banks should be of approved design, not less than 6 feet wide on the top, placed with the land face on an average not less than 95 feet back from the river-banks as existing prior to the pinching of the widths due to the deposits of tailings. These stop-banks must be constructed with proper culverts, fitted with flood-gates of an approved design, so as to let all land-drains empty into the rivers except in times of flood. The stop-banks are to be formed of dredgings taken from the bed and banks of the adjacent channels, which channels will be thereby much improved.

Dredging.

It is recommended that suction dredges should be employed in making these stop-banks and in deepening the rivers, the land side of the banks being formed of manuka brushwork in such a manner as to protect the lands from damage during the construction. The banks must be fenced off on the landward side, so as to protect them from cattle. All cross fences on the river side should be removed, and all willows and other trees on the river side of the banks should be cut down and destroyed.

Land for stop-banks to be dedicated free of cost.

Your Commissioners are satisfied that the value of the lands so protected will be so much increased by these stop-banks, and by the construction of proper drain-outfalls, that it is quite reasonable Parliament should require that the lands taken should be dedicated to the River Board free of cost; and they recommend that such lands as may be required should be resumed without compensation for the value of the lands up to an average width of $1\frac{1}{2}$ chains, or for any damage or loss during the period of construction of the works, excepting only that in any case where the area resumed exceeds 5 per cent. of the whole holding it is suggested that any excess above 5 per cent. should be paid for at a fixed rate of, say, £10 per acre. In the legislation required to give effect to this recommendation, provision should be made releasing the lands taken by the Crown from any mortgage charges, and burdening the balance of the lands therewith.

Access over stop-banks.

Any buildings within the resumed area should be shifted free of cost to the owner, and provision made at each holding for suitable access to the river-bank for jetty purposes and for the watering of stock. The stop-banks, after completion, should be soiled with the surface soil previously removed from the site, and the area should be sown with grasses of a character to bind the river-sands together.

Native lands.

The Commissioners recommend that all Native lands immediately abutting on the rivers, and which will be benefited by the proposed works, should either be purchased prior to the erection of the works or be brought into line with lands owned by Europeans in the matters of taxation and contribution towards the cost and upkeep of the new works.

Extent of stop-banks, Ohinemuri.—Sand-deposit ground.

The Commissioners recommend that the stop-banks should be carried up the Ohinemuri on both sides as far as the Te-Tawa-a-Te-Kuao Stream, near the abattoirs, and that immediately below Mackaytown the low-lying lands of the Wairere, Te Rewarewa, and Otara Blocks should be purchased, the fences removed, and that they be held vacant so as to afford room for the river-waters debouching with high velocity out of the gorge to spread out in time of freshes, and by losing their velocity to enable them to deposit any heavy material they may have in suspension before the waters enter upon the more level and tortuous course of the lower reaches of the river.

Riverside roads.

In the Township of Paeroa and elsewhere, where there are roads on the present river-bank, the stop-banks would probably take a special form to suit the local requirements.

River Ohinemuri: Diversion at Pereniki's Bend.—Waihi-Paeroa Gold-extraction Company (Limited), River claims.

The Commissioners are strongly of opinion that the course of the Ohinemuri should be shortened by some three miles by the construction of a short cut or diversion from Pereniki's Bend to a point a short distance above the Junction; but counsel representing the Waihi-Paeroa Gold-extraction Company (Limited) claimed before the Commissioners that under the seven river claims issued to that company so recently as the 18th March last (1910), the company would have a claim for compensation to a very large extent if this cut were made. It appears to your Commissioners to be unfortunate that the mining law is such that the licenses held by this company could have been reissued so recently when it must have been realized that their issue might have some bearing on the recommendations of the Commission which then was about to be formed.

The Commissioners deem it strange that the law should, on the one hand, permit the agricultural value of river-bank lands to be depreciated by the deposit therein and adjacent thereto of mining tailings, and should, on the other hand,

take from the owner of such lands any chance of recouping himself, out of such accretions of area and of material, by the issue to other persons of a right to exploit the wealth contained in such deposits.

We understand that in one case a freeholder (Mr. W. Marsh), whose title extends to the centre of the river, disputes the validity of the special licenses.

Interpretation of licenses.

The Commissioners recommend that the legal position of the rights claimed by this company should, if possible, be cleared up, and the true meaning of the licenses be ascertained as to whether the company is entitled to remove the accumulations of tailings on the banks as well as in the bed of the river, and as to whether it would have any claim for damages, if the proposed cut was made, for loss of tailings or of water access to its freehold section. As the company claims that it has had granted to it, for a very small annual rent, and subject to the payment of duty on the gold saved, rights of enormous monetary value, it would not appear to be doing that company any material injustice if Parliament were to limit the time in which the concession may be worked, so that the benefits to be derived by making the Pereniki cut may not be indefinitely postponed.

Prompt removal of sands necessary.

The representatives of the company suggested that the work of removing the banks of tailings could be expedited by the erection of a larger grinding and extraction plant, and proposed that the Dominion should find the increased capital for the additional plant, receiving payment therefor by an annual first charge on the profits. As any such arrangement would be one for careful negotiation, the Commissioners are not prepared to make any recommendation thereon, further than to say that so far as is practicable it is essential, in their opinion, that the Ohinemuri should be cleared and enlarged and the short cut made as speedily as possible; and, moreover, to point out that if the large accumulations of coarse tailings existing above high-water level in that river, and which it is understood are claimed by the Gold-extraction Company, are found not to belong to that company, then they should be forthwith worked either by the Government or by arrangement with some extraction company, so as to provide funds for the works proposed herein, and for the purpose of enabling the river to be promptly cleared and the proposed diversion made.

Waihou diversion, Ngararahi, Te Koutou.

The Commissioners recommend that a cut be made from the Upper Waihou at Ngararahi in a north-easterly direction, across a narrow neck of land to the Lower Waihou at its bend at Opukeko, and thence across a second smaller neck at Te Koutou, to again join the main river just above the present Te Puke–Netherton Ferry.

These diversions will shorten the course of the Waihou some three miles, thereby improving the velocity in, and lowering the level of, the Upper Waihou, and obviating the necessity of any works in the river between Ngararahi and the Junction, as well as avoiding the removal of the island and groin at the Junction. The point at Ngararahi selected is one where the river has overflowed in all recent floods. The present course of the Lower Waihou below the present junction to the new junction will, after the diversion is made, be available to carry off the waters of the Ohinemuri alone. It will therefore have an additional length in which any coarse sands brought down in times of flood from the existing deposits can settle, with the result that the waters will reach the navigable waters of the river in a much clearer state than is at present the case.

Termination of Paeroa navigation below Te Puke.

These proposed diversions in the Waihou will necessitate that the steamers now trading to Te Puke should terminate their run at a new wharf to be built just below the site of the present Netherton Ferry, at an increased carting distance from Paeroa of half a mile. It is suggested that the bridge, which it is understood is about to be erected across the Waihou just below the Junction,

should be erected on the site of the present Te Puke – Netherton Ferry, and that on the western side of the new cut a road be made out of the material to be excavated from the cuts and forming the stop-bank for that portion of the river.

Upper Waihou stop-banks —Survey Waihou-Awaiti-Piako watershed.

The Commissioners are emphatic in their advice that from Ngararahi up to Mangaiti such stop-banks should be erected as may be necessary to effectually prevent the Upper Waihou from overflowing in times of freshes, and from joining its waters to those of the Piako watershed, and they advise that a careful hydrographic survey should be made by a competent engineer of the district lying between the Awaiti, Piako, and Waihou Rivers, with a view to determining what works, if any, are necessary, in addition to those recommended by this Commission, to prevent any risk of either river breaking through to the other. The Commissioners believe that this study should be made not only as regards the existing levels, but with regard to the probable lowering of the ground-surfaces owing to the gradual drainage and settlement of the lands, and with regard to the artificial works being carried out by the Lands Department in the Piako district.

Suction dredge, plant, and appliances.

For the purpose of the construction of the Ngararahi-Opukeko cuts, and the erection of stop-banks, and for the dredging of the beds of the rivers, the Commissioners recommend that there should be purchased two suction dredges, each capable of lifting 500 tons of sand per hour, and of delivering the material dredged to an elevation of 20 feet above low water, and to a distance of 2,000 feet, and provided with all necessary punts, barges, and appliances for the proper discharge and distribution of the dredgings on the stop-banks. A small steam-tug would be required, with oil-launches; also a barge provided with powerful steam-winches and log-hauling gear for use in snagging the river and in removing the trunks and branches of the willows.

Scour of light sands, Upper Waihou.—Logs.

Specific powers should be given to the River Board to prevent, by the erection of flood-gates and protective works, all undue scour from the flat pumiceous lands in the Upper Waihou, and to make a charge of the cost of same against the lands drained; and also to recover from the owners of logs the cost of removing them from the bed of the river.

Ring-barking willows.

The Commission recommends that the willows on the river-banks be ring-barked and treated so as to be killed; that all the branches and twigs be thoroughly removed and disposed of; that, at any rate, for the first few years, the stumps of the willow-trees be left in the soil, so as to assist in retaining the banks and to prevent denudation; and that all roots, stumps, branches, and twigs of willows be thoroughly removed from the bed of all the rivers and tributaries.

Reference Clause 4.

Finance of recommendations.

4. The fourth reference made to the Commission is to determine what proportion of the cost of carrying out its recommendations should be a charge against the revenue derived by the local bodies from the mines interested in the use of the watercourses.

Half-cost to be borne by gold duty.

The Commissioners are of opinion that one-half of the annual cost of carrying out its recommendations, including interest and sinking fund on the loan-moneys employed and for maintenance, should be a charge upon the gold duty of the district.

Thames Harbour District.

The Thames Harbour Board have control of, and charge dues upon, vessels using, and on goods landed in, that portion of the Lower Waihou known locally as the "Thames River," lying within its jurisdiction, which jurisdiction extends up the river for a distance of about five miles and a half, or to a point about three-quarters of a mile above Turua (Bagnall's Wharf); but, so far as is known, the Harbour Board have not taken any steps to either protect the adjacent lands from flooding or to improve the navigable channel by dredging.

Stop-banks in Thames Harbour District.

The Matatoki Branch of the New Zealand Farmers' Union, as representing the settlers on the east bank of the river, sought that the Commission should consider the flooding of their lands from the river, and from two creeks and drains discharging into it. The Commissioners were unable to personally visit this land, but are of opinion that the stop-banks ought to be made as far down as the mouth of the river, where the flood-levels show that they are required, and that they should be constructed at the same time as the other banks, and be under the supervision of the River Board proposed hereunder, notwithstanding that the portion of the river adjacent thereto is under the supervision of the Thames Harbour Board, and notwithstanding the restriction in section 73 (2) of the River Boards Act, 1908.

Thames County District.

From the southern boundary of the Thames Harbour there is a portion of the river, some five miles and a half long, up to a point about one mile below the mouth of the Hikutaia Creek, which lies in the district of the Thames County Council. That body does not appear to have brought into operation the provisions of the River Boards Act, and this stretch of the river seems at present not to be under the special jurisdiction of any local body.

Ohinemuri River Board.—Dissolution of existing River Board.

From this point, near the mouth of the Hikutaia Stream, the rivers lie within the boundaries of the Ohinemuri County Council as far up as the southern boundary of the county, about one mile north of Te Aroha. In August, 1887 (*vide Gazette* No. 49, 28th July, 1887, page 1006), the Ohinemuri County Council became a River Board, with boundaries coterminous with the county. It has been stated that the River Board was formed solely for the purpose of preventing any extension of the jurisdiction of the Thames Harbour Board into their county. That object having been attained, the county, as a River Board, have apparently been most lax in carrying out their duties, have not struck any rate, have not called upon the occupiers to clear out the willows as they had powers to do under section 77 (1) of the River Boards Act, and in fact have been a River Board only in name—so much so that the Commissioners are unable to recommend that the carrying-out or upkeep of the new works proposed should be intrusted to this body as at present constituted, and therefore recommend that the present River Board should be dissolved:

Piako County Council.

The Upper Waihou, from the southern boundary of the Ohinemuri County to its source above Lichfield, is within the district of the Piako County Council, who have not, so far as is known, formed themselves into a River Board, or taken any serious steps as a Council to prevent the eroded matter from the artificial drains from blocking up the river-bed.

Execution of works by Public Works Department.

The Commissioners are satisfied that there is at present no capable body existing in the district to whom could be safely intrusted the duty of carrying out promptly, and in a proper and intelligent manner, the works of dredging, of forming river-diversions, of erecting stop-banks with their culverts and flood-gates, of cutting down and removing of willows, and generally of enforcing their recommendations. The Commissioners therefore recommend that the works should be carried out as speedily as possible by the Public Works Department.

Proposed new River Board.—Cost of works a debt owing by Board.

On completion the works should be handed over to a new local body specially constituted for the purpose of the maintenance of the completed works, or of the execution of any additional works which time may show to be necessary. It is proposed that the new local body, which should have all the powers of a River Board as well as any special powers that may be deemed advisable to grant to it, should be charged with the whole cost of the works executed for them by the Government, who, it is presumed, will find the necessary capital under favourable terms as to interest and repayment of loan.

Jurisdiction of Board.

The Commission recommends that the jurisdiction of the new River Board should be coterminous with the watersheds of the Waihou and Ohinemuri Rivers and their tributaries, and that they should have rating-powers as a River Board over the whole district, including the boroughs and townships therein.

In the Thames Harbour District, though the River Board would have the maintenance of the stop-banks, the duties of dredging the river to maintain navigation ought to remain with the Harbour Board.

Tolls on vessels and goods.

The River Board should have granted to it the right to levy tolls on vessels using the waters under its jurisdiction, and on goods passing over wharves built or maintained by it.

Constitution of Board.

The Commission recommends that the new Board should consist of eleven members, and be constituted as follows :—

Two members to be nominated by the Ohinemuri County Council.
One member to be nominated by the Thames County Council.
One member to be nominated by the Piako County Council.
Two members to be nominated by the mining companies.
Three members to be nominated by the Government.
Two members to be elected by the ratepayers of the new river district.

The Commissioners are of opinion that the Government nominees should be non-political appointments, and advise that officials having local knowledge should be selected, such as the Warden, the Inspector of Mines, and the District Engineer of the Public Works Department. It may be considered advisable, after the completion of the works, to reduce the Government nominees to two, replacing the third member by one to be elected by the ratepayers of the drainage district. It is suggested that only the mining companies contributing to the special rate upon them should be voters, and that they should select their representatives by voting in proportion to the amount of gold duty paid by each company in the previous year upon gold won in the district.

Revenue of Board: Gold duty three-sixths; mines one-sixth; rating one-sixth; Government one-sixth.

The Commission recommends that three-sixths of the annual revenue required to be found by the new River Board should be deducted from the gold duty; that one-sixth should be contributed by those mines and extraction companies which discharge their tailings into the rivers or watercourses, and that the allocation of this special rate should be directly proportional to the tonnage of tailings so discharged; that one-sixth should be derived from rates to be levied in the new river district upon all lands, Native or European, excepting Crown lands, and to be leviable in varying proportions dependent on the direct or indirect benefits to be obtained, as is provided for under the River Boards Act; that one-sixth should be contributed by the Dominion out of a special allocation to be authorized by Parliament, in order to provide a contribution in respect to the Crown lands which, whilst benefiting under the proposals, could not otherwise be rated.

Waihi Borough and gold duty.

The Commissioners find that since the Waihi Borough was formed in 1902 it has received up till the 31st March last from the gold duty and goldfields revenue the large sum of £122,151; that for the year ended the 31st March, 1909, there was received from gold duty £20,775, from other sources of goldfields revenue £1,553, or, together, £22,328; also that for the corresponding period ending the 31st March, 1910, the similar receipts were £22,153, and that, in addition to these large sums, there were subsidies received from the Government in 1908–9 amounting to some £395.

No doubt, in a mining town suddenly coming into existence, with a large population, it is very advantageous that the gold duty should be available for the purpose of providing for the facilities and for the decencies of life, which could not otherwise be provided for out of current rating-powers; but your Commission respectfully points out that it probably was never intended by Parliament, when passing the Gold Duty Act, that this source of income should render the inhabitants of a mining township more immune from taxation by municipal rates than the citizens of other townships throughout the Dominion.

The Commissioners are satisfied that the existence of the annual income from the gold duty and goldfields revenue has led to municipal extravagance, and that the taxation by rates is far less than in other New Zealand towns of a similar size. In 1908–9 the total rates collected from a population estimated as about 5,850 was only some £830 (which included £176 Government subsidy on the rates), being about 2s. 10d. per head of population per annum, or 11s. 9d. per ratepayer. This contribution per head per annum may be compared with the revenue derived from taxation in the following towns of somewhat similar size. The information is deduced from the statistical tables issued by the Government relating to local governing bodies for 1908 (*vide* pages 713 to 718).

Name of Borough.	Population.	Number of Ratepayers.	Revenue received from Rates.	Amount of Rates per Head of Population.	Amount of Rates per Ratepayer.
			£	£ s. d.	£ s. d.
Waihi	5,850	1,410	830	0 2 10	0 11 9
Lyttelton	4,150	635	2,195	0 10 7	3 9 1
Mount Eden	8,700	2,409	5,855	0 13 6	2 8 8
Hokitika	2,100	625	1,562	0 14 10	2 10 0
Thames	3,750	920	2,919	0 15 7	3 3 5
Grey Lynn	7,000	1,356	5,996	0 17 2	4 8 5
Blenheim	3,351	751	3,235	0 19 3	4 6 3
Hamilton	2,600	550	2,749	1 1 2	5 0 0
Westport	4,000	1,200	4,943	1 4 8	4 2 4
Petone	7,200	1,026	8,902	1 4 9	8 13 7
Parnell	5,600	674	6,974	1 4 10	10 6 11
Oamaru	6,000	1,250	7,477	1 4 11	5 19 7
Devonport	6,300	1,103	8,565	1 7 2	7 15 3
New Plymouth	5,200	800	9,491	1 16 6	11 17 4
Gisborne	7,000	1,209	13,560	1 18 9	11 6 0
Timaru	7,600	1,450	15,789	2 1 6	10 17 9

Waihi rentals and overdraft.

It is also understood that the rentals charged for building-sections under the goldfields laws are also much smaller than is the case in other parts of the Dominion. Notwithstanding the favourable conditions produced by such large annual receipts from the gold duty, &c., the officers of the municipality admitted liabilities in the way of loans and by way of an overdraft of some £36,000 at the 31st March last, and urged that immediate extensions of municipal requirements would involve a further capital expenditure of some £91,500. It is, no doubt, a very laudable desire that the Borough of Waihi should be a model township, equipped with every convenience and even luxury that will conduce to the happiness of the inhabitants, but the Commissioners are of opinion that the time has now been reached when the borough should cease to be spoon-fed to

the extent that it has been in the past, and that the inhabitants should be willing to be rated to an extent more commensurate with the rating existing in other boroughs. Whilst it may be right that in districts where gold-prospecting is being carried out, and the returns are small and uncertain, the gold duty should be handed over to the local body, it does not appear as reasonable that where the industry, as at Waihi, has settled down to a period of great and continued prosperity, the local body should derive so great benefits.

Gold duty to provide one-half income.

The Commissioners have therefore no hesitation in recommending that the gold duty and goldfields revenue should contribute one-half of the annual income required to carry out their proposals.

Paeroa–Waihi Road maintenance.

It has also been brought under the notice of the Commissioners that the Waihi Borough contributes too small an annual sum to the Ohinemuri County for the upkeep of the main road from Paeroa to Waihi. As this road is used above the Owharoa Bridge almost entirely by the mining traffic to and from Waihi and Waikino, which latter township is an offshoot from and is entirely dependent on Waihi, and as there is practically no agricultural or other interests concerned in this portion of the road, the Commissioners recommend that the Waihi Borough should pay for the whole cost of the upkeep of the road from the Owharoa Bridge to the borough boundary.

Ohinemuri County and gold duty.—Small rateable area.

The position of the Ohinemuri County Council, the only other recipient of gold duty and goldfields revenue in the Ohinemuri district, is a very different one from that of the Waihi Borough. Out of 306,000 acres in the county, the area on which rates can be collected is only about 34,000 acres, or one-ninth. All lands to the eastward of the river, except the Township of Paeroa and some freehold land along the river front, is in the goldfields area, and, as such, is exempt from rating. There are large areas of Crown lands as yet unoccupied, and therefore not paying rates; and, whilst the large area of Native lands can theoretically be rated, there is no power in practice to collect such rates. This county, only having power to rate one-ninth of its area, has within its boundaries the Township of Paeroa and the mining Villages of Mackaytown, Karangahake, Waikino, Waitekauri, and Komata; and it has to form and maintain great lengths of roads, both main and branch, to these villages, and to other mines. Owing to the bulk of the gold duty having been earned in the Borough of Waihi, the county has thereby suffered by not receiving that portion which would have been its share had the Town of Waihi not been severed from the county. From 1903 to 1909, inclusive, the Ohinemuri County only received £56,674 from gold duty and goldfields revenue for expenditure in its widely spread district and on behalf of its widespread population of 5,895; whilst the Borough of Waihi with its population of 5,850, received for the same time £122,151. That the Ohinemuri County was unable to carry out its functions on this income is shown by the fact that in the past eight years, ending March, 1910, they have received Government grants in aid to the extent of £23,944.

Revision of distribution of gold duty.

It appears to your Commissioners that it would be well if in future the provisions of section 13 of the Gold Duty Act could be brought into operation, which section permits one-half of the gold duty to be distributed to local bodies other than those in whose district it is produced, in such a manner as to put the Ohinemuri County Council on a more satisfactory financial footing.

Native lands: Rates should be collected.

The Commissioners are of opinion that those lands owned and occupied by Maoris existing within the district that will be benefited by the proposed works should contribute equally with the lands occupied by Europeans, and be rateable

to the same extent. They recommend, if these Native lands are not purchased by the Crown, that in any legislation giving effect to the recommendations of the Commission there should be provision made that any rates levied shall be capable of being collected as if from a European, and not only after reference to the Native Minister. It is also recommended that similar powers of resumption of riverine lands for the construction of stop-banks and other works should be enforceable against Native lands without compensation, as is proposed for European lands.

Estimates, £150,000.—Annual expenditure.

Whilst the Commissioners have not been enabled to make estimates in great detail, they have satisfied themselves that the works they recommend, including payment of the compassionate allowances for damage by floods, and including the plant necessary to execute the works, can be carried out probably for £130,000. But, in order that there may be sufficient funds, they recommend that provision should be made for a Government loan to the new Board of the sum of £150,000, which it is presumed can be provided at a rate of 4½ per cent to cover interest and the extinction of the loan, or an annual charge during the existence of the loan of £6,750

For annual upkeep of the works after completion, for dredging where and when it is required, with office, engineering, and management expenses, including cost of collection of rates, and of elections, the Commission think a liberal allowance would be 3,250

Or a total annual expenditure to be provided of £10,000

In the proportions recommended by the Commission the gold duty would bear one-half, or a maximum of £5,000
the mining interests would bear one-sixth, or a maximum of ... 1,667
the Consolidated Fund would bear one-sixth, or a maximum of ... 1,667
rates from the new district would bear one-sixth, or a maximum of ... 1,667

£10,000

Charge per ton of ore on mines.

Upon the present output of about 550,000 tons of ore treated per annum, the proposed charge amounts to less than ¾d. per ton—a tax which cannot affect the working of any low-grade ore, and an amount which it is believed the mining industry can well afford to contribute towards a solution of the difficulty.

Rating on lands.

The rates on the new district would probably be divided into three classes under the scheme laid down in the River Boards Act, and be assessed at different rates upon the three classes of land interested—*i.e.*, upon those lands directly benefited by the works; upon those lands benefited, but not to so great an extent; and upon those lands deriving no direct benefit from the works, but which, being within the drainage area, contribute to the flooding by letting down the waters more rapidly than would have been the case in a state of nature.

Drainage Board.

The Commissioners recommend that, in the special legislation which they presume will be needed to give effect to their recommendation, the new Board should be constituted not only a River but a Drainage Board, and that the beneficial and operative clauses of the Land Drainage Act be embodied.

As much of the lands on the western side of the Waihou River are at levels that require systematic draining if they are to be made fit for settlement and are to be brought into satisfactory cultivation, and as such drainage must be largely to the Waihou River, it appears to your Commissioners that, in order to prevent overlapping of or interference of duties, the matter of arterial drainage should be intrusted to the new local body, and be carried out as a part

of the scheme of river improvement and upkeep. Provision would have to be made for the assessment of a special charge to cover the cost of works of drainage or outfall done to benefit special lands.

5. The fifth reference made to the Commission was that it should generally report its opinion on all matters arising out of or touching upon the inquiry. As in the preceding portion of the report the Commissioners have touched upon various collateral matters in addition to those referred to them under each heading, they have little to add thereto.

Reference Clause 5.

Fishing industry.

It may, however, be a convenient place in which to express the opinion of the Commissioners that the fishing industry at the Thames, as relating to the Hauraki Gulf, has not been seriously affected by the discharge of tailings into the river. The fishing industry is one which is everywhere subject to considerable variations from natural causes, and to fluctuations sometimes arising from the depletion of the fishing-banks by excessive working. The Commissioners regret that there should be a risk of further damage to the Thames fishing industry by the carrying-down of fine slimes into the Hauraki Gulf, but are satisfied that this cannot be avoided, and that the local fishing industry must, if trouble arises, give way to the general benefit to the Dominion caused by the continuance of the mines. They are of opinion that any further change in the fishing-fields will be very gradual, and that the fishermen will in a similar gradual manner adapt themselves to the new conditions, and they also think it probable that, with the improvements now being carried out and proposed in the Paiko River, the fish may change to that stream from the mouth of the unquestionably polluted Thames River.

The Commissioners therefore recommend that there should be no compensation provided now or in the future to the Thames fishermen.

Tree-replanting.

The Commissioners noticed in many cases that the removal of the bush from the hillsides had been followed by serious slips of the soil. The effect of these slips must be that large quantities of soil will find their way to the streams, and that the escarpment so caused will be of no value for carrying grass. The Commission recommends that on all hillsides where there has been, or is, an indication of slippage the lands should be replanted with suitable trees. It is understood that some 6,000 acres of bush lands have been cut out in the Waihi and Waitekauri district for mining purposes, and that such land is of but small use for grazing purposes. The Commission urges that in such cases it should be compulsory on the mines benefiting by the use of the timber to reafforest the lands. It cannot be too strongly urged that the maintenance of bush on hillsides, by holding back the rain-waters and permitting them to flow off slowly, tends to reduce the magnitude and violence of floods, and that the vegetation, whilst itself absorbing rain that would otherwise flow off, also prevents the removal of the soil into the streams.

Summary.

Summary.

The Commission respectfully summarizes its recommendations as to what should, in its opinion, be done to deal with the evils that it was set up to investigate, as follows:—

(a.) As to Affected Lands.—That a survey be promptly made of the lands affected by recent flooding; that, as the results of such survey, a Stipendiary Magistrate be authorized to fix the amounts of compassionate allowances to be awarded for total or partial loss of land, and of stock and income therefrom.

(b.) As to the Use of the Rivers as a Sludge-channel.—That the 1895 Proclamation be revoked six months hence; that a new Proclamation should be issued permitting slimes to be placed in the Ohinemuri River, and, from existing

mines only, in the Waihou River and Komata Creek; that no mining *débris* be placed in the Ohinemuri River, except under special permit, from the mines at Karangahake; that fine grinding to slimes be enforced in all cases, and that fine grinding be defined as 95 per cent. of the crushing to pass through a standard 80-mesh screen.

(c.) As to the Utilization of the Wealth contained in the Coarse-sand Tailings claimed under River-dredging Licenses by the Waihi-Paeroa Gold-extraction Company (Limited).—That the legal position should be determined, and, if possible, that the gold contained therein should be made available for payment for the proposed works.

(d.) As to Works of Prevention.—That the Public Works Department be employed to make stop-banks, with flood-gates, &c., along each river-bank where required, on lands to be taken without compensation; that the Public Works Department obtain plant for and carry out the dredging in the rivers, removal of the willows, the making of the river-diversion in the Waihou at Ngararahi-Opukeko–Te Koutou; and, so soon as it can be legally done, in the Ohinemuri from Pereniki's Bend to the Junction; that a new wharf be constructed on the site of the present Te Puke – Netherton Ferry.

(e.) As to the Blending of the Waters of the Waihou and Te Awaiti-Piako Rivers.—That a survey be made and steps taken to divide the watershed in accordance with the information thus obtained.

(f.) As to Native Lands.—That any lands affected by the proposed works should either be purchased or be made subject to European conditions, and that any rating for river purposes be enforceable against Native lands.

(g.) As to River Board.—That the existing Ohinemuri River Board be abolished; that a new Board be constituted, having special representation and jurisdiction over the whole watershed area, except within the Thames Harbour Board limit, to collect funds to pay interest on the cost of construction of the works proposed, and on their completion to undertake the duty of their upkeep and extension; that the Board be given, in addition to usual River Board powers, special powers to deal with sludge-channel interests and as a Drainage Board, and to deal with the influx of light sands from drains, with power to impose tolls on vessels using the navigation and goods using the wharves, except within the Thames Harbour Board limit.

(h.) As to Finance.—That the funds required—say, £130,000 to £150,000—be advanced by the State to the River Board, and that the revenue of the Board, to provide interest on and to repay same, and to carry out its functions, be derived from gold duty, from a tonnage rate on the discharge of mining *débris* and residues into the rivers, from a contribution from the Consolidated Fund, from rating-powers over the River Board and drainage district, including Native, but excluding Crown lands, and from sundry tolls, &c.

(i.) As to Gold Duty.—That an equitable distribution of the gold duty be made between the Waihi Borough and the Ohinemuri County, and that the cost of the upkeep of more of the Main Road be thrown upon the borough.

(j.) As to the Fishing Industry.—That it has suffered no substantial harm entitling it to special consideration.

(k.) As to Hill Bush Lands.—That it is important that works of reafforesting be undertaken.

(*l.*) The Commissioners advise that in so far as their recommendations cannot be now legally carried into effect there should be special legislation.

And this our report, which has been unanimously adopted, we have the honour to respectfully submit for the consideration of Your Excellency, in obedience to the Commission addressed to us.

Given under our hands and seals, this eighth day of July, nineteen hundred and ten.

WILLIAM FERGUSON. (L.S.)
EDWIN MITCHELSON. (L.S.)
F. R. FLATMAN. (L.S.)
CHAS. R. VICKERMAN. (L.S.)



JANUARY, 1907. VIEW TAKEN DURING FLOOD.

Left bank of Upper Waihou, about two miles from junction, at place called Komati Waihou West No. 3 Block, Block XII, Waihou Survey District, showing where river broke over bank and flowed towards Netherton.



JUNE, 1907. PHOTO OF SUCK-IN BAY (KOPU).

Where figure standing boats could go up. It was in Suck-in Bay the "Luna" turned round after backing down from Puke to Wainui.



JUNE, 1907. VIEW FROM MARSH'S PADDOCK, A LITTLE BELOW CATTLE-CROSSING AND LOOKING UP-STREAM.



JUNE, 1907. VIEW FROM ABOVE RAILWAY-LINE BELOW MOANANUI'S HILL, SHOWING SILT ON BOTH BANKS OF RIVER LOOKING TOWARD TRIG. STATION 62.



JUNE, 1907. VIEW OF SILT-BANK, PERENIKI BEND.
Settlers used to tie up their boats at willow where figure standing, in about 6 ft. of water.



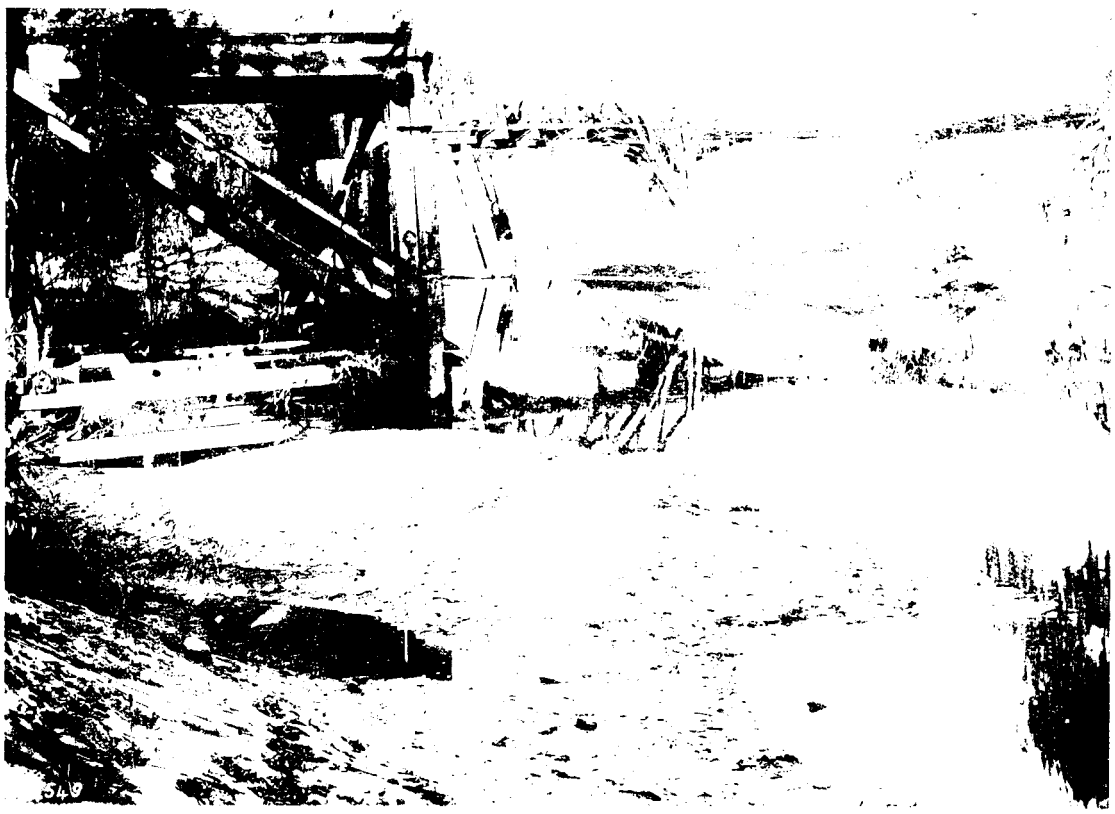
JUNE, 1907. WAIBERE PADDOCKS (MARSH'S), DESTROYED BY SILT.
View looking up stream. River to be just seen through the willows on left of picture.



Steamers "Nanaimo" and "Patrick" and Launch "Mayook" taking on Railway Wheels



Railway Wheels and Part of Railway Bridge
Taken from Steamer "Nanaimo" at Railway Wharf



JUNE, 1907. VIEW OF RAILWAY WHERE AND SILT BANKS TAKEN LOOKING UP STREAM.
Compare with photographs on previous page as to level of stream.



JUNE, 1907. VIEW OF SILT DEPOSIT ON BARRETT'S PADDOCK.
River at willows, looking towards Mr. Cock's house.



JUNE, 1907.—VIEW OF SILT BANK ORINEMERE RIVER, LOOKING DOWN STREAM, BETWEEN VINCENT'S HOUSE AND BARGETT'S PADDOCK.



ABOUT AUGUST, 1907.—SHOWING SILT DEPOSIT, OPITA, ON RIGHT BANK UPPER WAIHOU, MOANA KAPITI BLOCK.



August, 1907.—Taken on Left Bank Ohinemuri, opposite Snodgrass's Wharf.



August, 1907.—Showing Silt on freshly ploughed Land at Puke te Waiuri.



August, 1907. Silt on Right Bank Ohinemuri River, opposite Paeroa Dairy Factory.

OHINEMURI AND WAIHOU RIVERS SILTING COMMISSION.

Plan of Portion of Ohinemuri and Waihou Rivers SHOWING Areas affected by Floods.

Index to Owners of Lands affected who gave Evidence.

1. G. Buchanan.
2. F. Cock.
3. W. Marsh.
4. A. Wight.
5. A. J. Thorpe.
6. Jakob Bertelson.
7. James McKee.
8. J. W. Thorpe.
9. S. J. Laughlin.
10. W. Moore.
11. T. M. Robinson.
12. Mary Tetley.
13. R. W. Bagnall.
14. T. N. Kenny.
15. S. Fisher.
16. J. Morrison, Senr.
17. Hugh Gillard.
18. Ralph Stock.
19. James Thomas.
20. M. Morrison.
21. C. J. Vedder.
22. Tukukino Hunia.
23. F. Adamson.
24. A. K. Alexander.
25. Asher Cassrells.
26. Haora Tareranui.
27. Paora Talunga.

Note: The numbers on plan corresponding to above are shown within circles, thus —(12)

SCALE OF CHAINS
80 40 0 80 160

C. W. Pinhard Dirx

By Authority: John Mackay, Government Printer



OHINEMURI and WAIHOU RIVERS SILTING COMMISSION.

PLAN OF WATERSHED AREAS.

By Authority: John Mackay, Government Printer.

OHINEMURI AND WAIHOU RIVERS SILTING COMMISSION.

Plan of Portion of

Ohinemuri and Waihou Rivers

SHOWING

Areas affected by Floods.

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Note: The numbers on plan corresponding to above are shown within circles, thus:- (12)

BLOCK VII. WAIHOU S.D.

BLOCK VIII. WAIHOU S.D.

BLK XI. WAIHOU S.D.

BLOCK XII WAIHOU S.D.

Hikutaia Stream

Ohinemuri R. (Thames)

Waihou River

Kaimanawa Road

Komata North Road

Te Iringa o Pirori . North.

Te Iringa o Pirori . South.

Rangiora Ferry Road

Netherton Road

Thames - Rotorua Railway

Waimarie Bend

Netherton Ferry

Light Dues

Puke Wharf

Heavy Opukeko Deposit

Drain Reserve

Komata Station

Native Settlement

Te Komata Stm

Te Tzwa Stm

Awaiti Stream

Kahikatea Forest.

Flax, Raupo, & Ti-tree

Netherton Creamery

School

Whaka Muri No 1.

Whakamuri No 2.

Mangonui

Turiponi

Mangonui No 1

Uira Karapa

Tinikauere

Omania

Te Kari Block (11)

Te Warerau (18)

Te Manuka Te Tauranga (13)

Kahikaputa (13)

Grant to L. A. McCaskill

Te Arawhakapekapeka

Kaikahu No 4. (13)

Kopuapotu

Tamahore

Tahanui

Temutu

Tawhinga

Te Kapara

Te Rangiora

W. Moore

Akurenga

G. Vowles

Raumanga

Whakahoro

Te Koronae North No 2.

Te Komata North No 3

Te Komata North No 1A No 5

Te Komata North No 1A No 1

Te Komata North No 1B No 1

Te Komata North No 1B No 2

Te Komata North No 1B No 3

Te Komata North No 1B No 4

Te Komata North No 1B No 7

Ahipukahu

J. Thompson

Waihou West No 1B

W. J. Mc Kee

Te Puke

Grant to W. Thorpe

Te Houtou No 1

Te Houtou No 2

Te Houtou No 3

Te Houtou No 4

Te Houtou No 5

Te Houtou No 6

Te Houtou No 7

Te Houtou No 8

Parahamuti

Parahamuti No 1

Parahamuti No 2

Konamu

Ororako

Rau o te Huia

Rau o te Huia No 2

Ngararahi

Ngararahi No 1

Ngararahi No 2

Waihou No 1

Waihou No 2

Te Ao te Kohai

Tuhuaa Puoa

Poko Poho

Opatito

Hararahi No 1

Taiwhakarewakauri

Awaiti No 1

Awaiti No 2

Awaiti No 3

Ngahina Pouri

Tourunanga

Hubbard Bros

Te Puke

Komata South

Scale of Chains.

80 40 0 80 160

C. McKerrard. Dirx

1300.-8/10/346.

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MINUTES OF EVIDENCE.

PAEROA, MONDAY, 23RD MAY, 1910.

THE Commission met at 10 a.m.

Mr. T. Cotter and Mr. T. A. Moresby appeared for the Ohinemuri County Council, Mr. R. McVeagh and Mr. E. Clendon for the Waihi Borough Council, Mr. C. J. Tunks for the mining companies, Mr. A. Hanna for the Waihi-Paeroa Gold-extraction Company (Limited), and Mr. F. H. Mueller for the Ohinemuri River Silting Association.

The Chairman: There was evidence given before the Goldfields and Mines Committee in 1907, I.-4A, which clears away a good deal of the ground, I take it. I presume that some of the witnesses who gave evidence then will be here to give evidence again. I suggest that the matter might be simplified possibly by their stating that, so far as the evidence as given by them is concerned, they approve of it, and they can state what changes have taken place since then. Some of the exhibits then put in evidence by them have unfortunately been destroyed by the fire that occurred at the Parliamentary Buildings. It appears to me that the best method of procedure will be for those representing the farming industry to show what extent of damage has been done to their properties. We will take their evidence first.

Mr. Mueller: In opening the case for the farming community, I wish shortly to state that the holding of this Commission is one of the most important events, if not the most important, which has occurred in this district for a very considerable time. The result of the inquiry, no matter what that result may be, will undoubtedly have a very great effect upon the welfare and prosperity of almost the whole of the individuals in this district. There is no doubt that during the whole of this inquiry a great deal of what might be called ancient history will be placed before the Commission. Therefore I would ask the Commission to bear with me for a moment in referring to what has led up to the present position, and to the agitation which has resulted in the holding of this inquiry. The Ohinemuri goldfield was opened in 1875. In 1895 the Proclamation was issued declaring the river to be a sludge-channel. Up to that time the amount of mining in the district was very small comparatively, and it was not until some years after that any result was seen as to the effect of this silting. It was in 1900 or 1901 that it was first noticeable to have any serious effect. It was then drawn attention to, and a report was obtained from Mr. Perham, which no doubt the Commission has seen, or will see. Up to the year 1901, from the information that I have been able to gather, roughly there would be about half a million tons put into the river. Up to the present time I think it will be found that over four million tons have been put into the river. This quantity of stuff has been increasing in a very large ratio. The Silting Association was formed some years ago for the purpose of seeing if they could not have remedied what they looked upon as a very serious evil to the farming and agricultural interests of the district. In 1907 a petition was presented to Parliament, and evidence was heard before the Mines Committee as to both sides, and that petition was favourably reported upon. The petition practically sets out the stand which the association takes at the present time, and which it has taken up, in connection with this matter. The petition states,—

"To the Honourable the Speaker and Members of the House of Representatives in Parliament assembled.

"The humble petition of the undersigned members of the Ohinemuri River Silting Association humbly showeth,—

"1. That your petitioners are the members of the Ohinemuri River Silting Association, and were duly appointed at a public meeting convened for that purpose.

"2. That on the 4th day of April, 1895, the Ohinemuri and Waihou Rivers flowing through the Thames Valley were proclaimed sludge-channels for the deposit of mining *débris*.

"3. That since the date of the said Proclamation the introduction of the cyanide process in the treatment of ore has led to a silting-up of the rivers, thereby destroying a valuable navigable waterway, and creating great and lasting damage and injury to large areas of valuable land by the deposit of silt and the obstruction of natural drainage, and streams available for domestic and township water-supplies are being destroyed.

"4. That the Thames Valley has become an important producing and farming district, settlement is becoming permanent, and large areas of land are being brought into productive use; and, in addition to this, thousands of acres of Crown lands are becoming available for settlement, use, and occupation, all of which is being seriously prejudiced by the raising of the river-beds owing to the silt-deposits.

"5. That by reason of the silting-up of the Waihou and Ohinemuri Rivers numbers of farmers and settlers are being ruined, their properties destroyed, large and valuable industries are being crippled, settlement will be retarded, and the progress of this portion of the Dominion checked.

"6. That this question is not merely a local one, but is a colonial one, affecting great national assets; and the said rivers are amongst the most productive and important navigable highways in the Dominion.

"7. That the stoppage of the deposit of silt in the said rivers will not prejudicially affect the mining industry in any degree commensurate to the great and lasting damage that is now being done to national assets and permanent industries.

"Wherefore your petitioners pray that such immediate steps be forthwith taken as will prevent the damage to and destruction of the valuable national assets comprised in the said waterways, lands, and industries.

"And your petitioners will ever pray, &c."

That is the stand which they still consider it their duty to take up in the interests of the farming community. As regards the damage, it will be the main point of our case that the damage can be put down—firstly, to the land, and, secondly, to navigation. That will come into the matter, of course, on account of the farmers also. And the damage to the land is not only to the surface of the land, but it is damage to the other land in the way of the stopping-up of drains; the outlets of the drains to the rivers become choked, and the land which may not be covered with silt is affected by the want of drainage. We will attempt to place the matter of damage as far as possible before you, starting from the top of the river as near as possible, and taking the properties in sequence, as near as possible, down the river. We will try to give the actual area which is absolutely destroyed, in the opinion of the owners, and we will also try to give the actual area that is partially damaged. The question of damage, of course, not only refers to the land which is damaged, it refers to the cattle also; and in that respect I shall specially mention to the Commission one particular, and that is this: that the very fine deposit that will sometimes be made over the pastures is so fine that it actually adheres to the grass itself, and when the sun comes out after the flood-waters have subsided, this deposit is adhering to the grass, and the sun turns the deposit into a sort of paint almost. The farmers call it whitewash, but it is worse than whitewash, because it does not wash off with ordinary rain. It has either to be eaten off by the cattle or grown off by the grass. Evidence will be given to show that some of the cattle have been found after slaughter to have this stuff inside of them—in their lungs—stuff which is presumed to have come from the pasture itself. The land is not only European land, but there is also Native land. A very large portion indeed of the land in this district is Native land. We have one or two representatives of the Native race who will give evidence before the Commission on behalf of their different tribes, who are very largely interested in this matter. They say that at the time this district was ceded the Government, in asking them to sign the deed of cession for mining purposes, gave them a promise that they would not be injured at all by the mining; and they consider, whether rightly or wrongly, that they have a grievance in connection with the silting-up of the river and the damage to their land. It may be said that the evidence which will be given in connection with the assessing of the damage to the land will be overestimated. I wish to draw your attention to this fact: that these farmers, who will be glad to give evidence as regards the damage to their land and as to the depreciation in value—every one of them would sell out to-morrow, if he got an opportunity. I think I am justified in saying that all of them are willing to sell at once. They do not like to put the damage done at a very great amount, because they are under the impression that if they depreciated the value of their land out of their own mouths, how could they ask a purchaser to give them the figure they think they ought to get for the land? So that, instead of the damage being overestimated, I think you will see that it will be rather underestimated, because they are in that position that they are willing to sell at any time. I think it is a foregone conclusion that will be admitted by practically all the parties to this inquiry that some damage has been done. The question will be the amount of damage. As regards the navigation, I dare say the Commission have seen the different heads of navigation that have existed from time to time in this river. At one time the navigation went right past the Paeroa Township by a couple of miles, right up to Mr. Cock's place. When the bridge near the Criterion Hotel was erected, that prevented the navigation going past it. And then there was Snodgrass's Wharf, a little below the Criterion Hotel; and from there it went down to another wharf at the end of Wharf Street, about the centre of the township. Then the railway-bridge was built, which prevented any traffic above that. Then the Junction Wharf was built, near the junction of the Ohinemuri and Waihou Rivers. That has been discarded, and now the head of the navigation is at Te Puke—that is, as regards the Ohinemuri River. As regards the Waihou River, the navigation still continues to go right up to Te Aroha Township. The evidence will be that the navigation has been impeded very materially, and that it is still being hindered. After the question of damage comes the question of the remedy. The association which I represent is not an association of experts: it is purely an association of farmers and business men, and they look upon the matter in this light: They say that what has caused the damage is the silt that has been put into the river: therefore the natural sequence follows that if the silt is prevented going into the river the damage will cease. Clear out what is in there, and prevent any more going in. In support of their contention there have been reports made. There was a report of Mr. J. Stewart, made in 1907, when he was talking about the Piako land, which was then being considered by the Government. He said in his report, "But at a time when it is seriously proposed to commence the arterial drainage on the great low lands in the Thames and Piako Valley, it seems anomalous that a system should be continued which would to a large extent render nugatory a scheme of such importance from a national point of view." And Mr. Blow, Under-Secretary for Public Works, in a report to the Prime Minister, says that the only thoroughly effective remedy is to prevent further deposits of tailings into the river. It will be said that nothing else can be done but put the tailings in the river. There will be evidence to show what is being done in other places, and what can be done in that respect. Apart altogether from the absolute prevention of any further tailings going into the river, there are the alternatives of, first, dredging the channels and cutting down the willows; and then comes the question how that is to be done—the question of finance. As regards finance, I should just like to mention this: that the revenue which is mentioned in the text of the Commission—the revenue derived by the local bodies from the gold-mines—relates to two sorts of revenue. You will probably hear a lot during the Commission about the gold duty. Now, gold duty is only one of the portions of the revenue derived from the mines. The gold duty is a duty of 2s. an ounce on all gold actually won. The mines have to pay that in the way of tax. There is another portion of the revenue which is called "goldfields revenue" in the mining district, and that comprises the moneys received at the different Wardens' Courts of the district for the issue of miners' rights, rent of claims, rent of residence and business

sites, and license fees: that comprises goldfields revenue. In this district there is a considerable amount received per annum as goldfields revenue. That revenue is distributed to local bodes. Then there are the Natives. I might explain that in the mining district there is some Native land, and when Native land is taken up for a claim, or for any purpose connected with mining, a £1 miner's right has to be taken out. The ordinary miner's right is 5s. That £1 goes to the Native owners of the block. That is not distributed to the local bodies at all. It is only the five-shilling miner's right that is distributed to the local bodies, and the rents and license fees. So that when you hear gold duty spoken of, you want to remember that that is only a part of the goldfields revenue distributed to local bodies, although, of course, the gold duty, as it turns out, comprises a very large portion of the revenue. That is a very rough outline of the evidence we will place before the Commission. It is impossible to go into the details at present. These details can only be evolved from the evidence which will be submitted. We all hope that the result will be one that will be looked back upon as a matter of history, and will be satisfactory to all parties in the welfare of this rather important portion of the Dominion.

GEORGE BUCHANAN examined. (No. 1.)

1. *Mr. Mueller.*] Your name is George Buchanan?—Yes.

2. You are chairman of the Silting Association?—Yes. I live on the Thames Road, Paeroa. I do not live near the bank of the river, but I am trustee of a property on the bank of the river. I am a trustee of the Huruhuru Estate, situated about half a mile above the Ohinemuri Traffic-bridge—the Chinamen's gardens.

3. How long have you been here?—About eighteen years.

4. What was the condition of the river when first you knew it?—It was a clear deep river; you could see to the bottom of it in most places, except where there was extra depth.

5. As regards its drinkable qualities?—It was drinkable by man or beast.

6. What is, roughly, the condition of the river now in that respect?—It is not fit to drink, and it is very shallow in many places. The sides are greatly contracted by deposits of mining tailings.

7. What effect has that in time of flood?—The whole of the adjoining lands are covered with water. After the floods subside there are great deposits of mining tailings: the coarse tailings are near the outer banks of the river, and the finer tailings are inland, further from the river.

8. Do you remember the steamers coming up to Paeroa?—When we came here first I saw the p.s. "Patiki" and the p.s. "Te Aroha" about 100 yards below the Criterion Hotel—the first traffic-bridge; it was at Snodgrass's Wharf.

9. *The Chairman.*] Have you any idea of the tonnage of the vessels?—I could not say. I think evidence will be called as to that.

10. *Mr. Mueller.*] What is the condition of the site of the wharf at the present time?—The site of the wharf is completely covered by tailings to a depth of 4 ft. or 5 ft. You cannot see any of the old wharf now.

11. Do you remember steamers coming to the Wharf Street Wharf?—Yes, the "Ohinemuri" and "Paeroa." Several large steamers used to come to that wharf.

12. That wharf is in the river about the centre of the township?—Yes. Where the "Patiki" used to lie there is a bank now about an acre and a half in extent, I should think, filling up more than half the bed of the river. There is now a bank of tailings where Snodgrass's Wharf was.

13. What is the state of the wharf where the Wharf Street Wharf was?—What is left of it—there is a heavy deposit of tailings there, and large banks on either side.

14. What vessels can get up to those wharves now?—It is all that small yatching-launches can do to get up as far as that now; at low tide it is practically impossible.

15. *The Chairman.*] I would like to have it cleared up about this bank of about an acre and a half. What was the length of Snodgrass's Wharf?—It was a small wharf. It was about 8 ft. long—just long enough to allow steamers to go alongside.

16. How far out did it go from the bank?—About 6 ft. or 8 ft. It was deep water right alongside.

17. Now, you say there is about an acre and a half of bank there?—Yes, at low tide.

18. What length is it?—I should think it would be about 9 chains long from end to end at low water.

19. Can you mention any other portions of the river that are very bad?—Pereniki's Bend. It is almost impossible to get a boat across there. It would be almost impossible to get a boat of any draught more than that of an ordinary launch up the river beyond that place—that is, at low tide. There are many banks of tailings on the northern side of the river beyond that point. Here are photographs of Pereniki's Bend and the river at the Railway Wharf, taken on the 21st April. [Exhibits 2 and 3.]

20. *Mr. Mueller.*] You know the junction of the two rivers, the Ohinemuri and Waihou?—Yes.

21. Is there a large bank there?—There is a very large bank just below the junction of the two rivers, on the Paeroa side of the Waihou, in the main river.

22. What has happened to that bank within the last few years?—It has been greatly increased in size. Steamers used to come up on that side of the river; large steamers came up—the "Paeroa," "Ohinemuri," "Taniwha," and the "Waimarie."

23. And they used to berth at the wharf above?—Yes, at the Junction Wharf.

24. What is the state of navigation there now?—It would be impossible for them to get past it unless at very high tide or when the rivers are in flood.

25. You have been up the Waihou River?—Yes.

26. What distance up the Waihou can you find mining tailings?—At the mouth of the Waihou, almost at the Junction, there is a large island of tailings: and for a distance of two miles up the river tailings are to be found on either side.

27. *The Chairman.*] What extent of tailings?—There are greater quantities nearer the Junction, and in a lesser degree for about two miles up.

28. *Mr. Mueller.*] How do you account for those tailings being found two miles up the Waihou River?—When the Ohinemuri is in flood it rises quicker than the Waihou, and when the water cannot get away past the Junction quick enough it has to back up the Waihou.

29. *The Chairman.*] You think it goes up, and takes the tailings with it?—It backs up the Waihou. The Ohinemuri water comes down much quicker than the Waihou.

30. *Mr. Mueller.*] You know the Waihou right up to Te Aroha?—For about eight miles past the Junction.

31. Above two miles from the Junction, what is the state of the Waihou compared with fifteen or eighteen years ago?—Practically the same as it was fifteen or eighteen years ago. There is an island a good way up that has a bank of river-sand behind it.

32. How far is that from the Junction?—I should say about seven or eight miles up. It may be a little less.

33. Do you know the Waimarie Bend?—Yes.

34. Whereabouts is that?—The point of the river below the Rangiora Road, pretty well opposite Robinson's place.

35. What can you state about the Waimarie Bend?—There is a point of tailings running out there, about 30 ft. or 40 ft., I should say.

36. Generally, what effect have these tailings on the river?—Narrowing the banks to a great extent on the main Waihou, and in the Ohinemuri filling up the river-bed, and also encroaching on the banks to a very great extent.

37. *The Chairman.*] Why do you think the river-bed is being filled up from below?—The Waihou is pinching or narrowing, except the larger banks at the Junction. I am speaking of the main Waihou River. The banks are encroaching in the main Waihou from the Junction down.

38. You do not think the bed is rising?—No.

39. Have you any reason for saying that?—We went down in a boat, and we could not find any appreciable extent of bed rising, but we could see evidence of the sides encroaching.

40. Do you think the bottom is of the same character as it was before?—Yes, very much the same.

41. As far as the nature of the bottom is concerned?—Yes.

42. Is that all the way down from the Junction?—No; there are banks beyond the Junction—more particularly just below the junction of the two rivers.

43. You think that below Te Puke what you say is right?—Yes; the banks are encroaching greatly below Te Puke. There are spits running out here and there. Just below Netherton there is an island—just about a mile down—an island with a willow-tree at the top end of it.

44. *Mr. Mueller.*] As regards the Ohinemuri, can you say whether the bottom has filled up?—Yes; in some places near the top you could hardly touch the bottom with an oar once, and you can almost walk across it now.

45. Is that in one or two places or in many places?—In many places.

46. What is the effect of that on the drainage of the country?—Naturally the water cannot get away quick enough, and the capacity of the river has been so much decreased that it must go over the banks.

47. It flows over the banks?—Yes.

48. Coming down to your own land—the Huruhuru Block that you mentioned: can you state what area has been damaged?—About 40 acres altogether of that land. It is only that land that the river and tailings have been over.

49. *Mr. Vickerman.*] That is not destroyed, it is damaged?—There is about 5 acres of river-bank that used to grow very good feed. It is completely damaged; it is useless. There is about 12 acres of Chinamen's garden. The adjoining paddocks are practically useless owing to the depths of the tailings-deposit on them.

50. *The Chairman.*] Useless for what?—Practically useless for gardening purposes or for grass.

51. *Mr. Mitchelson.*] Is there any grass on that land?—Yes, in some places.

52. *The Chairman.*] You say that 5 acres has been completely destroyed?—It will not carry anything like what it should carry. It will carry very little indeed; in fact, it is impossible to plough it in. There are patches that will grow a little grass. The silt is too deep.

53. It is reduced in value, you say, considerably. How much did you value it at originally?—It is let at about £4 an acre to the Chinamen for gardens. I will read to you the following statement of the damage:—Property of executors of M. R. S. Buchanan, Huruhuru Block; area injured, about 40 acres: 1½ acres used for accommodation, tenanted by Ah Foy and Ah Hing; annual rent, £4; capital value, £80. 13½ acres used for gardens, tenanted by Ah Foy and Ah Hing; annual rent, £50; capital value, £1,000. 12½ acres used for grazing, tenanted by William Marsh; annual rent, £24; capital value, £480. 5 acres used for grazing, tenanted by Mrs. J. Capill; annual rent, £10; capital value, £200. 4 acres used for grazing, tenanted by Buchanan and Vincent; annual rent, £8; capital value, £180. 2 acres used for grazing, tenanted by R. Rusden; annual rent, £5; capital value, £100. 7½ acres used for grazing, occupied by self; annual rent, £3; capital value, £60. Total annual rent, £104; total capital value, £2,100. Reckoning interest at 5 per cent. on the capital value, it would be worth £2,110.

54. What is the Government valuation of that land?—About £1,800.

55. Have you ever appealed against that?—No. There are paddocks that are let for grazing at the rate of £4 per acre a year. There is the land that has been let for gardening purposes. That was previous to the floods. When they saw the floods they backed out of their agreement. The agreement was not signed. The Chinese have already given notice to leave the garden. They cannot keep on any longer, although they have been fifteen years there.

56. It would be worth how much?—An average of about £1 5s. an acre.

57. *Mr. Mitchelson.*] That is for rental purposes?—Yes. Some of the land was sold at £60 a half-acre for building-sites.

58. *The Chairman.*] On terms or cash?—Cash. The greater part of those flats would be equally valuable for building-sites if the tailings had never been put into the river.

59. Is there much demand for building-sites: the town is not growing very rapidly?—It would have grown very much more rapidly if it had not been for the tailings.

60. What would have made the town grow?—If the tailings had been stacked.

61. Apart from the tailings, what would have made it grow?—The mining industry and the farming industry.

62. *Mr. Mueller.*] Is there any unoccupied land about Paeroa?—Yes, any amount.

63. Could that be utilized if there had been no tailings at all?—The whole of the land would not be utilized for agricultural purposes, but plots were very much sought after.

64. What do you reckon the present capital value of that property is?—Not more than £1,000, owing to the damage. We shall not get the rental value for more than that out of it.

65. *The Chairman.*] You will practically get half?—That is only since the last flood. Had there been no tailings in the river the land would not have been so much damaged; the land would have been of very much more value for building-sites.

66. You say that, apart from being agricultural land, it was suburban land, and as suburban land you might have been able to get a higher rental than £104: what rental?—I think the great majority of it would have been sold by this time at corresponding prices with Porritt's.

67. How many new houses have been built in Paeroa during the last five years, apart from business premises?—I should think about forty or fifty. It is impossible almost to sell township sections, owing to the floods.

68. *Mr. Mueller.*] Where has the building taken place?—On the high ground and hills near the Thames Railway. Four new houses have been built there practically within the last few months.

69. You are chairman of this Silting Association?—Yes.

70. What are the objects of the association: what does your association want as regards this silting matter?—We want the tailings not put in the river, or a remedy that will be equally as good. We want the present condition of the rivers relieved at the earliest possible date.

71. If something is not done, what do you think will be the result?—All the low-lying lands adjacent to the river will be practically useless in a very few years' time—it will be of very little, if any, use.

72. Do you produce a letter received by one of the previous chairmen of the Silting Association—a letter in connection with the deposit of silt?—Yes; it is a letter from Mr. Montgomery, mining inspector, Western Australia. [Exhibit No. 6.]

73. You have described the result of the last flood on the land that you are trustee of. Has that land been previously flooded, and to what extent?—During our residence here of eighteen years, we were here nine years before there was one flood, which came after three days of very heavy rain. The water from that flood covered about 10 acres of that land—that is, the lowest of it—about 18 in. deep. That would be about nine years ago.

74. *The Chairman.*] You do not know whether that rain was local?—No, I could not say. It covered about 10 acres to a depth of about 18 in., except at the lowest place, where the creek runs. It was about 4 ft. deep there. The last flood completely covered the whole land.

75. What was the date?—About the 30th March. It completely covered the whole of those flats—the whole of the 40 acres mentioned.

76. *Mr. Mueller.*] The last flood was considerably higher than the one of nine years ago?—Yes, there were two floods last year, one within a week of the other, which covered the whole of the property except a strip of about half a chain wide on the highest part of the river-bank.

77. *Mr. Tunks.*] Could the steamers get to Paeroa at the places you have spoken of except on the tide?—I could not say.

The Chairman: We understand that they came up with the tide: the Commission understand that.

78. *Mr. Tunks.*] Can they now get to the Railway Wharf on the tide?—I do not think it would be possible.

79. You have been here about eighteen years. During that time has there been any considerable clearing of the country, felling of bush, and so forth?—Yes, to a certain extent.

80. There has been a good deal cleared during the last eighteen years?—Not much cleared for agricultural purposes; simply for mining purposes as far as the Ohinemuri is concerned.

81. That, of course, is the watershed?—Yes.

82. Will not that have a considerable effect in increasing the amount of water that is brought into the river?—It would to a small degree, but only a limited area has been cleared of bush.

83. Would it not have the effect of bringing the water more quickly into the river?——

The Chairman: Do you not think you might bring such evidence direct? Is there any object in asking such questions of this witness, when the question can be dealt with directly by expert evidence? You will be able to produce certain direct evidence that there has been a certain acreage cut down. There is no object in producing indirect evidence.

84. *Mr. Tunks.*] We shall be able to produce direct evidence on that point. (To witness) Have you ever gone into the question of what these deposits in the river are—tailings, river-silt, or what it is?—We have taken samples of the tailings, which are now in the hands of Mr. Pond, Government Analyst.

The Chairman: Is Mr. Pond to be called by you, Mr. Mueller?

Mr. Mueller: No; but we expect to get his report at any moment.

85. *Mr. Tunks* (to witness).] Where were the tailings taken from?—Some were taken from below the Junction. We have taken some off our own property, the Chinamen's gardens, and some out of the houses in the Town of Paeroa.

86. Does your analysis show that there is other matter besides the tailings on the land?—Mr. Pond has to make the analysis.

87. You really do not know whether what has come down is all tailings, or river-*débris* and that kind of thing?—Some of the deposits on the river-bank I think any amateur or professional would take as tailings. I do not think that anybody could mistake the fact that they are tailings. They are here for the Commissioners to look at.

88. What parts are you referring to?—The whole of the bank from Mackaytown down past Netherton, and on the adjoining land also.

89. You are speaking generally, and without any special knowledge on that point?—Except that I have seen tailings. I have seen them come from the mines, and I recognize these as being the same. There is river-sand in the Waihou, which is quite different from these tailings.

90. Have you investigated to see to what extent these banks of silt you refer to on the Waihou —what depth they are? Are they not simply a covering, a sort of blanket on the land?—No: in the Waihou, a quarter of a mile up, there is quite a bank of tailings.

91. What do you mean—does it extend right out into the river?—From the bank, slanting into the river.

92. Where was the old bank; can you give us any idea?—I should say it is encroaching about 8 ft. or 10 ft. It is a bank on the south side.

93. You mean to say that the Waihou at that point is reduced in width by 8 ft. or 10 ft.?—It is a shelving bank running into the river.

94. Has that affected the bed of the river at all?—I did not test it there.

95. Is not that probably merely a result of the willow-trees reducing the speed of the current, and allowing the stuff to settle?—I think not. The Waihou is a fast river, and if you go four miles up you will find no traces of tailings, and the willows are not taking root as they are in the Ohinemuri. If it were an ordinary stoppage caused by willows, they would take root.

96. Do you mean to say that the willows are not taking root in the Waihou?—About four miles up.

97. How long is it since you were last there?—I was up in a steamer about last October.

98. There has been a considerable change since then. Do you not think that the willows have any effect on the Waihou at all?

The Chairman: There is no necessity to pursue that further. The right thing for you to do is to ask the Commission to go up and see this spot for themselves. We are a Commission of inquiry to look into these matters. If this were an expert witness I would not in any way prevent you testing his knowledge, but this is not an expert witness. We are quite in a position to judge for ourselves. If you ask us to go and see this place we will go and see it.

99. *Mr. Tunks* (to witness).] You referred to the flood of nine years ago. How did that flood affect the land that you referred to as building-sites?—It left a deposit of tailings in a small low place, about 4 in. deep, covering the grass.

100. Did not that indicate that the land was unsuitable for building purposes?—The people living there seemed quite satisfied. Only an occasional flood occurred—once in nine years. As it is now, the people would not look at the property for building-sites. It was only the lowest portion of the country that was covered at that time.

101. *The Chairman.*] Has the County Council or anybody else kept a record of the floods in any way?

Mr. Moresby: I cannot say, except a record has been kept by the County Engineer. Then there is the evidence of Mr. Kenny and Mr. Porritt.

102. *Mr. McVeagh.*] During the last fifteen or eighteen years you have had a vast increase in the population of this district—the Paeroa-Waihi district?—Yes.

103. Can you give the Commissioners any approximate information as to the extent of the increase of population?—No.

104. Would you venture to make any approximation whatever?—I do not know the population of Waihi.

105. Call it 6,000?—And Karangahake?

106. You ought to know. You have been here eighteen years. Were there a thousand people here eighteen years ago in this settlement?—I should think there would be.

107. Much more?—Not a great deal.

108. I think there are about 10,000 in the district now?—There may be.

109. During the greater portion of that time goods have been carried up the river by steamer?—As far as Paeroa.

110. There has been almost a daily or a tri-weekly service?—A service six days a week.

111. That has been going on for the last fifteen years?—Close on that, I should say.

112. That was not so when you first came here?—No.

113. What was the service when you first came here?—The steamers first brought the goods to the Thames, and the "Patiki" brought the goods up to Paeroa, and by launch and barge.

114. How often?—About twice a week; and then the "Ruby," and after that the "Paeroa" and "Ohinemuri," and after that the "Taniwha" and "Waimarie."

115. Until you had the railway-line a few years ago the whole of your goods were brought up by steamer?—Yes.

116. And the steamers still continue to run six times a week?—To Te Puke, necessitating extra carriage of all goods from Te Puke to Paeroa Township.

117. Is it not a fact that between Te Puke and the Paeroa Township the river is of an extremely tortuous character?—Yes.

118. It is about six or seven miles long, while the distance by road between Paeroa and Te Puke is about three-quarters of a mile?—Absolutely ridiculous.

119. What do you call the township?—Paeroa Township. I should say it is about two miles to Te Puke.

120. It is very much longer by the river?—Yes.

121. What is it?—About six or seven miles, I should think.

122. I think you have a very luxurious growth of willows along that stream?—More so since the tailings came.

123. They have fed on the tailings?—No.

124. When you came here eighteen years ago, what did you pay for your land?—My land was bought when I was a child. I do not know what was paid for it.

125. What was it worth when you came up?—I could not tell. The county records will tell you.

126. Could you give us any information at all?—No; I was a boy then.

127. I suggest that it was worth about £2 or £3 an acre?—The flat land was worth considerably more than that—very much more.

128. Before you had the railway-line up?—Yes.

129. Can you give us any idea what it was worth?—When I came here first the house on the flats was let at £60 a year. The whole 40 acres was let as a farm.

130. *The Chairman.*] What is the house let for now?—The house is let as a dwellinghouse now at £40 a year, not as a farmhouse. It is high and dry, above the flood-level.

131. *Mr. Mitchelson.*] What extent of land goes with it?—About 5 acres.

132. *Mr. McVeagh.*] You remember the time the sludge-channel was proclaimed?—Yes.

133. That was about 1895—fifteen years ago. The increase of population has added very much to the value of your land during that time?—Yes.

134. The mining industry has brought the population here?—Yes, to a certain extent.

135. Nine-tenths of it, I should say?—Perhaps so.

136. Might I say that it has more than trebled or quadrupled the value of your land?—No, I think not.

137. To what extent do you say it has enhanced the value of your land?—We did let our place at the rate of £2 an acre, for grazing purposes, to a man who was supplying the creamery—merely as grass land. I reckon that land would be worth £40 an acre, taken on a 5-per-cent. basis.

138. At the present time?—Not since the last fresh. It would be worth £40 an acre for dairying purposes. That would be £2 an acre all the year round.

139. What would it be worth if there was no silt trouble, with the present population?—It would be worth £40 an acre if there was no silt trouble. If we had no more floods it would be worth about £1 5s. an acre renting-value.

140. You say £40 an acre for dairying purposes?—Yes.

141. Can you point to any land in this province for which £40 an acre is paid for dairying purposes?—We got paid £2 an acre rent for part of that property for dairying purposes.

142. Take the Waikato land?—I have had nothing to do with Waikato land.

143. They get £20 an acre?—I submit that we have received £2 an acre for this land.

144. When the sludge-channel was proclaimed, did you make any claim for compensation?—We were not aware of the extent of the evil of the cyanide process—as to how much these lands would suffer. If we had had that information we would have objected as one man.

145. Had you known, you would have objected by putting in your claims for compensation?—Certainly.

146. Your complaint is now of not being able to foresee the mischief that cyanide would do. Can you suggest a remedy?—No. We submit that the party that has caused the trouble is able to provide a remedy. The Government proclaimed the river a sludge-channel, and we take it that they can cancel the proclamation of the river as a sludge-channel.

147. Had you known, you would have made a claim at the time?—Yes.

148. The claim would have been made on the basis of the then value of your land?—We would have made no claim. We would have objected to the proclamation of the river as a sludge-channel.

149. But if you had made a claim then, you would have made it on the basis of the then value of your land?—I cannot say what we would have done.

150. What do you want now? Would you base your claim on the present value of the land, enhanced as it has been by the increased population, or would you make it on the then basis of its value?

The Chairman: I understand that this gentleman has not made a claim for compensation.

Mr. McVeagh: I submit that it is relative. The witness has already told us that if he could have foreseen the evils that would have resulted from the deposit of silt there would have been, first of all, an objection raised to the proclamation of the river as a sludge-channel. Assuming that a claim for compensation had been made, the point is, on what basis that claim would have been rested.

The Chairman: It is common-sense to think that it would have been based on its then value.

Mr. McVeagh: Exactly. It is rather important that we should have it made clear that the claim would have been upon its then value, and not upon its future value.

151. *The Chairman* (to witness).] The butter which is made from your cows—is it largely exported, or is it consumed in the district?—There is a very small percentage of our total output goes to Waihi and the surrounding district. Last year about £800 profit, roughly, was made by our association in the Waihi district. I think the total profit was about £4,000. The chairman of the dairy company will be here to give the correct figures.

152. *Mr. Mitchelson.*] You export to the Old Country?—Yes, the greater portion of it.

153. What is the difference in price between butter that is exported and that which is sold locally?—The chairman of the association will tell you.

154. *Mr. McVeagh.*] I think the method is this: The foreign buyer sends an agent here to buy?—I think the chairman of the company will tell you that most of the butter is sent to London agents.

Mr. McVeagh: I have the figures in my hand.

The Chairman: Why not reserve that examination until you get the right man as a witness?

155. *Mr. McVeagh.*] Very well, sir. (To witness) You have spoken of past floods. I want to know whether you have any records of the rainfall upon which you base your statements?—I have no records of the rainfall, but my diary gives the dates of the largest floods that have occurred within the last nine years.

156. Take the flood of nine years ago: it then rained for three days continuously?—It was a steady, heavy rain.

157. It took three days to flood the river on that occasion nine years ago?—Yes.

Mr. McVeagh: Are you aware that the rainfall before the last flood was compressed into fourteen hours?

The Chairman: The Commission understands that there was practically very little rain here. Therefore any comparison of the rain that fell here with that which fell years ago or in another part of the district, although it is in the same watershed, has no bearing upon the question. The floods may have been due to different causes: there may have been a waterspout at Waihi, or the flood may have been due to another cause.

158. *Mr. McVeagh.*] That is exactly it?—There was very little rain here.

159. You heard of people being taken from the roofs of their houses on the Waihi Plain?—Yes.

160. You never heard of that during any previous flood?—I doubt whether any of the houses were there.

161. You value your land at £40 an acre?—I would not sell it at that. I hope to get some good out of the Commission.

162. What would you sell the land for now?—It is not open for sale at present.

163. You want a fancy price, is that it?—No; it is not for sale at present.

Frederick Cock examined. (No. 2.)

1. *Mr. Mueller.*] Your name is Frederick Cock, and you are a settler residing at Paeroa?—Yes, I came to the district thirty-nine years ago.

2. You own land on the banks of the Ohinemuri River?—Yes, 85 acres. It is called Ouerangi, Ngahutoitoi, and Koronae. I have resided on the property during the whole of my stay in this district. It is situated about two miles above the Township of Paeroa.

3. When you went there, what was the depth of the water about your place?—When the tide was in there would be about 7 ft. or 8 ft.

4. The tide would make a difference at that time of about 3 ft. or 4 ft.?—Yes.

5. *The Chairman.*] Was the current fast or slow?—Not particularly fast.

6. *Mr. Mueller.*] Did boats come up to your place?—Yes, boats drawing 7 ft. of water. My place was known as the end of navigation in those days.

7. What type of boat?—Both steamboats and cutters.

8. *The Chairman.*] Why was it the end of navigation: was it because the river became shallower higher up?—Yes, it shallowed very much a little higher up. Then there were several creeks a little above that—the Tarariki Creek.

9. What is the depth of water at your place now?—There is a little bit of a fresh on now. In summer-time it is 7 in. or 8 in.; in some places it is 2 ft., and in no place is it more than 4 ft. Nothing could get up in the shape of a vessel. You can walk across it.

10. What does the tide rise now?—From 2 ft. to 3 ft.

11. At high water you have got from 2 ft. 8 in. to 3 ft. 8 in.?—Yes.

12. *Mr. Mueller.*] What is the cause of this difference in the river?—It has silted up—the silt coming down from the mines. The bed of the river has gone.

13. *The Chairman.*] Do you find any difference in the character of the bottom of the river now to what it was?—In some places it is very hard and in other places it is very soft. There are times when the cattle get bogged in it—bogged in the silt—and you have to dig them out.

14. Before the Proclamation had the river a gravelly bottom or a sandy bottom?—Gravelly.

15. What sort?—Very good for making roads.

16. Boulders?—No, there are no boulders below Karangahake.

17. Half a pound?—Oh, yes, bigger than that. In former days the water was as clear as crystal, and we could get fish in the river.

18. *Mr. Mitchelson.*] What kind?—Whitebait, mullet, and eels.

19. *The Chairman.*] How long ago is it since you lost the fish: since 1895, when the sludge-channel was proclaimed?—It is many years since we lost the fish.

20. Ten years since?—It is quite that. A little above me there is a place where the Maoris used to catch whitebait. You cannot catch any there now.

21. *Mr. Mueller.*] You claim that you own the land to the middle of the river?—Yes; that is according to the Act.

22. Previous to the silting, could you use every inch of the land right down to the water's edge?—When I took it it was in its rough state. I spent a lot of money on it. When I pastured it, cocksfoot grew luxuriantly right down to the water's edge.

23. What is the position now as regards your pasture right down to the water's edge?—It is sand there as high as this ceiling. The land is very good. You will find no land in the Waikato equal to it.

24. What about your fences?—They are all destroyed since the last flood. I have had to make my fences four times—they have been destroyed every time. I have moved them back from the river. Ill health prevented me inspecting the paddocks before, but when I went over them yesterday I was astonished to see what the flood has done. Sand has gone all over the farm. In some places it is light, but in one paddock there is 12 in. of sand on it.

25. What is this stuff that is on your land that is the height of this room?—It is all silt which has come down from the mines.

26. What area of that land can you say is absolutely destroyed?—To put the land back in its former position would require more expenditure than the land is worth—that is, in respect to 40 acres of the land.

27. Forty acres of the land is practically destroyed?—Yes.

28. And the whole of that land was covered by the last flood?—Yes; in some places not up to any appreciable depth.

29. *The Chairman.*] Was your house flooded?—No; the house and garden stand high.

30. How much land is there to the house and garden?—About an acre.

31. About an acre out of 85 acres was not flooded?—Yes.

32. *Mr. Mueller.*] Can you tell us the effect of this fine deposit on the grass itself—the effect as regards the cattle?—It kills them. They browse about the decaying roots of the grass, and they cannot eat it without taking up some of the silt. I have lost young stock through it. We have opened the young stock after death, and have seen the stuff in them. I have lost full-grown cattle through their getting bogged in the silt, and I have lost young cattle through their eating the grass and taking in the sand. The contents of the stomach was like coarse hair or fine wire.

33. *The Chairman.*] Is it not a fact that cattle in other districts have a sort of material in them, and round in shape?—I believe that is so.

34. It is not peculiar to Paeroa?—No.

35. Have you ever seen such substance, and round in shape, taken out of animals in other places?—No.

36. So that you cannot compare the two?—No.

37. *Mr. Mueller.*] What is the nature of the stuff that was taken out of the cattle that died?—In eating they take in some of the fibre of the pennyroyal, and silt with it, and that kills them.

38. Can you state whether the stuff you have seen inside the cattle is actually silt?—In the round mass there is actually silt as well as the fibrous material.

39. Can you give us any actual figures of the amount of damage you have suffered from the silt?—I have been losing £30 a year. That is a very modest estimate. That is reckoning the pastoral land at £2 an acre. Mr. Nicholls leased grazing-paddocks at £2 an acre, and I base my calculations on that. I do not think the estimate is an extravagant one.

40. That is your continual loss?—Yes; that is what I have been losing for some years.

41. Have you been put to any extra expense on account of these floods?—The fencing has had to be shifted from time to time.

42. And the cattle destroyed?—Yes.

43. Can you give any amount as to the cattle destroyed?—I lost two full-grown cows and about five calves.

44. Is this trouble increasing?—Every flood seems to increase it. There is nowhere for the silt to go to. It must come up on to the land.

45. How do the floods now compare with the floods of previous years?—In previous years we never had a flood. We had freshes, but they did us more good than harm. We always knew when we were going to have a fresh, because they always came from the east, never from the south or west. This last one came from the east. In the former floods or freshes there was nothing in the water to injure the land.

46. Now, does it take much rain to cause a flood?—Twenty-four hours' rain does it.

47. *Mr. Vickerman.*] You would not get a flood in westerly weather now, would you?—No.

48. *Mr. Mueller.*] You were agent for the Northern Steamship Company?—Yes, for about fifteen years, until about two years ago.

49. What can you state as regards the navigation of the river during that period?—The navigation was all right.

50. *The Chairman.*] Can you give us the draughts of the vessels of the company that traded here when you were agent?—The "Paeroa," about 6 ft 6 in.; the "Ohinemuri," 6 ft. to 7 ft. I am speaking of the vessels loaded.

Mr. Moresby: That information is given in the evidence of Mr. Porritt before the Mines Committee—question 120.

51. *Mr. Mueller.*] From the commencement of your experience as regards the navigation, how far did the steamers come up?—First, they came up to the Wharf Street Wharf, about the centre of Paeroa.

52. The boats that came up there were the "Paeroa" and the "Ohinemuri"?—Yes.

53. After that, what happened?—Of course, there was opposition. After the opposition knocked off, larger boats, the "Waimarie" and "Taniwha," were put on. The Junction became the wharf then.

54. And the Junction remained the head of the navigation for some years?—Yes.

55. They are still trading?—Yes.

56. How does the draught of the "Waimarie" and "Taniwha" compare with the "Paeroa" and "Ohinemuri"?—They could not come up under 7 ft. or 8 ft.

57. What was the reason the Northern Steamship Company ceased to run their boats to one wharf, and ran them to the Junction Wharf?—Because they could not get up.

58. What was the reason of their leaving the Junction Wharf and coming up only as far as Te Puke?—Because they could not get up to the Junction.

59. When the steamers ran to the Junction Wharf, can you give us any idea of the depth of the water at the Junction Wharf?—When they first ran there I suppose it was about 10 ft.

60. You have seen steamers stirring up the mud and silt?—Yes; they do that always when they are late on the tide.

61. Can those steamers get up to the Junction Wharf?—Not nearly.

62. What would be the result if the steamers ceased to run to the Te Puke Wharf? What effect would it have on the navigation?—I expect all the channel would be filled up. If they did not keep the channel open, in a few days they could not get up at all. That is my impression, and that is the opinion of the captains too.

63. I suppose you are rated on your land that is destroyed?—Yes.

64. *The Chairman.*] How much a year do you pay?—About £12, I think.

65. You know the land of Mr. Barrett?—Yes; his land adjoins mine.

66. He has 39¾ acres?—Yes.

67. Can you say how much of that land is affected by the silt?—I should say about half of it—about 20 acres. I think the whole of the 20 acres has been rendered useless.

68. Can you state the loss he has suffered through the last flood?—I expect he suffered in about the same proportion as myself.

69. Can you state the depth of the deposit on his land?—From 12 ft. to 15 ft. near the river, and it goes back to a much lower depth.

70. What was his land used for?—Pastoral purposes. There is one small portion in crop. The land has been destroyed.

71. Is there anything else you would like to put before the Commission?—The best evidence is for the Commission to go and see the land, and you will find whether I am exaggerating or not. I intend to ask the Commission to visit the land. It is very handy. It is one of the very good examples of silt-deposit. It is close to the town.

The Chairman: We shall see not only the picked properties, but also those that have not been affected.

72. *Mr. Tunks.*] How long ago was there a bridge built below your place?—About thirty years ago.

73. Was it not the building of the bridge that stopped the navigation going up to your place?—No; because we have got barges up through the bridge.

74. Could steamers go up to your place after the bridge was built?—I do not think so.

75. As a matter of fact, the building of the bridge did to a large extent stop navigation up to your place?—Not at all.

76. *The Chairman.*] What did you bring up or down in the barges?—Firewood was brought up from the old mill in barges.

77. You did not take any produce down?—No.

78. *Mr. Tunks.*] Why not?—There was never any to take.

79. It was the tailings prevented you using the water above the bridge thirty years ago?—No.

80. Would not the stopping of the navigation of itself cause the river to silt up?—There was not sufficient of it to keep the river open.

81. When did you first begin to find the river silting up or building up?—Some time after the mines began to work. Before they began to work we had a clear crystal stream.

82. When did you las take a barge up as far as your place?—About four years ago. We got up at the top of the tide.

83. Four years ago it was as good as ever for that purpose?—No; we got up on the top of the tide. The rise is 4 ft.

84. The railway-bridge has been built about sixteen years, I think?—Yes, I dare say.

85. Would not that have the effect of bringing the navigation still further down the river?—No.

86. It had no effect at all on the navigation?—As far as the steamers were concerned it had. Barges used to come up.

87. Do not the steamers' propellers help to keep the river open?—Of course they do.

88. These bridges that have been built from time to time had the effect of pushing the steamers further down the river?—I do not know that they had that effect, because they can go through the bridges.

89. Was it only the silting-up of the river that caused the company to move from the Junction to Te Puke? Do you not save a considerable amount of time on the tide?—You save some distance.

90. Can you not save about an hour on the tide by coming to Te Puke instead of to the Junction?—Yes.

91. Was not that one of the reasons that influenced the company to make the change?—No, I do not think it was. If they could have come up they would have done so. They were very accommodating people.

92. As agent of the company, you have seen a great increase in the company's traffic?—Yes.

93. So that, in spite of the discharge of silt into the river, the use of the river by the steamers has increased?—Yes.

94. The traffic on the river has increased since the mines began to discharge silt into the river?—Until the railway came.

95. Notwithstanding the railway, has not the traffic on the river increased?—They are not always loaded.

96. You have a considerable number of willows on the banks near your place?—Yes.

97. *Mr. Clendon.*] When did you first lose any of your cattle by this silt-consumption?—About three or four years ago.

98. Have you opened every one of those animals?—No; I opened two.

99. Did you take any expert opinion as to the cause of death?—No, I did not require any; the thing was so obvious.

100. Was any one present but yourself?—My son.

101. Is it only the calves that it affects?—Yes.

102. What did you pay for your land per acre?—I bought land from the Natives.

The Chairman: If the witness does not care to tell us, we cannot press him.

103. *Mr. Clendon.*] What was the value of your land per acre in 1895—£4?—Yes, and more than that. I would not then have taken less than £15 an acre for it.

104. Can you point to any land in the vicinity of Paeroa that has brought about £15 an acre?—I do not know that any was sold. I know that some has been sold since at double the money.

105. Do we understand that you cannot give the value in 1895?—No; what has increased the value of the land here is the butter-factory.

106. Can you say what stock was running on that land in 1895?—An average of forty head.

107. What are you running now?—About thirty-eight.

108. How many cows were you milking in 1895?—About eighteen, I should think.

109. How many are you milking now?—About twenty or twenty-two.

110. And in the summer-time about forty-two?—No.

111. What is the most you milk in the summer-time?—I milk on an average twenty-two cows.

112. What proportion of the 40 acres do you say is damaged from the top of the bank towards the water?—I suppose about 30 acres.

113. Probably a little more?—There may be.

114. I think it was land that was never of much use?—There never was better land in New Zealand—not even in the Waikato.

115. It was land that consisted mostly of gravel, stones, and shrubs?—I wish we had a little more gravel.

116. What is the difference in the depth of the channel at Te Puke now and eighteen years ago for navigation purposes?—I do not think much difference.

117. Is there any?—There is some, but there would be a great difference if the boats were run off: they keep the channel open.

118. How many acres of Barrett's farm is damaged?—About half of it.

119. You have not been over that land to inspect it?—I can see it from my place.

The Chairman: He said about half was injured by silt. We can go and see it for ourselves. We do not want anything more than that.

120. *Mr. Clendon.*] When were you last on Barrett's land?—Yesterday.

121. I think blackberries are growing very luxuriantly upon your property?—No, they cannot grow for silt.

122. *Mr. Mueller.*] Have you purchased any land since you originally came here?—Yes.

123. How long ago?—About five or six years ago.

124. So that the number of cattle you were running in 1895 were running on a less area than they are running on now?—Yes.

125. Do you know whether the Junction Wharf was used by the Northern Steamship Company before the Paeroa Railway-station was made?—Yes, I think it was.

126. Steamers were running to the Junction only before the railway-bridge was erected across the river?—Yes.

127. It has been suggested that you and the farmers have greatly benefited on account of the mining?—That is not so.

128. How do you make that out?—I have not made a penny from mining. The mining industry has pauperized this place. If they had been loyal to their own parent county, things would have been different: but they seceded when they formed a borough, and took all our revenue away, and left us poor indeed. You have only to look at the place: it is like an empty sepulchre. If it had not been for the butter industry this place would have been wiped out altogether. We have laid out some £13,000 in the dairy industry, and we have a little launch running up the river.

129. Are the farmers dependent on the population of Waihi?—No, we export all our butter—very nearly the whole of it.

WILLIAM MARSH examined. (No. 3.)

1. *Mr. Mueller.*] What is your name?—William Marsh. I am a farmer residing at Mackaytown.

2. You own the Wairere, 37 acres, and Rewarewa, 23 acres, Nos. 1 and 2 Blocks, of a total area of 95 acres?—Yes.

3. The Otara Block, 35 acres, is where you live?—Yes.

4. What area has been affected by silt?—About 65 acres has been affected, and about 31 acres of that has been destroyed, by silt. The silt is from 6 in. to 10 ft. deep.

5. What is the state of this land that is absolutely destroyed?—It is from 1 ft. to 10 ft. thick in tailings.

6. How long have you been in occupation?—About thirty-four years.

7. Previous to the silt trouble, could you farm the whole of your land?—Yes.

8. Was there feed on the banks of the river?—Yes, particularly in the winter-time.

9. Is there any feed now on the banks of the river?—No; 10 ft. or 12 ft. of tailings instead.

10. Have you had to remove your fences?—Yes, three or four times. I shall have to remove them again, I expect.

11. *The Chairman.*] Does witness's property just go to the river, or to the centre of it?—To the centre of the river.

12. *Mr. Mueller.*] Can you put down your loss per annum?—Previous to the last fresh I used to put down my loss at £50 per annum, but since the last flood I cannot tell. I have been two or three weeks carting the tailings off to find the mangolds and carrots.

12A. *The Chairman.*] What did you do with the tailings?—I tipped them on top of some other tailings on the banks of the river.

13. *Mr. Mueller.*] What do you assess the damage to the mangolds and carrots?—I think the loss on the mangolds and carrots is about £25, and it cost about £30 for carting the tailings off.

14. Can you put anything down to the loss of fertility of the soil?—Yes; it will never be so good again.

15. Without any tailings on your land, what would you consider the value of it?—Fifty pounds per acre.

16. *Mr. Mitchelson.*] For building-sites or grazing?—For grazing. I would not sell it for that.

17. *The Chairman.*] What would you rent that land for previous to the last flood?—I have been paying £2 per acre for land not nearly so good as mine—some of George Buchanan's land, for which I am now paying £1 per acre since the flood.

18. *Mr. Mueller.*] Have you a milk-run?—Yes, I supply milk to Karangahake.

19. Have you lost cattle through the silt?—No, I cannot say I have.

20. How does the present flooding of your land compare with the floods of fifteen or twenty years ago?—Fifteen or twenty years ago we did not have a flood—just a bit of a fresh, which lasted for an hour or two.

21. Now, what effect has a flood?—The last flood took about twelve hours before the waters left, and it was 4 ft. or 5 ft. deep.

22. Previously, would it require much rain to cause a flood?—Yes, about forty-eight hours.

23. What do you attribute that to?—I attribute it to the silting-up of the river. It has not such a capacity to take the water away as it had. The bed of the river was filled up in one place at Mackaytown about 3 ft.: the cows used to have to swim across it. Now that bank is about 3 chains long and 1 chain wide of silt.

24. Have you noticed that fine tailings have been deposited on the grass itself?—Yes, and mud tailings too.

25. What effect has that on the cattle?—They will not eat it.

26. Will this stuff blow off or wash off?—A little of it will wash off, but in the dry weather, when the cattle eat closely, they are bound to swallow some of it.

27. How far from the river-bank have tailings been deposited on your land?—About 6 or 7 chains, when the ground begins to rise.

28. Just previous to this last March flood, did you not have an area of land ploughed up?—Before the January flood came I had it ploughed up, but that left about 2 ft. of tailings on it; now it has about 6 ft. of tailings on it. It took me two days to find a harrow.

29. Can you give an estimate of what you consider you have lost in hard cash on your land?—I consider £1,000 would not pay me for the whole loss sustained by silt. Fourteen acres has been completely spoiled ever since, and I reckon that at £2 per acre per year.

30. When did you first notice the silt coming on your land?—About five or six years ago.

31. *The Chairman.*] At that time silt was going past you in the stream, I presume?—Yes. It did not fill the stream up then.

32. *Mr. Mueller.*] And the deposit on your land has taken place since then?—Yes.

33. Does it appear to be increasing or decreasing?—Increasing.

34. *Mr. Tunks.*] Has not the making of the railway-line helped to block up the river near you?—No, not near me. Higher up it may have done, but nowhere else.

35. Has not the putting-in of the spoil higher up helped to fill up the river?—It is the tailings that has done the mischief. There is not much mullock below Mackaytown Railway-station.

36. Has not the presence of mullock in the river helped to make the river flood?—It has left a lot of mullock up at Irishtown and Mackaytown.

37. What would you suggest should be done with the silt?—We want it stopped, and it is for an expert to say how it should be stopped.

38. Has not some application been made to you to take away some of your tailings?—I would not let them take the tailings.

39. Did they not want to take some tailings off your land?—Only from the river.

40. What is the land worth to you now?—It is not worth anything.

41. *The Chairman.*] Did any one ask you to allow them to take tailings away from your property?—No.

42. *Mr. McVeagh.*] When did you take up your land?—In 1878.

43. That was when you came to this district?—I came to this district in 1875.

44. It is low-lying land, is it not?—It is about 10 ft. or 12 ft. above the river.

45. You estimate it to be worth about £50 per acre?—Yes, I do.
46. Have you ever had that offer for it?—No; it is not in the market for sale.
47. Do you know of any other property that has changed hands at £50 per acre?—There is no other land near mine, except that owned by the Natives.
48. I want you to explain to the Commissioners how you arrive at that result?—It is what I put on it.
49. You have told us it is worth £50 per acre because you put that price on it?—I have brought it up to that.

ARTHUR WIGHT examined. (No. 4.)

1. *Mr. Mueller.*] What is your name?—Arthur Wight. I own about 450 acres of land at Komata North, Section No. 1B, mainly lying between the railway-line and the river.
2. *The Chairman.*] How much frontage to the river have you?—About 90 chains.
3. *Mr. Mueller.*] About 330 acres of your land lies between the Thames Railway line and the Waihou River?—About 340 acres.
4. Do the floods come over your land?—Yes, anything up to 18 in.
5. What effect has that on the vegetation?—If it is any time early in the season it kills the grass, and throws it right back; if it is in the winter it does not do so much harm.
6. Have you had to remove your stock?—I have had to take them on to higher land, especially the sheep.
7. How long have you owned that land?—Since about 1893.
8. *The Chairman.*] Is that freehold?—It was leasehold then; I have since bought it.
9. Out of the profits you made on the land?—Practically.
10. *Mr. Mueller.*] In the earlier times you say this land was not affected by floods?—Not at all. I have known land round the Puke at Paeroa to be flooded when mine was not.
11. In later years how has your land been affected by floods?—It has been flooded for years, at times.
12. You have outfall drains going into the Waihou: what effect has a flood on these drains?—It fills the mouths of them up with tailings.
13. Does that cause expense?—Yes, I have to clear them.
14. Have you to do that time after time?—Whenever it is required. The drains want fixing up a bit after each flood.
15. *The Chairman.*] How many drains are there along the 90 chains?—Six, I think, and the boundary drain.
16. How far up the drains do the tailings run?—Not a great distance—just a few chains.
17. How many days' work to each drain?—I should say about two days' work for each drain.
18. What do you do with the tailings?—Just shovel them out on the side of the drain.
19. *Mr. Mueller.*] Are there deposits of silt on the banks of the river on your frontage?—Yes.
20. What would you say would be the width of the deposits on your land?—On the banks of the river, anything up to half a chain for about 40 chains on my frontage.
21. And the other part of the frontage, is that a little bit higher than the other?—I think so.
22. In the river itself, is there a deposit of tailings?—Yes.
23. On each bank?—On both banks of the river.
24. During the recent floods, were there fine tailings distributed on your grass?—Yes, the grass was whitewashed with tailings in one or two places.
25. How do you find that is affected by rain?—It takes several showers of rain to wash it off; I think there is still some there.
26. Have you known any cattle to be damaged through that?—No.
27. As regards the river itself, you look upon that as the natural drain of the country: how has that been affected?—I should say the carrying-capacity has been reduced by over one-third.
28. *The Chairman.*] How is it reduced—in the width, or depth?—In both.
29. How do you know it is reduced in the depth?—When I went down there first I took down a punt-load of posts, and I judged the river to be about 12 ft. deep at low tide.
30. Have you any reason to think it has filled up since?—I have seen stock walking across the river at low tide. I judge the river to be about 4 ft. deep at low tide.
31. Then, how do you account for the water getting away?—It cannot get away anywhere else than through the river.
32. Does the river run more rapidly now?—About the same, I should think.
33. *Mr. Cotter.*] Did you know the district at all prior to your buying this land, or leasing it?—Yes.
34. How long did you know that locality prior to your leasing it?—I should say about ten years.
35. Then, you have known the land practically for about twenty-five years?—Yes.
36. Was it not always considered as low-lying land, with a great difficulty of drainage?—No, I do not think so.
37. Can you tell the Commissioners about what fall there was when you first took it up?—I think there was about 1 ft. of fall in 50 chains.
38. In some places was not actually the bank of the river higher than the land just inside it?—No: the bank of the river on my place is lower than the land, bar at one place, where it is about level.
39. Can you give any other instance that supports your deduction about the depth of the river?—We used to swim in the early days, and cross the river in a boat.
40. And what difference have you found?—The river was then deeper.

41. When the first water came over your place after you had got into occupation of it, can you give us any idea as to how long it remained?—I should say, probably a day.

42. Was that prior to your drains being cut?—I cut the drains very shortly after I went there. The property was not flooded during the first few years I was there.

43. Do you remember during that period any such fall of water taking place as fell on the occasion of this last flood?—Usually it took about three days to make a flood. I believe this last flood was due to a heavy local fall of rain at Waihi; we had very little.

44. When you had the first flood on your land, did any such heavy fall take place in such a short space of time?—It usually took about three days' heavy rain.

45. Have you thought, yourself, of any remedial measures that might be suggested with regard to improving the river other than stopping it being used as a sludge-channel?—It would be a simpler plan to catch the tailings and pump them away than to dredge them afterwards.

46. Then you have not looked at it from a point of view other than stopping it as a sludge-channel?—No.

47. Have you considered the question of the willows?—Yes.

48. Will you tell the Commissioners are those willows beneficial or otherwise to the navigability of the river?—They are no assistance to the keeping of the river open.

49. Then, in your opinion, it would be advisable that they should be removed?—It depends. If they are taken away between Paeroa and the Junction, then it will let thousands of tons of tailings away that will find a lodging-place further down.

50. Then, you consider that the tailings already on the banks and in the bed of the river should be removed?—Yes—do the whole thing at once.

51. Then, the willows should be removed?—Yes.

52. Have you gone up the Waihou?—As far as the flax-mills—about two or three miles.

53. In your opinion, are the willows there and for that distance a great obstruction to the current of the water?—Yes, they are.

54. Have you sufficient knowledge, or did you make observations as to the difference between what we have called the coarse tailings, as they appear on the river-bank here, and the slimes?—Personally, I have had nothing to do with them.

55. Are you sufficiently acquainted with the subject to tell the Commissioners whether the tailings opposite your place are the coarse tailings or the slimes?—I should say there was about three-quarters coarse tailings and one-quarter fine.

56. Did you make any examination to see to what depth the fine tailings or slimes went?—No.

57. *Mr. Tunks.*] You say that you think the bottom of the river has become shallower: can you say in what way?—The bottom is hard, so that a beast can walk over.

58. Was this land of yours very wet?—Yes; about half of it was swamp.

59. Of course, since you have drained the land there has been a consolidation of it: it has sunk a little, has it not?—Yes.

60. The map here shows something like five little streams on your property: is that so?—They were not streams; they were low gutters.

61. Is there any water there now?—No.

62. If there had been no flood in the river at all, they would back up now, would they not?—Yes.

63. *Mr. Clendon.*] You have had a good deal of experience of land in the Piako district, I understand. Is it not a fact that there is a white scum over the whole vegetation in the Piako district?—I should not think so.

64. Have you seen the land after a flood, and have you seen the white scum there?—No, I cannot say I have.

65. Have you noticed it in any other locality?—No.

66. Are we to understand that your land is only flooded by the water that goes up the drains?—The whole lot is flooded, drains and all, sometimes.

67. If you erected three or four flood-gates, would it not keep the water off your property?—No.

68. What area of land is affected by the deposit of white slimy matter?—I should say up to 150 acres.

69. When was this?—This last flood, and the one before.

70. What did you pay for your land in 1893, or when you bought it?—I do not think that is a fair question.

71. What was it worth, say, in 1895?—About £6 per acre.

72. What is its present market value?—Twenty-five pounds per acre.

73. Is it not a fact that land in the immediate locality of that was sold at £4 10s. per acre subsequent to 1895?—I cannot say.

74. *Mr. Mueller.*] Supposing that the river were dredged, the tailings were taken out, the willows cleared, and the silt still allowed to come down the river: if your land flooded, would it be damaged by these fine slimes?—If the fine slimes settled on the grass, it would be injurious to cattle, and I consider we shall have to put down artesian wells for the cattle to drink from. I have already had the wells located on my place.

75. *The Chairman.*] Did the cattle refuse to drink out of the river in times of flood?—They have to drink out of the river.

76. Are they dairy cattle?—No. I fatten cattle.

77. *Mr. Mueller.*] Could the cattle walk over the river in previous years?—They would be bogged in the soft land before they reached the river. Several times I have brought cattle from Netherton, and they have walked back there.

78. *Mr. Flatman.*] I think you state in the early part of your evidence that the silt kills the grass in the early part of the year: does it kill it in any other part of the season?—I do not think so; it kills the clover.

79. How much per acre do you estimate your land has been damaged through being silted?—I do not know; I never made it up.

80. *Mr. Vickerman.*] Before the railway-line was made you would not have been able to settle there, would you?—I think so. The railway-bank dammed back the river on the top side of the property.

81. *The Chairman.*] Are you carrying any less stock now than you were before the last flood?—I should think I am carrying a hundred head less. I have about 183 head of cattle on the farm now, and about 150 sheep. I have been selling sheep lately.

82. What were you carrying in January this year?—I should say at least a hundred head of cattle more.

83. Why did you get rid of the hundred head of cattle?—Shortage of feed, and some were fat and wanted selling.

84. By how many head of cattle has your farm been depreciated, if any?—I can hardly tell you.

85. That means, none at all?—The farm is now damp and sour, and grows more rushes.

86. How long have you had the rushes growing?—For a few years after I lived there. There has always been a few there.

ALFRED JOSEPH THORP examined. (No. 5.)

1. *Mr. Mueller.*] What is your name?—Alfred Joseph Thorp. I am a farmer, residing on the bank of the Ohinemuri River, between one and two miles above Paeroa.

2. How much land have you got there?—About 1,300 acres—Tawa, 49 acres; Pareroiroi, 44 acres; Manuka, 63 acres; Otamaurunganui, 1,170 acres.

3. How long have you been in the district?—About sixty-seven years; thirty years on that land.

4. As regards that land, can you state how many acres of that is affected by the silt?—The last flood covered about 200 acres. The only place out of water was the house and cowshed.

5. When did you first notice this land flooding?—I never saw it flooded before.

6. How long has that flooding occurred?—About eight years, I think.

7. Did you grow crops right down to the water's edge?—The banks of the river are about 20 ft. above the river. I used to plant potatoes there, and they were never flooded.

8. Can you do that now?—I should be liable to lose the whole of the crop through flooding.

9. Can you give us an idea of the damage you suffered through the last flood?—Forty calves were washed away, worth about £1 10s. each—£60. About 60 chains of fencing was broken off and washed away.

10. What do you estimate that damage at?—The fencing, 60 chains, was worth about 10s. per chain—£30. I also lost a lot of sows and young pigs, to the value of about £20, and about 15 pounds' worth of sheep.

11. Can you give an estimate at all of the loss in land through depreciation, or earning-power of the land?—I can hardly go into that just now. The damage is not so apparent at present, but it will be if things go on. There is a certain amount of silt in the grass and a considerable amount inside the bank of the river.

12. Can you tell us anything about the navigation of the river?—We used to get heavy loads of machinery up the Ohinemuri in cutters, and I have brought potatoes down in cutters drawing 6 ft. or 7 ft. of water, and at the present time you could not think of getting anything like that up there.

13. Do you know the junction of the two rivers—Waihou and Ohinemuri?—Yes.

14. What is the state of the junction now?—You would not know there is a river at all there now at low water. In 1875 the Government steamer "Luna" went as far up as the Maori settlement.

15. Do you remember the flood in 1907: did that go on your land?—Yes, but not so deep as the last flood.

16. Did that 1907 flood do damage to you?—Not much; it did not stop on the ground long enough.

17. Do you know of any drains that go into the river, and what effect they have on the river?—There are plenty down the river. The silt has filled up miles of drains and altered the fall of water.

18. What do you consider the cause of the flood?—The mining tailings.

19. Opposite your place, what is the average width of the river?—About a chain.

20. Can you walk across it?—Not easily. It used to be about 15 ft. deep at one time.

21. *Mr. McVeagh.*] When did you acquire these properties?—In 1871; the Manuka Block in 1878.

22. I want to know the time when you took this produce up or down the river?—About 1876 or 1878.

23. I do not think that portion of the river has been used for navigation since then?—Only by small boats.

24. Since when has that upper portion of the river been in use for settlers?—Since we got a good metal road there is no need for it.

25. At the time you speak of, you had not a good metal road?—No. I do not think there was a bridge even at that time.

26. This last flood was a phenomenal one, I think?—Yes.

27. You had a flood, I think, too, in 1907?—Yes, a summer flood.
28. That was a general flood all over the province?—Yes.
29. It flooded the Upper Waihou as well as the Ohinemuri?—Yes, a general flood.
30. This last flood of a few weeks ago did not flood the Waihou River?—There was very little water in it.
31. *The Chairman.*] Is any portion of your property drained to the Waihou?—No.
32. The boundary is pretty close, is it not?—About a mile and a half away.
33. *Mr. Flatman.*] Have you lost any cattle since the slime has come over the paddocks?—I have not had experience of any. I am told it is detrimental to cattle.
34. Do you think it would affect the milk of a cow?—I have no doubt it would.

PAEROA, TUESDAY, 24TH MAY, 1910.

JAKOB BERTELSEN examined. (No. 6.)

1. *Mr. Mueller.*] Your name is Jakob Bertelsen, and you have a leasehold interest in the Piraurahi No. 10 Block, with an area of 246 acres?—Yes.
2. How much of that is affected by the floods?—The whole of it.
3. Is there a silt-deposit upon your land?—Yes.
4. What depth?—At the present time it varies a good deal. It runs from 2 ft. down to 6 in. Sometimes there is 4 ft.
5. Where does that silt come from?—From the Ohinemuri River.
6. How long have you been in occupation of that land?—About eleven years.
7. During that time have you noticed that the floods have become more frequent recently?—Yes, in the last six years they have become pretty bad.
8. Whereabouts on the Ohinemuri River is your property situated?—About a mile down the river.
9. *The Chairman.*] You have no frontage on the river?—None in that block.
10. How many chains back from the river are you?—About six.
11. *Mr. Mueller.*] What is the state of the river-bed?—I have not examined the river-bed.
12. Is there any silt in it?—Oh, yes!
13. Is it navigable?—Yes; small steamers and barges go up there. If there is a flood the "Waimarie" and the "Taniwha" get up there easy enough.
14. Do you recognize this photograph as a photograph of your property?—Yes. [Exhibit No. 7, Auckland *Weekly Graphic.*]
15. Have you suffered damage on account of the silt?—I have, very much.
16. How many cows did you milk, say, four years ago?—Four or five years ago I used to milk fifty cows.
17. What did they bring in?—A couple of pounds a day.
18. How many cows can you milk now?—I could not milk any.
19. *Mr. Flatman.*] Is there any other stock running on your place?—No, it is covered with silt. There is no grass on the farm. I have a cow or two and a horse for household purposes, and I feed them on hard feed. I have another block that is not so subject to the floods. If I had not put the horses in there they would have died of the silt if they got too much of it.
20. *Mr. Mueller.*] Years ago did you crop this land?—Yes, with all sorts of crops.
21. What special crops did you get off it?—Oats and hay.
22. You are unable to crop it now?—I would not try.
23. For how long have you been unable to crop the land?—For the last three years—probably more. It is about three years since I had to dispose of all the cattle there.
24. Have you lost any cattle through their being drowned or killed?—Yes. In the last fresh we lost two brood mares with foal and ten head of cattle.
25. *The Chairman.*] How were they lost—drowned?—Yes, drowned, but not on this block, but on a block that adjoins Mr. Thorp's property—the Manuka Blocks Nos. 2 and 3.
26. *Mr. Mueller.*] You have just leased the Manuka Block?—Yes. It is about 80 acres in area.
27. When were the cattle lost?—At the end of March.
28. What loss was that to you in money?—About £100.
29. Did you lose any other goods or chattels?—Fifty or sixty fowls, and a lot of timber was swept away.
30. *Mr. Mitchelson.*] Fencing?—Yes, all the fencing is levelled to the ground. All the posts are knocked down.
31. *Mr. Mueller.*] On the 246 acres you had done a considerable amount of improvement?—Yes, it was practically in its natural state when I took it over.
32. Did you fence it?—Yes; fenced, drained, and stumped part of it. There were no buildings on it.
33. You brought this land into a state of cultivation?—Yes.
34. Erected buildings?—Yes.
35. That meant several years' work?—Yes, a good many years' work.
36. What have you got for that time, labour, and money?—I have a lot of silt lying on the land.
37. Are any of the improvements you put on the land of any use or value at the present time?—No, except the house I am living in. I am only killing time. It is no good to me.
38. *The Chairman.*] Are you still paying your rent?—Yes, the landlord is still demanding his rent in the usual form

39. How long has your lease to run?—About a year.

40. *Mr. Mueller.*] When you took up that land, could you, after effecting your improvements, earn your livelihood on it?—Yes; when we got the land laid down well in grass we had about £500 a year clear profit out of the place—that is, with the sale of horses and the milking of the cows.

41. *Mr. Mitchelson.*] Did you milk your cows for the dairy?—No.

42. *The Chairman.*] Had you a milk-run?—Yes.

43. *Mr. Mueller.*] Had you a partner?—Yes.

44. You and your partner had £500 a year between you?—Yes.

45. Now that has all gone?—Yes; we had to sell the cows about three years ago.

46. And you have leased this other piece of land?—The place we are on is no good, and we are in the habit of having a beast or two for household purposes, and I leased this block alongside to have some place to put a cow or horse on. There is only a few acres of the place I live on that is any good. There is only about 10 acres any good for grazing purposes.

47. *Mr. Mitchelson.*] Does the £500 include wages, or is it exclusive of the wages of yourself and partner?—We used to put that away every year, and pay our expenses, wear-and-tear, &c.

48. But no wages?—No.

49. What capital had you when you took up the land?—We were in business before we got this place. We had another block not far from there, and we just changed from there to the other place. We had the stock and business when we got the land.

50. You had stock, but no capital?—We only had our cattle, horses, wagons, &c. We might have had £100 or £200, but nothing to speak about.

51. *Mr. Mueller.*] In this lease of the Piraurahi Block did you have a purchasing clause?—No.

52. Or a right of renewal?—No.

53. What is your position now compared with what it was, say, eight years ago?—I am in pretty poor circumstances now. At that time I was doing well.

54. *The Chairman.*] What rent were you paying?—Fifty pounds a year.

55. *Mr. Mueller.*] Your present financial position has been caused by what?—By the silt.

56. You had a milk-run?—Yes, Paeroa and Karangahake.

57. Were there any others, or many others, doing the same thing, or were you doing the most of that business?—We were doing the bulk of it, but there were other people selling milk as well as ourselves.

58. *Mr. Clendon.*] From this Piraurahi Block you have a big outfall drain?—Yes.

59. What is the size of the drain—10 ft. deep, say, from the river up to your place?—About 30 ft. wide and about 20 ft. deep.

60. Is not the bank very high at the river there?—Yes.

61. This outfall drain runs alongside of your property?—Yes.

62. What is the average width of the outfall drain?—A little over 20 ft.

63. There are one or two paddocks on which there is very little silt?—A little.

64. Do you mean to say that there is any silt upon the two properties lying next to the river adjoining this drain?

The Chairman: We have seen it ourselves, and we are satisfied there is.

65. *Mr. Clendon.*] There were flood-gates upon this drain?—There was a kind of one.

66. And so long as those flood-gates were maintained you had no trouble with the silt?—I have not seen them maintained for a long time.

67. To come right to the point, is it not a fact that this silt came up this drain and was deposited upon your land by overflow from the drain?—Yes, that is quite right.

68. Are you aware that in the year 1896 or 1897 people were rescued in a boat from this property that you now occupy: the land was submerged by flood about 1896?—No, I think you are mistaken this time. I always keep a boat there, but it has not been in use lately.

69. You carry people on your back?—Yes, because the flood comes pretty quick.

70. This land of yours, I think, is rough land overgrown with tea-tree and rushes for the most part?—Yes.

71. The bulk of it, I think, is overgrown with rushes, tea-tree, and stumps?—No, you are stretching it a bit.

72. It is the remains of a kahikatea swamp?—Yes.

73. Stumps are visible over a great portion of it?—Yes.

74. And there are rushes and stumps on it?—Yes, but a lot have been taken out, too.

75. What proportion is covered with tea-tree and rushes which these milking-cows produced so much milk upon?—I suppose there were about 100 acres.

76. When did you last take a crop off this property, and what was the area of the land you cropped?—About 20 acres, and that was about seven years ago.

77. A crop that you could carry away on your back?—No.

78. What was it?—Oats. It ran from 3 to 4 tons to the acre.

79. *The Chairman.*] What part was cropped?—Where the silt is lying.

80. Close to the house?—It ran to within 3 or 4 chains of the house.

81. Next to the road, or next to the drain, or where?—It adjoined the big drain.

82. *Mr. Flatman.*] How did you ascertain there were 4 tons to the acre: Is it an estimate?—We sold the oats: we chaffed it. We knew roughly about how many acres there were, and we estimated the crop at about 3 or 4 tons to the acre. It was a very heavy crop.

83. *The Chairman.*] Do you remember what you got for the oats?—I have the information in my books at home.

84. *Mr. Clendon.*] To whom did you sell it?—Tierney, at Waihi.

85. How much did you sell to him?—I do not know. I also sold some oats to another stable-keeper.

86. Have you any books or accounts to show what you were earning off this property?—Yes.
87. Will you produce them to the Commission?—Yes.
88. Do you keep a banking account?—All the money went into the land.
89. Have you ever kept a bank account?—Yes.
90. Have you one now?—Yes, but I am sorry to say it is small.
91. You had a flax-mill?—No.
92. That rather crippled you?—No.
93. You are not working it now?—No.
94. How much did you lose in the flax-milling business?—That has nothing to do with this question.
95. Have you any land or interests at the Awaiti, on the left bank of the Waihou?—No.
96. Do you run a lot of stock on the Awaiti?—Only three bullocks.
97. These Manuka Blocks which you took up six months ago, where are they?—Close to the railway-line.
98. Those blocks that were submerged in March last?—Yes: I had some cattle there at the time, and they were drowned.
99. The water broke away from the Ohinemuri River, and came over those blocks during the last flood?—Yes.
100. Spread out over the railway, and washed away many chains of the line?—Yes, it washed away some of the railway-line.
101. What rebate of rent did you get from your landlord by reason of the silt being deposited on the land?—Not one farthing.
102. What is the length of the lease?—Twelve years.
103. Who is your landlord?—George Cooper.
104. What length of lease did you get of the Manuka Block?—It was only an accommodation for twelve months.
105. You have got four months to run of Manuka?—About that.
106. And one year to run of Piraurahi?—Yes.
107. *Mr. Hanna.*] You say that all this block Piraurahi is affected by floods, and that silt is deposited to a depth of 2 ft. down to 6 in. I suppose it varies a good deal, and that sometimes there is 4 ft. of silt. What becomes of the extra 2 ft. 6 in. of silt—where does it go to?—The silt is over the whole area from 6 in. upwards, but there is a large area which has only a thin coating over it.
108. You said that sometimes there is as much as 4 ft. on it, and that it varies from 2 ft. to 2 ft. 6 in.: what has become of the extra 2 ft.?—has it been washed away or been blown away?—You have already heard about the big outlet drain. This silt comes in, and when it gets dry and there comes a strong fresh it drives the dry stuff further back and deposits it further out on my property. That is how it gets all over the place.
109. How many freshes do you have?—Last winter we had a fresh pretty well every week for about four weeks running.
110. Have you ever examined the deposit of silt on your land?—Yes.
111. What does it consist of?—Quartz ground up.
112. Are you sure it is not pumice sand?—Yes.
113. All that you have seen are fine particles of ground-up quartz?—Yes.
114. Have you ever seen any of this whitewash that has been referred to on your land—the scum on the grass?—There is a kind of slime. It is finer than the tailings.
115. Is it white?—No, I do not exactly call it white.
116. Does it consist of these fine particles of sand?—Yes, it is ground finer.
117. You can see the particles in it?—There are some of what I call rough tailings, and then there is the slime.
118. Fine particles—that is what it is?—Yes.
119. *Mr. Mueller.*] In connection with the flood-gate that has been mentioned, do you remember any occasion on which that flood-gate was in good working-order and a couple of inches of silt was deposited on Mr. Cooper's land?—No.
120. Do you remember Mr. Buchanan having a crop of potatoes on Cooper's land?—Yes, I remember he had some oats. That land is between the road and the river. I remember that Mr. Buchanan had some oats, because we chaffed it for him.
121. Do you remember the flood being over there during that crop, and depositing silt on the potatoes?—Yes, I believe he did get his potatoes spoilt. I have seen that the water has come over the bank, but it was not as bad as when the flood-gate was not there.
122. Was the crop of potatoes taken out within the last ten years?—Yes.
123. Do you know where this new reduction plant is proposed to be erected down the river?—Yes, the silting plant.
124. Is that land where they propose erecting that plant on about the same level as your Piraurahi land?—It is a bit lower. The bulk of the land is a bit lower.
125. With respect to the crop of oats, is it not a fact that you cropped that piece of land and that you have taken several crops off the land?—Yes; we drained and stumped that piece, and worked it up well. Everybody in the neighbourhood admired the crop.
126. *The Chairman.*] How much of the 240 acres did you stump?—From 20 to 30 acres. We surface-sowed the land, and burnt it, and laid it down.
127. *Mr. Mueller.*] This was not one solitary crop that you have taken off during eleven years?—No.
128. You have taken many crops off?—Yes; we used also to take hay off for the cattle for the winter.

129. *Mr. Flatman.*] How many tons of hay do you estimate you could grow to the acre?—A couple of tons, or a little more, to the acre.

130. *The Chairman.*] About this drain: when you went there eleven years ago what width was it?—We used to jump over it. It would probably be about 6 ft. wide, and it was about 2 ft. wide at the bottom.

131. What depth was it: is it deeper now than it was then?—Oh, yes!

132. Were there flood-gates then?—There was a sluice-gate then.

133. How did it come to be deepened and widened?—By Mr. Cooper.

134. With your permission?—No, I was against it.

135. Was it deepened all in one operation, or in more than one operation?—On different occasions.

136. When it was deepened they put in the sluice-gates?—Yes.

137. Who paid for the sluice-gates?—I think there were some three persons in it.

138. Did you contribute?—No, I was against it. There was another block at the back that had to be drained into that big drain belonging to John L. Scott, schoolmaster, of Parnell.

139. If they had left the drain alone as it was when you took it, your property would not have been flooded or silted?—I should have been all right.

140. Did any floods come before the drain was deepened?—There came a fresh, but nothing serious. The water went away and the grass came again.

141. There are no flood-gates there now?—No; they washed away just like a paper bag.

142. How many flood-gates have been there since the first one?—I could not say.

143. Have there been three?—More than three.

144. The water inside the drain washed them out?—No: it is the pressure from the river that breaks the gate away.

JAMES MCKEE examined. (No. 7.)

1. *Mr. Mueller.*] Your name is James McKee, and you own land—Waihou West No. 3?—Yes; it is above the Junction. The area is 277 acres. I own or lease 440 acres altogether. I own and lease the land from this Waihou Block, on the west side, right down to Thorp's Bend. It is agricultural land.

2. Is that land subject to floods?—Now it is.

3. Where does the overflow come from?—From the Ohinemuri, backing up the Waihou, causing it to overflow its banks and go into the Hauraki Plains.

4. How long have you held this land?—About ten or twelve years.

5. Was it subject to flooding when you took it up?—No.

6. Would you have taken up the land if it had been subject to flooding?—No.

7. Are floods more frequent now than they used to be?—Yes, they are getting worse and worse.

8. *The Chairman.*] Are they getting worse in height or merely in number?—In height.

9. And in number?—Yes, they come oftener. Pretty well every month you look for a flood now. I had two last March.

10. *Mr. Mueller.*] What is the cause of the flooding becoming more frequent and becoming higher?—The silting-up of the river.

11. Have you got any outfall drains on to the Waihou?—Yes, five.

12. Are they being blocked up by the deposit?—Yes: there are two I have got flood-gates on, and there is one completely blocked up.

13. What size one is that?—Seven feet at the top, close on 6 ft. deep, and 2 ft. at the bottom. It is filled with tailings and silt—mixed with mining *débris*.

14. Is there any of this silt deposited on your land?—Yes.

15. On what area is the silt deposited?—Nearly all over, from 1 in. to 6 in., and to 18 in., and in some places 2 ft. Some places got a worse doing than others.

16. Your land is pretty well level?—Yes; the bank is a little higher. It has been biult up lately by the tailings.

17. There is silt over the 400 acres?—Yes.

18. *The Chairman.*] You do not mean to say that there is over 6 in. of silt over the whole of your 440 acres?—No.

19. There is silt over the whole of it to some extent?—Yes.

20. Over what area does it exceed 6 in.?—I suppose about 40 or 50 acres, close to the Junction.

21. *Mr. Mueller.*] What effect has that upon the vegetation?—It spoils it for cropping or for growing grass. It will only grow a little grass. You cannot expect ground to grow much grass with silt 6 in. deep.

22. With respect to the drains: If you cleaned them out, would that get over the difficulty?—We should have to clean the drains out after every flood.

23. You remember the January flood, 1907?—Yes.

24. What do you consider you lost during that flood in the way of cash?—I lost all my crops—some potatoes, 2 acres of mangolds, two paddocks of hay—about 10 acres.

25. *The Chairman.*] This is close to the Junction?—Yes.

26. *Mr. Mueller.*] Was there a loss of pigs?—Yes, I lost thirty-two pigs. I had to sell the pigs for whatever I could get—at 17s. apiece. They were no good to me. I sold them at a loss because I had no food to give them.

27. At that time you were milking fifteen cows?—Yes.

28. And did the cows stop milking?—Yes, the place was ruined.

29. You had to get rid of some of your stock at a loss, and others died through want of feed?—Yes.

30. Have you any particulars as regards the March flood?—All the tailings have not been put on by one flood. One flood deposited perhaps two or three inches, and subsequent floods another half-inch, and so on.

31. Did you suffer any special damage during the last flood?—Yes.

32. Can you give us any particulars of that damage?—The grass was the biggest loss. When you lose the grass the cattle grow thin, and it is a big loss.

33. Did you use the cows for the creamery?—No, for making butter. After the flood goes away the whole of the grass is as if you took a paint-brush and painted it. The marks are round the kahikatea-trees as if you had painted it with silt.

34. Does it wash off the grass easily?—If the rain comes on as the flood is going down this stuff will pretty well wash off.

35. Not all wash off?—If the flood goes down and it happens to be fine weather, and the sun comes out, this stuff dries on the grass, and there it sticks.

36. Were you forced to sell any of your stock at the Hikutaia sale last month?—Yes.

37. What did they fetch?—I sold good cows half-gone in calf at £2 apiece—cows that I expected to get £4 10s. for; but I had no feed to give them. They were good dairy cows, with no blemishes on the teats.

38. Would you have sold them at all if you had had feed for them?—No.

39. Did you attempt to sell any others at the Paeroa sale?—Yes; forty-two head I offered, and I was not offered a shilling apiece for them, because they had been eating this grass, and it affects the cattle. I sold some heifers, but I took nineteen cows back home again.

40. *Mr. Flatman.*] Were they good-bred cattle?—Yes; I am going to put them in the next Hikutaia sale. They are no good to me. If there is another flood they will only die.

41. What is the market value of a cow?—It depends on the condition. £6 5s. is the average.

42. Did the water come up into your house?—The last flood did. It is the first time it ever came in.

43. Whereabouts is your house?—Just below the Junction, at the mouth of the Ohinemuri.

44. What depth of water came into the house?—Two inches.

45. How high is the house above the level of the land?—It has about 2 ft. 6 in. blocks, I think.

46. What is your position now as regards this property: do you intend to keep it?—I do not intend to keep the leasehold. I suppose I shall have to stick to the freehold, or let the Waihi Company do what they like with it.

47. Have you worked long on this land?—Yes, I have practically spent all my life on it. I worked it to provide a home for myself in my old age, but I am afraid I shall not be able to keep it. I do not know whether I could sell it.

48. What about the dwellinghouse: do you intend to move that at all?—Yes, in three weeks' time. I have arranged for the carpenters to shift the building.

49. Where are you going to shift the building to?—I bought 10 acres adjoining the railway.

50. Close to Paeroa?—Yes, on the high land: I am done with the flats.

51. Did you buy this additional piece of land for the express purpose of putting your house on it?—Yes, to make my family safe.

52. Would you have purchased this additional piece if your other land had turned out as you expected?—No.

53. *The Chairman.*] What did you give for the 10 acres you have just bought?—A hundred pounds. I bought it cheap.

54. *Mr. Mueller.*] Do you know that that land was bought some ten years ago at £10 an acre?—I heard he gave close on £100 for it. The owner has been away from here a long time.

55. During the floods at your place near the Junction, have you had to chop down cabbage-trees and willow-trees for feed for your stock?—Yes, in order to keep the cattle alive. There is no bridge to get the cattle across the river.

56. You have been on the land for ten or twelve years: what is the result of the labour and money you have put into it?—A good deal of money has been spent on the place one way or another. I have got nothing for my labour and expenditure. I have had to discharge my working-men, and now I am left by myself.

57. According to your account, you will soon be off?—Yes, if another flood comes.

58. *The Chairman.*] How much of the 440 acres is freehold and how much leasehold?—Seventy-two acres freehold, the rest leasehold.

59. *Mr. Mueller.*] You produce photographs showing the effects of the flood on your land, and the silt deposited on it?—Yes, and I have here a photograph of the last paddock I ploughed. [Exhibit No. 7.] I have also a sample of silt taken about 150 or 200 yards back from the river, and about one mile up the Waihou. The deposit was about 6 in. deep. I have two other samples—one taken 1 chain back, and the other 10 chains back; the third was taken about a mile up the Waihou.

60. *Mr. Moresby.*] I think you have tried ploughing it in?—Yes; I have sown grass-seed on the top. I have ploughed in about 6 in., and only touched the old formation—just skimmed the black soil underneath.

61. Have the original banks of the river on your land been added to by the silt?—Yes.

62. Can you say to what extent the encroachments are?—Four or five yards in some places. It all depends on how the current strikes the bank.

63. There are some big encroachments in some places?—Yes.

64. I think you use the river a good deal between the Junction and Thorp's Bend?—Yes; three or four times a week.

65. Do you consider that that portion of the river is any shallower than it was formerly?—It is a lot shallower.

66. Can you tell us what portions of the river between those points are shallower?—At the mouth of the Ohinemuri, where it strikes the Waihou. There is one bank beginning to show this morning. If the weather keeps dry for a week it will be a big bank. It was showing about half a chain this morning as I came up.

67. You cannot say whether it is due to tailings or river-sand?—It is not river-sand.

68. Do you know what the bed is composed of?—I have never tested the river-bed.

69. *The Chairman.*] Have you noticed any difference in poling across for eleven years past?—It is a hard bottom at the present time.

70. *Mr. Moresby.*] Whether it is river-sand or silt, it is filling up?—Yes.

71. From the Junction down to Thorp's—do you say that the whole of that has shallowed up?—It is more towards the top.

72. *Mr. Tunks.*] Have you owned the whole of the leasehold during the whole eleven years?—No. One lease of 57 acres I have had all the time. A couple of years ago I acquired 277 acres. I took it for a short period, simply for grazing purposes. I only lease it from year to year. I bought Ngararahi five or six years ago. I have two or three other pieces of freehold right at the Junction. I acquired them about ten years ago, buying them by degrees.

73. How long ago did you sell the 110 acres?—About six years ago. That was the lowest ground I had. The price was £4 an acre.

74. When was the first time that your land was ever flooded during the eleven years?—The January flood, 1907.

75. When was the first time water came over your land by reason of the rising of the river?—About three years ago.

76. Do you say that prior to that, in the first eight years that you were there, you experienced no floods at all?—Perhaps twice.

77. Did they bring tailings down at all?—No.

78. And did no damage of any kind?—No.

79. Rather, perhaps, benefited you, did they?—Yes, perhaps.

80. When the water came over the sections, was it the Ohinemuri or the Waihou?—Heavy rain, the river, and the willows; I dare say mostly the Waihou.

81. It was not due to the tailings?—No.

82. You said the land has not recovered from the January flood of 1907?—No, and it never will. It is getting worse and worse.

83. Do you say that the January 1907 flood was due to silt?—Yes.

84. Not to heavy rain?—Heavy rain, I suppose, helped.

85. Do you know whether Hikutaia was under water at that time?—I cannot say.

86. All you know of is the floods you have had on your own place?—Yes. When a flood comes I have to look after my own place and stock. There are five paddocks that I have sown since the last flood. I am trying to get the paspalum-grass to grow through the tailings, but I do not know whether it will or not.

87. When you bought this freehold land, about five or six years ago, what did you give for that?—It was Maori land, and I started buying it at £4 or £5 an acre. It meant running after the Maoris, and I reckon it cost me £9 10s.

88. What do you value it at now?—I have been offered £13 an acre.

89. What would you take for it now?—I will take £10 an acre. The valuation is a little over £9. I will take £10 for it with the house off.

90. When was the county valuation made?—Three or four years ago, perhaps.

91. Whereabouts does your house stand?—On the freehold land.

92. *Mr. McVeagh.*] I want you to give some more particulars about these drains?—When I went on the property eleven years ago there were some small drains. I widened them and straightened them. I have five drains. There were drains, I suppose, 15 to 18 chains long. I deepened the drain to 5 ft. on the top, and 4 ft. 6 in. deep, and it is about 2 ft. on the bottom.

93. Where does that flow into?—Into the Waihou, below the Junction.

94. Is that your lowest drain?—Yes.

95. Take the next in order: What is the length of the next drain?—About 20 chains.

96. Does that also flow into the Waihou below the Junction?—It was a small drain, and I enlarged it. Its dimensions now are about 5 ft. on the top, 4 ft. 6 in. deep, and 2 ft. on the bottom.

97. The third one?—That is the one that silted right up.

98. What is its length?—About 10 chains. It is about 7 ft. wide at the top.

99. The fourth drain?—That is another big drain. We have got a flood-gate on that. That is a drain 10 chains long. There is about a foot of tailings lying in it now.

100. The last drain?—That is about 12 chains long. It is half-full of tailings now. It is about 4 ft. deep.

101. Have you subsidiary or small drains?—Yes; I have about 12 chains of smaller drains in one place. There is another about 20 chains long, and another about 25 chains.

102. Are these drains through the freehold?—Through the freehold and leaseholds.

103. It was very wet land when you went there?—No; but the more draining you do the better it is for you.

104. How long have these drains been in existence?—Some of the little drains I made myself, but the big drains were made before I went there. Some were made as long ago as fifteen years.

105. I suppose the effect of these drains has been to consolidate the soil?—They make the soil drier and better.

106. And reduce the level?—Yes.

107. You have done some clearing also?—Yes.

108. At the back of your place there is a long extent of low-lying country?—The Hauraki Plains go into the back. It cannot be so extra low when so many people are balloting for the land. I think those people will be worse off than me. God help the people who are living in the Piako! The men who are balloting do not know what they are doing.

109. Can all your cattle run on your land?—Yes, they used to do well in summer.

110. You have some leaseholds: have you any objection to stating what rentals you pay?—Eighteen pounds a year.

111. What area?—Two hundred and seventy-seven acres. I am now going to throw it up altogether. I have four months to run, and the owner can have it. It is no good to me.

112. I think there is no demand for dairy cattle about this time of year?—You get a good cow, and in good condition, and in calf, and you will get a price for it.

113. Do you say there is as big a demand now as at the beginning of the milking-season?—In the spring—that is the time for the demand.

114. Have you ever seen the Ohinemuri in flood and the Waihou not in flood?—Yes, often.

115. Will you mention any occasions?—This last flood. The Waihou was as low as possible, and the Ohinemuri came down with such force it was simply a torrent, and ran up the Waihou for three miles, and carried some posts up the river three miles, and they are lying there now.

116. *Mr. Vickerman.*] Did you say you had posts carried three miles up the Waihou from the Junction?—Yes, and some cabbage-trees that I had cut down for the cattle were lifted and floated up the river. Mr. Macdonald and the skippers of two small boats could tell you that if they wished to do so.

117. *Mr. McVeagh.*] How do you identify your cabbage-trees?—I am the only man who has been chopping them at the Junction.

118. As a farmer, you know that if a stream of water flows across the ground, and the sun comes out, you have the grass shrivelled and injured—practically scorched?—Yes. The worst flood you can have is in the summer.

119. And the flood of 1907 was a summer flood after the drought in December?—Yes, there was very warm weather.

120. That would account for the damage to your grass?—No: when the sun came out it destroyed the grass in the way I have described.

121. Do you not know that the January 1907 flood was general over the whole province? Do you not know that the Waikato train service was stopped for a fortnight?—It might have been. If it was, it was all fresh water; it was not water dirty with tailings. A little fresh water does nobody any harm: cattle can eat the grass when the water goes off. But with this other stuff on the grass, the cattle cannot eat it.

122. In 1907 are you not aware that cattle died at Hikutaia in consequence of the flood?—They might have done. I know there were a lot of cattle drowned. They died at Netherton. I do not know about Hikutaia. I know some men lost nearly all their milking-cows.

123. *Mr. Mueller.*] This land was not composed of peat?—No, 6 in. of good alluvial, and white clay under the 6 in. of soil.

124. *The Chairman.*] Is that soil peaty?—No.

125. How far does the white clay go down?—I cannot say. The white clay goes down as far as the drain.

126. *Mr. Flatman.*] Do you consider that good soil?—No soil in the Waikato can come up to Netherton if it is left alone.

127. There are some dairymen who supply Waihi and Karangahake: do they not look round for good cows to keep them supplied?—Yes: I was ashamed to own my cattle going to the sale during the last two or three years.

128. What was the amount of reduction in your butter-production after the last March flood?—I have been selling the milking-cows off. There were only six milking, and I am only milking four at the present time.

129. *Mr. Vickerman.*] Does the silt come on to your property from the back of where Bertelsen lives?—No, it strikes where the island is. The Ohinemuri forces the Waihou back, and then the Waihou overflows back of Netherton into the Piako Swamp. There is an overflow of about 2 ft. 6 in. for about seven miles. That goes into the swamp. There is about seventeen miles of overflow.

130. Does the Ohinemuri run from there too?—Certainly; that is how the tailings get on to my property. If it were not for the Ohinemuri there would be no tailings coming down the Waihou.

131. You mean to say that all the tailings that come on your land go up the Waihou channel: they do not go over at the point?—One river backs up the other.

132. Do not make any mistake: because some people say that it goes over at the other place?—No: they do not know anything about it.

133. You reckon that the tailings all go up the channel into the Waihou?—There may be a little, but the major portion goes up the river. The quantity of water coming down the Ohinemuri backs up the Waihou, and then it goes over into the Netherton Plains.

134. *Mr. Mitchelson.*] I think you stated that one of the samples you have handed in was taken about a mile above the Junction?—Yes.

135. Do you consider that that sample is tailings?—It is mining *débris*.

136. You are quite sure that the *débris* did not come from any other place than the Ohinemuri?—Quite sure.

137. It looks like clay to me?—I took the three samples yesterday.

138. *The Chairman.*] You say the Ohinemuri backs up the Waihou River. The colours of the water are distinctive?—Yes, the Waihou is perfectly clear blue water.

139. And if it is due to the backing-up, there must be some short distance between the places where they mix with one another?—Yes; in the middle of the river you will see in some places dirty water 2 or 3 chains long, and then a long clear patch in the middle of it mixing.

140. How high up have you seen that point of the mixture?—Right up as far as Mr. Nicholl's block of 277 acres.

141. *Mr. Flatman.*] How many miles would that be up?—About two miles and a half or a little more by the river.

142. *The Chairman.*] Does the mixed water go over the opposite bank to your place?—I have not been over there, but you can see the traces on the bank; but that bank does not suffer as much as my ground.

143. Is there much tailings on that bank?—The overflow is on my bank first. Here and there I suppose you could get a few tailings on the bank. The overflow rushes up the river, and then overflows to Netherton and Piako.

144. Does the Waihou River in flood bring down much stuff?—No.

145. Vegetable matter?—A little.

146. You spoke of white clay being under your soil: does that continue for some miles?—Yes, I think so.

147. If the banks erode, some of that would be washed out and would give the appearance shown in the third sample?—I do not think there is any fear of the river washing out the white clay. The white clay is very solid. It is hard to dig.

Mr. McVeagh: Might I suggest that the Commission would get a great deal more information by going up the Waihou.

The Chairman: We propose to do so. It may prolong matters, but it seems to me absolutely necessary that we should see these places whilst the evidence is fresh in our minds—that we should see the land and the places the witness has spoken of.

Mr. Hanna: It will really shorten the matter in the long-run.

The Chairman: And really shorten matters. What we want to get at is the truth.

JOHN W. THORP examined. (No. 8.)

1. *Mr. Mueller.*] Your name is John Wullanora Thorp, and you own 218 acres on the banks of the Waihou River?—Yes. I would like first to make a statement to the Commission. I found the first gold up here. It may be said that is of no consequence. It was a year after Gabriel's Gully was opened, in May. I spent over £2,000 in prospecting in the district. I wish to make this statement to show that I have helped the goldfield all I possibly could; and Thorp and party were awarded the prospectors' claim at Karangahake when this goldfield was opened by Colonel Fraser.

2. You have made a calculation of the damage which you have sustained by the flood?—Yes: it is as follows: "Loss sustained by John W. Thorp—Damage caused by silt in 1906-7-8-10: January, 1907—To loss of grass for three months at £2 per acre per annum, £38; loss of young healthy apricot and peach trees, 70 trees at £2 each, £140; one of the best apricots in orchard, £45 10s.; by 16 large apricots destroyed, at £20 each, £320; 6 smaller apricots, just bearing, at £5 each, £30; 12 large healthy apple-trees, at £12 each, £144; loss on 2 acres of a splendid crop of potatoes, at £17 per acre, £34: loss on Kouto Nos. 2, 3, and 4, depreciation, at £3 per acre, caused by silt and silting of river, £15; to 40 acres of splendid rich bottom, valued at £35 per acre, destroyed by silt, and only worth half-value now, £340; one fine cow, broke her leg in silt, £7. January, 1907—1 cow, £6, and two calves at £2 each, destroyed by silt covering grass, £10. Total, £1,263."

3. Your fruit-trees were a great source of revenue?—Yes. All the peach-trees and apricot-trees have been destroyed.

4. How long have you been in the district?—Over forty years.

5. How long have you occupied this land?—About thirty years.

6. Did you crop your land?—Yes.

7. Has it been spoilt for cropping-purposes?—Yes.

8. When did you first notice the flooding of your property?—Between six and seven years back the flooding commenced—I mean, flooding caused by the silt.

9. Has that been getting serious?—Yes, it has been getting serious every year.

10. And more frequent?—Yes.

11. Higher floods?—Yes. In the old days it took from two to three days' rain to cause a flood; now it only takes a few hours.

12. What sort of crops did you take off your land?—All sorts. I used to take off mangolds. I have had mangolds 50 lb. in weight taken off the land. It is quite useless for that now; they would rot with the flood.

13. You have outfall drains into the Waihou River?—Yes.

14. Are they liable to blocking up by the silt?—Yes.

15. Have you ever tried to clean them out?—Yes.

16. They have been blocked up again?—Yes. The members of the Commission saw one drain completely blocked up.

17. They are all affected?—Yes.

18. About the river itself: In the early days, twenty or thirty years ago, what depth of water was there?—The river was a good depth then.

19. Have you any idea of the depth?—I should think it would average fully 10 ft.

20. Are you considering that at high tide—at the highest?—No, at half-tide. The steamer "Sturt" came up with Sir George Grey in 1876. The "Sturt" drew 7 ft. 6 in., and the steamer

"Luna" drew about 8 ft. 6 in. I saw the "Luna" go up at half-tide. Captain Fairchild had to heave the steamer's nose right round at my bend, because the turn is sharp there.

21. Other steamers used to trade past your place?—Yes.

22. Had they the difficulty that steamers have now?—No.

23. What size boats can get up now?—Some flat-bottomed scows go up there. One got stuck at the Junction. She was loaded with bricks, and could not get past that place. That was only three or four weeks ago.

24. You have known boats to stick about the Junction within the last six years?—Yes.

25. Can you state whether, about your place, the river has been shallowing?—Yes.

26. Much or little?—A good deal. The river is narrowing.

27. Could you give us an idea of how far the banks of tailings extend out—I mean from the old original banks?—It extends out considerably in several places.

28. Have you seen a fine deposit of this stuff on the grass?—Yes.

29. What effect has that?—It is very bad for the grass. It did not wash off this last time for three weeks, even after rain.

30. Do you know whether the stock eat that stuff?—They would not eat it unless they were really starving.

31. How much of your 82 acres is affected with this silt?—The whole of it was affected in the 1907 big flood. There were 3 in. over the whole of it.

32. *The Chairman.*] Not over the whole of it. How many acres of low land?—There was about 3 acres of high land that was not touched by the water, 1 acre of which is an orchard.

33. *Mr. Mueller.*] Your best land was down on the river-point where the main orchard is?—Yes. That is where the silt ran over. In that summer flood of 1907 the river never went down for three weeks. That is what killed these trees.

34. Have you known any big floods in the past?—Yes, higher than any we have had, and they have never done any damage except to bring a big deposit of loam on the grass, and it enriched the ground, really.

35. If it had not been for this silt you would have had a very good orchard and home there?—Yes.

36. You have been practically ruined through it?—Yes.

37. Your financial position has been made bad?—Very bad, and through no fault of my own.

38. You have spent your time, and money, and labour on the property?—Yes, over twenty-five years getting the orchard; and there it is destroyed.

39. *Mr. Cotter.*] You have been residing in this place over thirty years. Do you remember the "Lalla Rookh" steamer?—Yes.

40. I think you actually took her down from Paeroa to Bagnall's mill?—Yes, at dead-low water.

41. Can you give us about the year?—It was previous to the opening of the goldfields.

42. About what was she drawing?—About 6 ft. 6 in., and she never touched bottom at all.

43. Where did you start from?—From Te Puke Wharf. I was residing there at that time.

44. You have stated that the river has been, in your opinion, shallowing during the whole of this time?—Yes, during the time the silt has been coming down.

45. Did you notice any shallowing during your residence there prior to the silt getting down?—No, I did not.

46. Is it your opinion that the whole difficulty now in navigating the river up from Te Puke at any rate to Paeroa is caused by the silt?—Certainly: not the least doubt about it. Any fool can see that.

47. Now, we have got the foolishness out of it, let us try and get a little about the wisdom. Have you thought of any way of getting over this difficulty?—Yes.

48. Do you think that this trouble, if something is not done, will go on below Te Puke?—Yes, it will block the whole river.

49. Being an old resident here, can you tell us whether, in your opinion, it is very advisable that the navigation of the river should be still preserved?—Certainly: not the least doubt about that.

50. Leaving out the colonial part of the question, is it, in your opinion, very advisable for the benefit of the district that the navigation should be free?—Certainly.

51. Will you tell us what, in your opinion, should now be done to preserve the navigation from Te Puke at any rate downwards?—You would have to start at the fountain-head. I wrote to Mr. Poland about three years ago while he was down at the House, and I told him that my scheme was this: My idea was to lift all the tailings when discharged from the batteries, 1,500 tons daily, at Waikino, and bring them back in the empty trucks and shoot them down alongside the railway-line. That would injure nobody.

52. That would not remove the whole difficulty even then. What about all the tailings in the river?—Clear them away—sweep them down the river somewhere.

53. Do you think that would improve the navigation from Te Puke downward?—No; it would not for a time. The main thing is to stop the damage at the fountain-head. If that is done there is nobody wronged.

54. Have you considered the question at all in this respect: Still preserving the river as a sludge-channel, as to what should be done?—It would be a useless job. You would never overcome it.

55. *The Chairman.*] Would you revoke the Proclamation?—No: but you could get the companies to assist in lifting this stuff.

56. *Mr. Cotter.*] Have you considered the question at all in relation to this fact: As to the difference in treatment at the mines so as to produce not these coarse tailings we see on the banks, but this fine sludge?—That is just as bad as the other.

57. Is not this what you mean by your answer, that the fine sludge is as bad as the other so far as its injurious effect on vegetation is concerned?—On the vegetation and the river.

58. Why do you give that answer so far as the river is concerned?—Because these slimes are sticking in the river now.

59. Can you refer to any place in the river where the slimes are to any considerable depth?—I could not say. I have never tried them.

The Chairman: Would it not be better, Mr. Cotter, to bring forward some direct evidence? We are very pleased indeed to hear Mr. Thorp, and we had a long chat with him. I do not think this cross-examination will bring very much out.

Witness: I should like to state that the Maoris stand on a rock. The Maoris were in ignorance of the Proclamation, and they would have protested if they had known of it. The Proclamation was never translated into Maori; it was never advertised, and no notice was given to the Maoris. The Maoris knew nothing about it.

60. *The Chairman.*] Therefore you think they have a claim against the Government?—I think they have a right to go to the Supreme Court and test the position.

61. *Mr. Tunks.*] Did you make any protest yourself?—No.

62. Why not?—Because I was interested in mining all along.

63. You knew something of what was going to happen?—I had no idea of the quantity of stuff that was going to be put into the river. If I had known that, I would have protested.

64. Why do you think the Maoris would have protested?—I do not know what they would know.

65. They would not be likely to protest unless they knew what was likely to happen?—They knew a lot of stuff would come down. Some of them are pretty knowing.

66. *Mr. Clendon.*] What age are you?—Sixty-two last August.

67. When did you buy this property?—About thirty years ago.

68. What was the value of your property in 1895—of this 82 acres?—I could not say just now.

69. What would you take for it now? Are you willing to sell it?—I might sell it if I got a fair price.

70. What would you consider a fair price for it?—I have not considered it yet.

71. This orchard, I think, has been condemned once or twice?—What for?

72. Have you received a number of notices from time to time to clear your orchard of disease?—Yes, codlin-moth. I did clear it.

73. Have you been convicted?—Yes; I cleared it last season.

74. Was that disease due to the silt?—No, codlin-moth.

75. The apricot-trunk which you have produced—was that tree on the property when you got it?—No.

76. What was the age of that tree?—About seventeen years.

77. What is the average life of an apricot-tree?—About twenty-five years. I have some near the house older than this.

78. Are you aware that a number of apricot-trees died throughout the Thames last year from some disease?—I do not know.

79. What caused the death of that tree?—The silt.

80. How do you know?—The water kept on the ground for three weeks.

81. How many other trees did it kill?—Practically all died except two.

82. You value this apricot-tree at £45?—Yes.

83. When did it die—last year?—About two years ago.

84. Why £45?—I can get seven or eight cases of apricots each year from such a tree.

85. What is each case worth?—Forty-five pounds in the case, at 4d. or 5d. per pound.

86. About £5 a year. You are giving the tree nine years' life?—Yes.

87. Can you give us the county valuation of your property?—I have not got it just now.

88. You say you had bigger floods than the flood of January, 1907?—Yes.

89. How much higher would the biggest be than that of January, 1907?—About 2 ft. higher.

90. When was that?—I could not tell you. It is perhaps thirty-five years ago. It went clear over the tops of the hedges at Te Puke.

91. You have never estimated the rainfall on these occasions?—No.

92. Have you examined the bed of the river from time to time during the last fifteen years?—No.

93. When was it that the "Luna" came to Paeroa?—When Sir Donald McLean came up. I think it was in 1873.

94. How do you remember that she came up at half-tide?—The tide was half in.

95. What was the state of the tide when the "Lalla Rookh" first came up?—I cannot say. I took the "Lalla Rookh" down previous to 1875.

96. What is the average height of the bank of the river adjoining your orchard?—About 4 ft. at high water, and at low water about 7 ft.

97. By "high water" you mean ordinary high tide, not spring tide?—Yes.

98. *Mr. Mueller.*] Did not the Maoris use the water of the Ohinemuri for drinking purposes?—Yes; it was beautiful drinking-water. Mullet used to come up past this bridge.

99. *The Chairman.*] I suppose the Natives lived usually on the banks of the river?—Yes. They caught eels, whitebait, and mullet. The Maoris used to use the banks of the river for early crops of potatoes, and now they are all ruined.

100. This ancient flood of 1875: was that after a very general rainfall?—Yes, and a very heavy south-east gale. We lost some cattle; they were drowned.

101. Does your land flood now if the Ohinemuri floods, without even the Waihou?—Yes. I have seen my land flooded without any flood in the Waihou at all.

SAMUEL JAMESON LAUGHLIN examined. (No. 9.)

1. *Mr. Mueller.*] Your name is Samuel Jameson Laughlin, and you are a farmer residing at Netherton?—Yes; I own a farm there of 207 acres, freehold—Waihou West Block No. 1B, Lot 3.

2. How much of that land is affected by the silt?—About 2 acres along the bank of the river.

3. Does your land flood?—Yes, from the Waihou.

4. You are down below the Junction, at Netherton?—Yes.

5. What effect has that flooding upon the pasture of your land?—It destroys the pasture.

6. Does that make a difference to your milk cheques?—Yes, the flooding kills the grass. I do not supply milk; I make butter. Three years ago after the flood I had to turn my cows out dry; they went right off the milk. I had to turn off thirteen cows.

7. What difference did that make to your receipts?—It took away practically my living.

8. Your living fell from a fairly good living to practically nothing?—To very little.

9. This last flood in March—what effect did that have on your land?—It did a good deal of damage, but nothing like the flood of three years ago.

10. Did it come as high as the flood of three years ago?—Yes, pretty near, I think.

11. Why did it not do so much damage as the flood of three years ago?—Because I had not quite so much crop.

12. Because the grass and stock were not there to be damaged?—Yes.

13. Subsequently to the 1907 flood, did you get rid of some of your stock?—Yes, I parted with a good few. I had to do so.

14. Did you part with them at a loss?—Yes.

15. There are some outfall drains on your land?—Yes.

16. Do you find them affected with silt?—Yes; there are three drain-outlets affected with silt. They are affected by being closed up at the junction with the main river.

17. Have you cleared them out at times?—One of them I have cleared out pretty often—I may say two of them; and the county has cleared them out.

18. Has that clearing been effective, or are they filled in again?—The next fresh fills them again—not the whole drain, but partially.

19. How long have you been on this land?—About eleven years; but I have owned the block for seventeen years—since July, 1894.

20. Prior to your residing there, did you often visit the place?—Occasionally I came up to have a look at it.

21. Was anybody else in occupation of the land?—No.

22. When did you first notice this land being flooded or damaged?—In the big flood about three years ago—the summer flood of 1907.

23. Prior to that, had your land been flooded?—No, I do not think so—not to a great extent—nothing big enough to draw my attention to it.

24. During these floods have you suffered loss in any other way than you have mentioned?—Yes; potatoes, oats, and bee-hives. I also lost three head of cattle, and my fences were damaged.

25. Can you give any estimate of the damage you have suffered on account of these floods and silting?—Yes, I had an estimate made out, but I have not got it with me. It is not the amount of silt we complain of at Netherton—it is the overflow of the Waihou.

26. What is that caused by?—By the junction of the Waihou and Ohinemuri Rivers being blocked up by mining *débris*.

27. What river frontage have you got?—About 22 chains.

28. What will be the result as regards your land if nothing is done to remedy this evil?—I think it is only a matter of time, and we shall be in the same position as our friends above the Junction.

29. You know the river frontage along your property: has that shallowed or filled up in any way?—I have a sample of tailings with me which I took off my river-bank. I took it this morning. [Sample produced.] There is a similar class of tailings on the opposite bank. The sample was taken off the river-bank.

30. How far is your land from the junction of the two rivers?—About seven miles below the junction.

31. Is there much of that sort of stuff on the river-bank?—Yes; there is a good deal of it shelving towards the channel.

32. Do you think there is a good deal of filling-in of the river itself?—Yes, of the banks.

33. Both sides?—In places, yes.

34. What effect has that had on the navigation of the river?—To use his own words, the captain of the steamer keeps what he calls the gutter, or the channel, which is very narrow, and it takes a man of experience to keep his vessel in it. If he gets out of that he gets fast on the bank.

35. In previous years could vessels have a wider scope in going up and down the river?—I think so.

36. Has the accumulation of tailings opposite your property been increasing lately?—Yes.

37. Can you state whether it has been increasing more this year than it did five years ago?—Yes; there are more tailings there now than there were five years ago. Every big fresh seems to put a new coating on the top.

38. *The Chairman.*] What was the effect of the March flood?—That brought down a considerable lot. It left a solution of tailings—I should call it silt—over the grass.

39. *Mr. Mueller.*] Finer stuff than you used to get?—Yes.

40. When did you first notice the fine stuff?—Principally after the last flood.

41. Have you noticed the fine stuff adhering to the grass?—Yes.

42. Does it easily wash off the grass with a shower of rain?—No, it seems pretty hard to get off.

43. Do you know whether that has any effect upon the cattle eating the grass?—I should say it would not improve them.

44. You know the Puke ferry?—Yes, I cross it three or four times a week.

45. Has there been any shelving of the banks there?—Yes, it is an annual cost to the Council to keep it open. They have had to extend the approaches 9 ft., particularly on the western side.

46. You are a member of the Ohinemuri County Council?—Yes.

47. This flood in 1907 took a long time to subside?—Yes, I think it must have run over Netherton for about three weeks.

48. In any previous flood had you any similar experience?—No.

49. In the earlier floods did the water remain on the land for any length of time?—No, the ground would be wet after a fresh came over it, but it seemed to get away fairly well.

50. *The Chairman.*] This January flood that came over from the back—did it carry silt with it, or was it water fairly clear?—I cannot say that it did bring silt. I did not notice any silt on my property.

51. In that flood there was none came over the river-bank; it all came from the back?—I could scarcely answer that question.

52. It did not pour over in the front?—No, it could not have done, because the water was pretty clear.

53. *Mr. Mueller.*] Do you know Mr. Chamberlin?—Yes.

54. Do you know where he put in a pump to get river-water for his cattle?—Yes. He lives at the Junction. As near as I can remember, there is a bank of tailings 15 ft. between his pump and the river.

55. *The Chairman.*] He put his pump directly into the river?—Yes, and now there is a bank of tailings 15 ft. between the pump and the river.

56. Is the mouth of the Komata Creek blocked up with silt?—It is pretty bad.

57. Where do you think those tailings came from at the mouth of that creek: did any of them come down the Waihou?—I should think that a good deal came from the Komata mines.

58. Do you think any of them came down the Waihou?—They may have.

59. This would be slightly above where the drains go into the Waihou?—Yes.

60. Do you know the time when the mouth of that creek was navigable enough to get barges and punts up it?—I have heard that you could once get a punt up there; but you could not do so now.

61. You know the Waihou River above the Junction?—Yes.

62. What have you got to show the Commission as regards your suggestions as to the Waihou River above the Junction?—The Waihou River having been declared a sludge-channel, and not being used by the mines that I am aware of, I think it would be a wise thing to try and remove the Proclamation, to save any trouble that may arise in time to come.

63. You know what has been referred to as slimes?—Yes.

64. Have you got any samples of slimes?—Yes; they have just been taken from the bottom of the river. [Samples produced.] This is a sample that I took out of the river about 2 chains below the Railway Wharf at Paeroa. I do not call it slimes.

65. Did you take it out of the middle of the river?—No, below the water-line. I call it very finely powdered tailings.

66. Were there other similar deposits?—There was one, but I did not take the sample myself. I have nothing to say about it, because I did not take it myself.

67. *Mr. Tunks.*] You said something about the Waihou River being declared a sludge-channel and not being used as a sludge-channel, and that it should be closed as a sludge-channel: what part do you refer to?—From the Junction up to Te Aroha.

68. Do you suggest closing the Ohinemuri River up to Waihi?—I should suggest that they do not put any more tailings in it.

69. Do the steamers not sometimes stop at your place on their way up?—The steamer stopped once about seventeen months ago.

70. And never since?—No.

71. Has there been any occasion for them to do so?—Not that I am aware of.

72. You cannot say whether or not they could stop there?—Certainly they could stop.

73. Was not there a big flood that was known as the "Old Man Flood"?—Yes, about 1897.

74. Was your land under water then?—Yes.

75. For how long?—About five days, I should say, round the house.

76. What caused that flood?—I suppose the water or the rainfall.

77. Had the silting of the river anything to do with that?—I consider it had. From the length of time it was on the ground I think it was partly due to the Waihou River being silted up.

78. Being silted up with mining tailings?—Mining *débris*.

79. You say that all these floods have been entirely due to the Ohinemuri River backing up the Waihou River?—The floods over Netherton.

80. Take the 1897 flood: what exactly was that due to?—In my opinion, if the Junction had been cleared of *débris* it would not have taken one-half the time to get off. If the Junction is choked up it takes longer to get away. Hence the overflow some three miles up the river from Netherton.

81. This water came from the Waihou towards the back of you?—It traverses from the Waihou straight over Netherton, and joins the Thames or Waihou River at the creamery.

82. *The Chairman.*] I want to be perfectly clear on that point: which flood are you referring to?—I am referring to the flood three years ago, known as the "Old Man Flood."

83. *Mr. Mueller.*] The "Old Man Flood" was in 1897?—I know very little about that flood.

84. You told us that in 1897 your house was surrounded for nine days, and in 1909 for five days. What about 1907?—I withdraw that.

85. *The Chairman.*] You stated that the water was around your house for about nine days?—For five days.

86. You are quite clear that was in 1907?—I was not living at Netherton at that time.

87. *Mr. Tunks.*] Do I understand that you do not remember anything at all about the 1897 flood?—I cannot say that I do.

88. Were you not in occupation of your land then?—No, I was mining at the time.

89. Have you had any experience of cattle having been killed by eating this grass?—No, I cannot say that I had any cattle which died by eating it.

90. Have you any stock on your property now?—About twenty-seven.

91. Are you making butter still?—Yes, a little. I send it to Paeroa to the local storekeepers.

92. Does very much silt come down the Komata Creek?—Yes, it is nearly full of what I call tailings.

93. Can you say whether the tailings on your banks come from the Komata or the Ohinemuri River?—No, I could not.

94. It might just as well come from the Komata as from the Ohinemuri River?—Yes.

95. Then the closing of the Ohinemuri channel, if the Komata is left open, would not help you?—I do not suppose there would be so much coming down.

96. *Mr. McVeagh.*] You got your land about 1894?—Yes.

97. How much land was taken up at Netherton about that time?—It was all taken up round about where I live.

98. How many settlers were there, approximately?—Really I could not tell you without a little time to go into it.

99. You had no dairy factories here at that time?—No.

100. What were they subsisting on then?—Cropping, making butter, and so forth.

101. Have you any objection to say what you paid for your land then?—It is a little bit private, but I have nothing to hide. It cost me about £3 per acre.

102. What do you estimate its value now?—The front portion is valued at £6 per acre, Government valuation; the back part of the farm, £4 an acre.

103. Can you give the area at £4 and the area at £6?—Forty-two acres at £6 an acre, and 165 acres at £4.

104. I suppose your land when you took it up was as good as any of the land in the immediate locality?—Yes.

105. Your land might be taken as a fair sample of Netherton land at that time?—I did not see much difference along the river.

106. I understood you to say that you were well acquainted with the Waihou River above the Junction?—I have been on it.

107. Have you been on it frequently, and, if so, when?—I think it is three months ago that I was up there in a yacht.

108. How far did you go up the river then?—I went up to where it overflowed into Netherton.

109. How far is that up the river?—By land it might be about three miles from the Junction. It would be a little further from Netherton.

110. Did you go up as far as the Awaiti country, where the flax-mill is?—Yes.

111. You know that the source of the Waihou River is up in the Patetere Plains?—Yes.

112. That is heavy siliceous country, and the river flows through that class of country for a considerable distance?—Yes.

113. You have noticed the willow-trees growing on both banks of the Waihou from the Junction up to as far as you have been in the habit of going?—Yes.

114. Have you never been beyond the Awaiti?—A little bit, but not very far.

115. You found a very thick growth of willows on both banks of the river for that distance?—Yes, in places very thick.

116. I think to such an extent that the willows almost meet in some places?—They overhang the banks very much.

117. The banks are low, and the left bank especially is a very low one?—I do not know that it is much lower than the other one.

118. Is not the average height of the bank throughout the distance you traversed from 3 ft. to 4 ft.?—I should say that the bank is about 4 ft. at ordinary high tide.

119. Is that the summer level or the winter level?—I have not taken that much notice. I noticed the banks to be about 4 ft.

120. What difference would there be in the height of the bank at spring tides?—I could not tell the height there, because I never measured it; but the tide rises about 4 ft. opposite my own place—from 2 ft. 9 in. to 4 ft.

121. Can you say whether there is any tidal influence at Te Awaiti flax-mill?—I could not say.

122. The effect of these willows must be to impede the progress of the flood-waters?—I should say they do harm, certainly.

123. Taking into consideration the willows, a flood in the Waihou, and tidal influence, is it not a very easy matter for the waters of the Waihou to overflow the left bank?—I could not say.

124. Do you not know, as a matter of fact, that before tailings were put into the Ohinemuri River the Waihou used to overflow that country on its left bank?—It may have done so, but not to the extent it is doing now. At least, I never heard any one complaining about it.

125. Because, I suppose, there was not very much settlement there then?—Yes, there have been people living at Netherton for considerably over five years.

125A. Are you not aware that long before the Proclamation people have been in the habit of protecting themselves from the waters there?—No.

126. At the back of Netherton, I think, there is a lot of swamp country?—I do not know what you call swamp country. It has a good clay bottom. I do not consider there is swamp land at the back of Netherton, or very little swamp.

127. Is there any swamp across the Te Awaiti country?—I cannot say much about that.

128. Is there not a big kahikatea swamp at the back of Netherton?—If you refer to the land that has changed hands lately, that is good, hard, dry land.

129. Does not the kahikatea grow in swampy country?—Not always.

130. Is there not some marshy country at the back of Netherton?—In some places there is peaty stuff on the top of the clay.

131. Have you drains on your property?—Yes.

132. How many?—The county has a large drain, and I have one or two little drains of my own.

133. What is the length of the county drain?—About 21 chains, and it is about 15 ft. to 21 ft. wide.

134. *The Chairman.*] What is it on the water-level?—About 7 ft.

135. Where does it start from?—From the Waihou River.

136. Where does it terminate?—The river side of the Netherton Main Road.

137. *Mr. McVeagh.*] What is the length and what are the dimensions of your two small drains?—One about 23 chains long, the other about 20 chains. One would probably be about 4 ft. deep, the other is a very shallow drain.

138. You have done a good deal of draining. Are the other settlers as industrious as you?—We have all done our work.

139. It must be very wet country?—I do not consider it is very wet.

140. The effect of the draining has been to consolidate your land and reduce its level?—I cannot say.

141. Do you know that pumice comes down the Waihou?—I have heard about it, but I have not seen it.

142. *Mr. Mueller.*] In connection with the Komata Creek, are there not tailings in the Waihou up to the Junction?—Yes, on both sides of the river.

143. You said the Government valuation of your land is £6 and £4 an acre. If there had been no tailings in the river, would the value of the land be more or less than that?—Certainly the value would have been more.

144. Has the Government reduced the valuation of the land since the proclamation of the sludge-channel?—No.

145. Have they increased it?—No.

146. There has been no reduction due to the silt?—Not that I am aware of.

147. Is not the advance in the price of land in the district due to the dairy industry?—Yes.

148. If it had not been for the tailings the dairy industry would have increased the value of the land?—Yes.

149. What would be the result, in your opinion, if on the upper reaches of the Waihou reduction-works were started and the material put into the river?—It would depend on the amount put into the river.

150. You suggest that before such works start the river should cease to be a sludge-channel?—Yes.

151. As regards the swamp land supposed to be at the back of Netherton, could not cattle travel over that land in summer-time?—Cattle could go over it now: I do not call it swamp land.

152. *The Chairman.*] Are there cattle on the land at the present time?—Yes, here and there.

153. *Mr. Mitchelson.*] You have not told us the amount of silt on your land—you only referred to 2 acres along the bank of the river having silt on it: what was the damage done to the other parts?—That damage was not done by silt, but by the overflow of clear water. But the last flood had a lot of sediment in it—sediment from the mines.

154. You have referred to the block at the mouth of the Waihou: do you attribute the whole cause of the flood to that obstruction?—There has been a little island there as long as I remember.

155. Was that not caused by the willows? Do you not think the destruction of the willows would have some effect on the floods?—It would cause some improvement. I think the island at the Junction has grown considerably. It has a lot of tailings on it.

156. You admit that the overflow of clean water has done most damage on your land?—Yes.

157. We were told by a witness yesterday that the freshes causing an overflow of clean water do no damage?—They do a lot of damage.

158. *The Chairman.*] River-flats are supposed to be the most valuable land, are they not?—Yes.

159. Does not a great portion of the water that comes on to your place come from the upper reaches of the Waihou?—I know that the Waihou overflows from the Junction up, in flood-times.

160. You are a member of the River Board?—Yes; but, so far as I can see, it is only a River Board in name.

161. *Mr. Moresby.*] From the Junction right up to Te Aroha district there is only one farm to rate: the balance is Native land. There is only one-ninth part of the land at Netherton that is rated?—That may be so.

162. *The Chairman.*] You gave evidence at Wellington: Is there any of that evidence that you wish to alter in any way?—No. I have never changed my opinion as to the remedy. I would like to say that I never heard that the river was to be declared a sludge-channel: I received no notice from the Government or any one else.

163. Do you read the newspapers?—I was living at the Thames then.

164. *Mr. Vickerman.*] You would not get a personal notice; there would be an advertisement in the newspapers?—I did not get the Paeroa papers.

WILLIAM MOORE examined. (No. 10.)

1. *Mr. Mueller.*] Your name is William Moore, and you own 183 acres of land?—Yes, Sections 4 and 5, Block XI, Waihou Survey District.

2. Your son Frank owns 240 acres, Block X, and another son, Walter, owns 163 acres in the Rangiora Block?—Yes.

3. You speak on behalf of your sons?—Yes.

4. You have all suffered loss?—Yes, very serious loss.

5. Is this a statement showing the particulars of your loss, amounting to £1,657?—Yes, up to the present time that is my loss. I settled at Netherton on the 25th June, 1879. The first flood that caused any damage was on the 15th January, 1907. On that occasion I lost the whole of my crops, also,—

	£	s.	d.
6 head of cattle, value	36	0	0
12 acres of oats for chaffing, average 3 tons per acre, 36 tons, at £4 per ton	144	0	0
12 acres meadow-hay, 24 tons, at £3 per ton	72	0	0
183 acres, all laid down in rye-grass and clovers, totally destroyed, requiring ploughing and sowing down afresh, at £2 10s. per acre	457	10	0
Loss on cream cheque through having no feed for sixty cows for five months	225	0	0
Loss on pigs through having no skim-milk	63	0	0
Feed required for sixty cows for five months	60	0	0
Loss on first flood, 15th January, 1907	1,057	10	0
Second flood, 4th September, 1909—loss by grass being killed ...	300	0	0
Third flood, 28th March, 1910—similar loss	300	0	0
Total	£1,657	10	0

Previous to 1907 the farm was let at £100 per year; after 1907 I reduced the rent to £50 per year; and after the 1910 flood the farm was thrown up. [Exhibit No. 8.]

6. Is that your evidence?—Yes, principally.

7. *The Chairman.*] Your complaint is simply of flooding. No *débris* went on to your land. The water only comes from the back?—The whole of the water comes from the Waihou River.

8. *Mr. Mueller.*] Your son Frank rented a farm from you, and he also owned a farm of his own?—Yes.

9. What has Frank had to do in connection with this land?—He has cleared out.

10. Left the farm and thrown up the lease of your land?—He paid £100 a year for five years. After the first flood I reduced the amount by half. Then after the last flood he gave it up.

11. *Mr. Tunks.*] You have given us a statement of your losses. On which piece of land were the sixty cows?—On the 183 acres.

12. Was that the piece you leased to your son?—Yes.

13. When did you lease it to him?—In 1902.

14. And he had it right up to 1907?—Right up to now.

15. This is not a statement of your loss; it is a statement of his loss?—It is all the same; I found him everything.

16. Had you a share in the thing?—The farm belonged to me.

17. But not the cattle?—I gave him some cattle when he started.

18. Have you any suggestions to make to remedy this?—I think that if the Awaiti Creek was cleaned out it would be an improvement. It wants to be made about 30 ft. wide, and deep enough to run out. At present the water is still.

19. Are there willow-trees there?—They have pulled them out, I believe. They ought to widen it considerably.

20. *Mr. Clendon.*] Were you a member of the local authority at the time of the Proclamation in 1895?—No.

21. Were you not one of the advocates of the sludge-channel?—No.

22. Were you an opponent?—Yes.

23. Why?—We had a beautiful clean river, with perpendicular banks, and I knew that when the tailings came into it it would not be clean very long.

24. You knew what the effect would be?—I did.

25. And of course you made your claim for compensation?—No.

26. Why?—What was the good? I should not have got anything. It had not done me any damage at that time.

27. What was the value of the land in 1895?—Twelve pounds an acre, some was sold at.

28. What is its value now?—I will take £20 an acre for it. I might take less if I got a buyer. It has depreciated in value at the present time.

29. Will you sell it at £12 an acre?—Yes.

30. Sixteen hundred pounds is the loss you say you have sustained in three years—the bulk of it in 1907?—Yes.

31. How long have you been in the district?—Thirty-one years.

32. During that thirty-one years have you ever known a flood bigger in this district than the flood of 1907?—I think the last flood was bigger if anything—the flood of 28th March last.

33. On your own property?—No, it was not so bad on my property as the 1907 flood.

34. Have you many drains on your property?—Six or eight from the river to the road. When they were made they were about 5 ft. on top and from 3 ft. to 4 ft. deep.

35. *Mr. Mueller.*] Was the flood of last year nearly as big as the 1907 flood?—It was not so big, and did not do the same damage owing to coming in a different part of the season. The 1907 flood came in January, when all the crops were ready to be housed. The settlers lost the whole of their crops.

CHARLES BRUNSKILL examined. (No. 11.)

1. *Mr. Mueller.*] Your name is Charles Brunskill, you are a carrier, and you have been in this district about fifteen years?—Yes.

2. You have been daily associated with the rivers and the steamers?—Yes; during that time, owing to the nature of my business, I was associated almost daily with the river, and with the steamers plying from Auckland to this place.

3. Fifteen years ago do you remember the steamers "Ngunguru" and "Paeroa" going right up to the Paeroa Wharf, in the centre of the town?—Yes, to the Wharf Street Wharf.

4. They discharged their cargo there daily?—Yes.

5. Drawing what amount of water?—The "Paeroa" was a small boat, but her draught was as much as that of the "Taniwha" and "Waimarie." She was the regular trader to Paeroa in those days.

6. At that time what was the depth of water at the Wharf Street Wharf?—In those days the banks were quite perpendicular. It was a beautiful running stream, and I should say that when the tide was up there was fully 10 ft. of water. The tide rose then about 5 ft. or 6 ft., and now, except at spring tide, its rise is scarcely perceptible.

7. What is the condition of the banks now?—I remember when I and others used to bathe at the old wharf. In one place I used to jump into about 10 ft. of water. Now there is a bank of silt about 20 ft. high about a chain out from where I used to bathe.

8. After the Government built the railway-bridge the steamers came to the wharf just below?—The Government erected a wharf for the accommodation of the steamship companies, and also an iron shed, but it was practically of no use after the first year or two. The boats could not get up.

9. *The Chairman.*] What year was the Railway Wharf built in?—I understand that it was erected in 1894.

10. *Mr. Mueller.*] Have you seen steamers trying to get up to the Railway Wharf and not succeeding?—They very soon found they could not get past Pereniki's Bend. They found it useless to try to get up to the Railway Wharf, and they fell back to the Junction Wharf.

11. The Northern Company then erected a shed at the Junction Wharf?—Yes, and in a few years they had to take it down again.

12. Did the vessels not run up to Paeroa even after there was little accommodation at the Junction Wharf: did they not land the passengers?—I had to meet the steamers at the Junction Wharf on the arrival of the steamers from Auckland, and I took the passengers off. The steamers then went up to the top wharf, and discharged their cargo. On leaving, the steamers had to leave an hour before. To save the long passage round, I drove the passengers down to the Junction.

13. You have seen the boats trying to get up to the Railway Wharf?—Yes.

14. Have you seen them obliged to discharge some of their stuff there?—Between the Puke and the Junction—that was a year afterwards.

15. For a number of years the Junction Wharf was used?—Yes, for four or five years.

16. *The Chairman.*] Can you give us the last year or date when the Junction Wharf was used?—It is fully ten years since I started running at the Puke Wharf. That would be when they gave up the Junction Wharf.

17. *Mr. Mueller.*] After they had been running to the Junction Wharf for a time the river began to shallow just below the Junction?—Yes; below Mr. Kenny's house they had to discharge cargo.

18. *The Chairman.*] Do you alter your previous evidence, and make it eight years instead of ten?—I was under the impression that it was fully ten years, but if you have documentary evidence to the contrary I cannot dispute it.

19. *Mr. Mueller.*] As to this place where they used to stick below the Junction: you have been there very often?—Frequently.

20. You know what is called the Island?—Yes, at the mouth of the Waihou River.

21. Was it at that Island or below the Island?—Just near the mouth of the Hape Creek.

22. You have been intimately connected with this river for sixteen years: have you noticed whether the silting-up has been quicker of recent years?—Oh, yes! That is very easily accounted for. About fifteen years ago there were plainly to be seen right along the Ohinemuri River large depressions or holes, some of them 20 ft. deep, in the river-bed and in the sides of the river. For six or seven years the silt went on filling up those holes; and the silt on the banks of the river was not very much in evidence until all the depressions were filled. It took an enormous amount of tailings to fill them. The same thing is practically happening to the Waihou River.

23. You think that would be the result as regards the Waihou?—I think that in a few years the holes in the Waihou River will be filled up, and the banks will then begin closing.

24. *The Chairman.*] That is, the Lower Waihou?—Yes, below the Junction.

25. *Mr. Tunks.*] I understand you to say that the rise of the tide at Paeroa is imperceptible?—It is very insignificant to what it was fifteen years ago.

26. Was there a charge at the Railway Wharf?—Yes, but I did not understand that that was the reason why the steamers did not go there. The carters had not to pay any charge: the Northern Company or some other company must have paid it.

27. The person employing you had to pay the charge?—The company may have put it on to their charges of cartage from Auckland.

28. You do not know that it exists at the present time?—No.

29. Are you carting still?—Yes.

30. Do not the willow-trees form a stoppage to the silt?—Yes.

31. Do you suggest any remedy for the trouble?—You want me to find a remedy and still allow the silt to go into the river—without revoking the Proclamation.

32. Do you suggest that the Proclamation should be revoked?—I should not like to say that.

33. You have not gone into that?—No.

34. Suppose you closed the Ohinemuri as a sludge-channel to-morrow, have you considered whether it would make any difference to the flooding of the country?—It would not make the floods any greater than they have been recently.

35. So that the closing of the river as a sludge-channel would not do any good?—Yes, it would. Supposing the amount of silt now in the river were put into the river between here and the Junction Wharf there would be very little opening left; it would fill the river-bed from bank to bank.

36. Do you suggest that the slimes now going into the river are causing any silting-up?—I have heard a good deal as to the difference between slimes and silt. I do not think there is any difference between the two. Close to the Criterion Hotel there is a large deposit of fine silt.

37. Have you examined it?—Yes, this morning; and I thought it could not be finer than it is.

T. M. Robinson examined. (No. 12.)

1. *Mr. Mueller.*] Your name is T. M. Robinson, and you own 234 acres of freehold land on the bank of the Waihou River, at Netherton—Komata North No. 1A No. 4?—Yes.

2. How much of that is subject to floods?—I might say that when I went to the place first, ten years ago, it was slightly flooded—the front portion. At low water, if there was a flood, it did not interfere with me to any extent. The last flood flooded some 40 to 50 acres.

3. Was that area affected by tailings?—Yes, the whole lot of it. From a chain to two or three chains back the deposit was 3 in. or 4 in. deep, and at 7 chains back it is too bad for the vegetation. It is there now. The water stayed on the land for two days. It came and went with the tides.

4. In the 1907 flood did it stay on your land for a considerable time?—It was there about five days.

5. You had a falling-off in your milk cheque: was that caused by the loss of feed?—Yes.

6. You noticed the grass being covered with a sticky slimy white stuff?—Yes.

7. Have you noticed whether that is hard to wash off?—I think you have to wait for a young growth.

8. How many cows were you milking last January and February?—About fifty-five or fifty-seven.

9. And after the March flood of this year your milk cheque dropped considerably?—Yes.

10. And after the 1907 flood there was even a further drop?—Yes.

11. Do you know the river as regards navigation?—Since the creamery started I have been on the river once a day at all times of the tide.

12. You go from your place to the Netherton creamery in a launch with your milk?—Yes.

13. How far is that, roughly, by river?—About three miles and a half.

14. What does your launch draw, loaded with milk?—Two feet.

15. Can you state whether the navigation of the river has altered in the last two years?—Yes, very much. Formerly I used never to "shallow," but that happens now. That has happened for the last two or three seasons. I am speaking of low water.

16. Do you consider that the river has shallowed during the last two or three seasons from your place to the creamery?—Yes.

17. You really do not know anything about slimes?—No.

18. *Mr. McVeagh.*] You are a member of the Silting Association?—Yes, I think I was the first who proposed it.

19. In the case of the Waihou, is there any draining going on up there?—I have no personal knowledge of it.

20. Was that considered at the meeting of the Silting Association?—No doubt the whole thing was discussed.

21. Was any attempt made to discover how much of the floods was due to the denudation of the country?—As far as I can remember, the association laid no weight on that.

22. What weight did they attach to the natural detritus carried down by the rivers?—Very little indeed.

23. Had you or any other member of the association any information as to the quantity of natural *débris* that is carried down by rivers?—It all depends on the nature of the country the river flows through. The Silting Committee is of opinion that had no silting been going on further up, or if the water in the river had not been affected by artificial means, there would be practically no *débris* coming down, or it would have been so minute as not to be noticeable for very many years.

24. You know that the Ohinemuri River is of a torrential character?—Yes.

25. There is consequently a great deal of friction in its descent?—Yes; in the Karangahake Gorge, where the river has been cutting its way through for thousands of years, the *débris* has been imperceptible.

26. Did your association consider the question of the placing of railway *débris* in the river?—I am aware there was a lot of stuff thrown out in the making of the tunnel. There might have been some cuttings, but I do not think a great deal came down.

27. Where has it gone to?—There are boulders in the river.

28. Where have the embankments gone to?—No doubt a little has come down the river and settled in the water.

29. You have formed no estimate of the quantity of stuff put into the river from that source?—No.

30. If it had not been for the tailings on part of your land, and the water flooding your land and depositing slimes on the grass, you would have been able to feed and milk more cattle?—Most decidedly.

31. How many more do you think: twice as many as you are milking now?—Yes. I have got rid of about thirty cows, but not all milking-cows.

32. *The Chairman.*] How many did you milk this morning?—We are finishing off: we ought to have milked into the winter.

33. *Mr. Moresby.*] Your boat runs up and down to the creamery?—Yes.

34. Is there any spit or bank running off at the Waimarie Bend?—Yes.

35. What is its extent?—More than half a chain. It is a chain from the old original bank.

36. *The Chairman.*] What is the width of the spit?—About 50 yards.

37. *Mr. Moresby.*] When did you first notice that spit?—About two years ago—the lower part of it.

38. Has it got worse in the last two years?—Very much. It is caused by the silt.

39. You know the wharf now owned by Mr. Walter Moore?—Yes.

40. What depth of water was there at that wharf at low tide when Mr. Charlton kept the "Lulu" there?—I never measured it, but you could get in there at low tide.

41. Can you get in at low tide now?—No. There is no water there at low tide. There is no water around the timber-wharf. It is now dry for about 9 ft. from the wharf.

42. Do you know a place called Thomas's? Have you had any difficulty in getting past there?—Yes, the river shallows a great deal opposite Thomas's, pretty well half-way down to the creamery.

43. Has that place got worse in recent years?—Yes.

44. Do you consider that the river has shallowed up in recent years?—Yes, both sides.

45. Right across?—Yes; but I cannot say to what extent.

46. Does that place cause you any difficulty at the present time?—We have to slow down, and then you can feel her touching the ground.

47. Have you tried to find a better channel?—Yes.

48. Three or four years ago, did you bump there?—No.

49. Has the river shallowed up below that—before you get to the creamery?—Yes, opposite Moore's residence, and we have a difficulty in getting over there.

50. You do not know whether it is the increase of the river-sands or mining *débris?*—No, I cannot tell you—not in the bed of the river.

51. Have you tested the bed of the river at all?—Yes, I got a young fellow to go down opposite Moore's, and he got some tailings and sand.

52. What did he take it up in?—He scooped it up.

53. *The Chairman.*] What was the size of the sand?—The size of bricklayers' sand. But I went to the same place and did not get so much sand the last time. I would not say that would be found there. We have tried again, and there was tailings there.

54. *Mr. Moresby.*] Have you had experience of mining?—Yes, for twenty-two years.

55. Do you know tailings?—I have broken quartz up through the stampers, got the amalgam, squeezed it, retorted it, and put the money into my pocket.

56. Do you know that portion of the river from your place up to Te Puke Wharf?—I have been up and down there a great deal.

57. In your opinion, is that portion of the river improving, or is it the other way?—I think it is falling in. I believe the tailings are accumulating on both banks the whole way up.

58. What about the bed of the river—is that shallowing up at all, in your opinion?—I do not go up there very often, but the last time I went up I could see it was shallowing just above Mr. Wight's.

59. Mr. Wight has told us that his cattle can walk across that place?—At low tides I have seen cattle drinking in the river.

60. How far out into the river?—About half a chain from the bank. In my opinion that part of the river by Mr. Wight's is shallowing up.

61. Do you know that portion of the river below Te Puke ferry? Is that portion of the river shallowing up?—I cannot say it is.

62. What is your opinion of the river from Puke right down to the creamery—is it your experience that the river is shallowing up or otherwise?—I believe it is shallowing up.

63. Has the shallowing increased in the last two years?—I believe it has.

64. *The Chairman.*] Has the river got narrower in the same period?—Yes, I believe it gets narrower. I am satisfied the river has not got the carrying-capacity it used to have.

65. What becomes of the water?—In times of flood it runs over the land.

66. If the river is narrower, must it not be deeper to get the same volume through?—I cannot account for it, but I have noticed the shallowing-up in the way I have described.

67. *Mr. Moresby.*] When you first went to your farm, what was the nature of the banks—hard or soft?—Soft.

68. What is the nature of the banks at the present time?—I would not say they were hard, but if they were left for a day they would be hard. I remember when the tailings were much coarser—they were thoroughly solid; but now they are more "puggy."

69. Are they any firmer than when you first went there?—Yes, the tailings are firmer than the mud.

70. Is the bottom of the river any harder or softer?—I do not know.

71. Have you pulled a barge on the river?—I have pulled a boat where there was, roughly speaking, 8 ft. of water in some places, and now cows can walk out and drink there. In the summer-time I believe there was 8 ft. of water once, and I do not believe there is any water at all there now in the summer-time.

72. *Mr. Tunks.*] Is there any depth of water at the bend?—There is a fair depth of water going round the bend.

73. Is not that bend a very sharp bend?—Yes.

74. You only made one attempt to find out what the bottom of the river was like?—That is all.

75. We shall produce evidence to show conclusively that there are practically no tailings at all there. Have you not found the channel alter during the ten years?—Yes, but not at my place.

76. The river has varied from side to side in some places?—Yes.

77. Do you say that the variation in the shallows of the river is greater than it used to be?—Within the last two or three years I have not been able to get down without dragging the bottom—that is, at low tide.

78. *Mr. Clendon.*] The "Waimarie" and "Taniwha" come up at a little better than half-tide?—Yes.

79. Drawing what?—Six feet, I suppose.

80. Have you ever seen them ground in the neighbourhood of your place?—I have seen behind them a darkening of the water as wide as this room.

81. *The Chairman.*] What colour was the water?—It was more like the disturbing of sand.

82. She did not stick, did she?—I have not seen her.

83. *Mr. Clendon.*] How did your creamery cheque for 1909 compare with your cheque for 1910?—My creamery cheque fell very considerably in consequence of the flood.

84. You say you went there about ten years ago?—Yes.

85. What did you pay for your property?—About £4 an acre.

86. What was the Government valuation last year?—£2,696 on the 332 acres.

87. That is about £8 an acre?—Yes.

88. Your land, I think, is for the most part low-lying flat land?—No; I do not think it is any more so than the others'.

89. But it is flat land on the river-bank?—Yes.

90. You told us that you had seen cattle drinking near Wight's place at low water: when was that?—I believe I have seen them this season.

91. You say your property was under water for five days?—For four or five days.

92. Were all the properties in the vicinity under water for five days too?—I suppose they were.

93. During last summer, I think you milked more cattle than you had milked before?—No; about the same number.

94. This scum that you found over your grass after the five days' flood—did you test it in any way to see whether it was harmful?—I believe that would be a matter for an expert. I know my cows will not eat it. I do not think it is a fair thing for me to allow them to eat it, and then make butter for people to consume.

95. Have you found whether it affects the cattle injuriously?—The cattle do not look as well as before the silt came there.

96. They have not got the same polish on their coats?—No, and it is not on their ribs either.

97. *Mr. Mueller.*] You have spoken a lot about the shallowing that has taken place in the river?—Yes, and the banks are narrowing.

98. What does that deposit consist of, so far as you can see?—It consists of ground ore—tailings; I believe they are now called "slimes."

99. If I asked you what, in your opinion, has caused the narrowing or shallowing of the river, what would you say?—I should say tailings.

100. You remember after the last flood there was some deposit of tailings on your land?—Yes.

101. Did you show that to the County Engineer?—Yes: he took some samples for 4 chains back in my place, and I think he considered they were slimes.

102. You have stated that the last Government valuation of your land was about £8 per acre: can you give us any idea as to what you consider the value of that land would be if there were no tailings in the river at all?—I would not take £16 per acre for it.

PAEROA, WEDNESDAY, 25TH MAY, 1910.

ALFRED TETLEY examined. (No. 13.)

1. *Mr. Mueller.*] Your name is Alfred Tetley, and you are a draper carrying on business at Paeroa?—Yes.

2. You are also a farmer, close to Paeroa?—Indirectly a farmer—representing my mother.

3. Your mother, Mary Tetley, owns 200 acres of freehold land, and you look after it for her?—Yes, Piraurahi No. 10, and part of Te Waka-o-tiki, Te Aroha. It adjoins Bertelsen's. It is between the railway-line and Bertelsen's.

4. It is agricultural land?—Yes.

5. You have no frontage actually to the river?—No.

6. Your land is subject to floods?—Yes.

7. How much of that 200 acres is actually affected by the deposit of silt?—Pretty well three-quarters, more or less.

8. Varying in depth to what extent?—From a thin deposit up to 2 ft.

9. *The Chairman.*] Where is the 2 ft.?—About 5 or 10 chains from the river.

10. *Mr. Mueller.*] What effect has this on the grass?—It destroys the grass.

11. Did you notice the deposit that has been referred to as slimes?—Yes, latterly.

12. Since when?—About six months ago, more particularly since the last big flood about two months ago.

13. And does that deposit adhere very closely to the grass?—It does.

14. Is it difficult to remove?—Yes; it takes a considerable amount of rain to remove it.

15. Do you find that the cattle will not eat that stuff if they can help it?—Unless they are compelled to do so.

16. Have you had some of your cattle that were compelled to eat this stuff?—Yes.

17. What effect did it have upon their condition?—It did not improve them.

18. Did it have the opposite effect?—Yes.

19. Did you try to plough in some of this stuff on your land?—Not exactly on ours, but I have observed the man next door, Mr. Lowrie, who has a lease from Cassrels, do it. That land is directly on the river-bank—Pukateawainui No. 1, I think.

20. What thickness was this deposit that he ploughed in?—From 3 in. to 6 in., that was deposited by the 1907 flood, and he has been cropping the ground ever since, and it has an effect on the crops.

21. *The Chairman.*] What are the effects?—In 1908 he put in oats where the silt had been ploughed in—very little matured 6 in. or 8 in. At the other end of the paddock, where there was no silt, there was a heavy crop. I noticed it more particularly the following season. Maize was sown, and they matured 2 ft. where the silt was mixed with the soil, and they attained a height of from 8 ft. to 9 ft. where there was no silt. It was the same crop.

22. Do you mean to tell me that there was some portion of Pukateawainui where there was no silt?—Yes; the water did not flow along the bank all the way, and part of this block was not covered with silt.

23. How it is that yours was covered with silt up to 2 ft.?—It was carried in in the outfall drain.

24. *Mr. Mueller.*] How long have you been in that part?—About thirty years.

25. And you have known this Pukateawainui Block practically the whole time?—Yes.

26. Have you seen good crops taken off the part of the block where the silt has now been ploughed in?—Yes, it is the best of the land. It was not the quality of the land that caused the failure of the crops.

27. Does the big outfall drain go through part of your land?—Yes, the boundary between Bertelsen's and our place.

28. And it flows into the Ohinemuri?—Yes, and out of it too when there is a flood.

29. Has that drain become silted up?—I would not say it has been silted up with silt, because the bulk of the water flowing in and out choked it; but the side drains flowing into the main outlet drains are choked up.

30. Have you had to clean your drain out from time to time?—Not lately—the place has been leased; but they should have been.

31. Opposite your land you have been constantly on the river during the last thirty years?—Yes.

32. What can you say about the navigation of the river in your experience?—I say it has silted up from the Junction to Paeroa. It is almost impossible to get a small boat up; in fact, I have given up trying to get to Paeroa in the launch. I live about two miles below Paeroa.

33. What does your launch draw?—Two feet.

34. And in that river the steamers from Auckland used to regularly come up?—Yes.

35. Where you cannot bring your launch now?—Yes.

36. You consider that your property has depreciated in value?—Considerably.

37. Could you state how many head of stock you think that place would carry under natural conditions?—It has had from 100 to 150 head on it at different times, and in good condition—stock reared on the place and living there.

38. *The Chairman.*] For more than six months at a time?—I could not exactly say, as I was not in charge of them.

39. What is the carrying-capacity of that land?—It is practically nil. We had a sale of cattle there—about thirty-five—a few weeks ago. We did not think they would winter. There are eleven left—as many as could live there.

40. Before the flood or afterwards?—Just after the last big flood. I have now from eleven to thirteen cattle.

41. You do not know how they are going to pull through the winter?—I am not certain.

42. *Mr. Mueller.*] The land at present could not carry any more?—No, I do not think so. It is directly after the floods when the grass is destroyed. In a few weeks' time it picks up. To enable them to live in the meantime is the difficulty.

43. Does the grass get back into its old condition, or do you notice any difference in the grass?—No, I have not taken any particular notice. I do not notice any difference, but it is destroyed in the meantime.

44. You are not in a position to put into figures the loss you or your mother have suffered?—No.

45. *Mr. McVeagh.*] How far from your property is the railway-line?—It is further off from one place than another. One end touches. Where the road crosses the railway is our back boundary.

46. That part of the line was swept away in the flood of 1910—the ballast was swept across the country?—Yes.

47. You got a great deal of that ballast?—We got some, I suppose.

48. Will you give us some particulars of how you have been cultivating your property during the last three years. What cropping did you do in 1907 after that flood?—The place was leased, and we did no cropping. Personally I did no cropping.

49. How long has it been leased?—Three years and a half.

50. Just after the flood?—Yes, in 1907.

51. Have you provisions in your lease requiring the tenant to do any particular amount of cropping?—The cropping is left entirely at the discretion of the man who has the place.

52. Do you know when any fertilizer was last used on that land?—I could not give you the date.

53. Was it between one and ten years?—Yes. I believe some was put on in 1906 in one particular place.

54. *The Chairman.*] Which particular place?—Not where the floods were. It is a piece adjoining the road.

55. Is there much raised ground there?—About 30 or 40 acres.

56. How long before was any fertilizer put upon any of the rest of the land?—There was none put on the rest of the land.

57. *Mr. Mueller.*] That part of the railway-line which was washed away—what was the ballast composed of?—Coarse pumice sand.

58. And broken metal?—No.

59. *The Chairman.*] Is there any pumice sand on the line now?—It is being reballasted with pumice sand.

RICHARD WELLINGTON BAGNALL examined. (No. 14.)

1. *Mr. Mueller.*] Your name is Richard Wellington Bagnall, and you reside at Turua?—Yes.

2. You are a director of Bagnall Bros. (Limited)?—Yes.

3. And you are Chairman of the Thames County Council?—Yes.

4. About 2,000 acres of land belonging to the firm is situated next to the Netherton district, in the Ohinemuri County?—Yes; Kahikaputa is nearest to Netherton. There are several blocks.

5. Were these 2,000 acres flooded by the water coming across from the Netherton district?—Yes, swept right across.

6. *Mr. Mitchelson.*] Over the whole area?—Yes, down as far as Manuka.

7. *Mr. Mueller.*] When did that happen?—On the 15th January, 1907.

8. And subsequently?—We have not been flooded since that.

9. Did this flood deprive you of a good deal of feed for your stock?—Yes; the cattle had to be taken off that land.

10. There is a creamery down there?—Yes.

11. You had a number of cattle that you milked for that creamery?—They were not grazing on the portion that was flooded.

12. But there was stock on it?—Yes, and they had to be removed.

13. How long did it take for the water to recede during that flood?—Fully three weeks.

14. In addition to the loss of the feed, was your communication cut off?—Entirely; the road was flooded as well as the land.

15. Did you notice a white deposit of slimes on the vegetation?—Quite perceptible in places.

16. What does that indicate, in your opinion?—It had the same appearance as the slimes from the mines. It was a fine powder, like whitewash.

17. Did that adhere to the grass?—Yes, or to any vegetation it came in contact with.

18. Did you notice whether it washed off easily?—I did not try it, but it was visible for some time, even after the rain.

19. I suppose you have some drains going into the river from your land?—Yes, a large number.

20. You had to clear those drains out?—They have to be cleared out every year.

21. Did you notice whether they are worse after a flood?—No, I could not say they are worse after a flood, but the deposit taken out of those drains is quite soft ooze; and in the drains in that district gold-bearing substance has been found, I believe—in one place three-quarters of a mile from the river.

22. *The Chairman.*] How do you know?—That was told me by some one who examined them—that is, on the other side of the river.

23. *Mr. Mueller.*] Did you have a stop-bank erected to try and prevent flooding?—We erected a stop-bank along our western boundary to prevent water coming over from the Netherton district.

24. How much was expended on that work?—Over £200 was expended in making that bank.

25. When was that erected?—After the January flood, 1907.

26. *Mr. Mitchelson.*] What height was it?—Over 2 ft.

27. *Mr. Mueller.*] Have you noticed the effect of that?—The land has not been flooded since, but whether it will be effective I could not say.

28. *The Chairman.*] What length of fence?—I could not exactly say. Roughly, between two and three miles.

29. *Mr. Mitchelson.*] That prevented the water overflowing from the 1910 flood?—The flood has not come over us since then.

30. It did not come over the riverside?—We are never flooded from the river.

31. *The Chairman.*] Have you seen any mining tailings at different points in the river?—What I believe to be mining tailings.

32. *Mr. Mitchelson.*] How far down?—Right down below the steamer-wharf at Turua.

33. There is a large area of land, is there not, both on the eastern and the western side of the Waihou practically all in occupation?—Yes; the low-lying land on the eastern side of the river would be anything from 20,000 to 30,000 acres, and on the western side from 10,000 to 15,000 acres.

34. And was the Thames County endeavouring to drain that land too?—Either into the Waihou or the tributaries of the Waihou.

35. You have resided in that district for a very considerable time?—Over thirty years.

36. So that you know that part of the river pretty well?—Very well, indeed.

37. From your thirty years' experience, can you state whether the navigation of the river has been affected during that time—has it become better or worse?—Speaking of the north portion, I could not say that the low-water level is higher than it was at that time, because banks have formed at different places, and the banks have become larger.

38. Has the carrying-capacity of the river remained the same?—The width of the river is practically the same, but the banks must reduce the carrying-capacity.

39. *The Chairman.*] Below the Ohinemuri County boundary you are of opinion that the width of the river is not changed?—I do not think so—not the actual width of the river. The shoals are extending further.

40. *Mr. Mitchelson.*] What do the shoals consist of?—Sand and slimes and various deposits.

41. Which predominates, the sand or the slime?—I could not say.

42. You know the bank where the boats take sand up to Auckland?—Yes.

43. Has that bank enlarged?—Yes.

44. Sand, silt, or both?—Very largely silt, I think.

45. *The Chairman.*] Have you landed there yourself?—No.

46. What you have said is not from personal observation, but from hearsay?—I have not landed there.

47. During what period have you noticed this deposit of what you call slimes down the river from your place?—Since the heavy flood of 1907.

48. Can you state that since that flood you have noticed deposits of a different nature to the deposits there previously?—Yes.

49. You can show us close to Turua slime-deposits?—I would not like to say it, because at low water I could not even say they are slimes, but what appear to be slimes. It is a different kind of material from what it used to be.

50. You know the river right up to Paeroa?—Yes.

51. Can you state whether the shallowing of the river has increased during the last few years?—I can state that the river has narrowed during that time.

52. *Mr. Mitchelson.*] What part of the river?—I should say from the lower Rangiora right up.

53. *Mr. Cotter.*] You are Chairman of the Thames County Council. Have you or any of your officers made an examination of the mouth of the river?—No.

54. *The Chairman.*] You are not a River Board?—No, the Thames Harbour Board are a River Board for five miles from the mouth of the river, to just a little above the Turua Wharf.

55. Have you acted as a River Board in any way?—No; between Hikutaia and Port of Thames there is really no River Board.

56. *Mr. Cotter.*] Have you considered at all the question of the alleviation of this trouble?—Yes, it has been considered.

57. In what way do you consider that the trouble might be either minimized or altogether prevented in the future?—I am not an expert in that matter.

58. Occupying the representative position that you have done here for thirty years, I was only trying to see whether we could get some information from you, having all this knowledge; but if you would rather not express an opinion I will not press you?—I would rather not, because I do not feel competent to give an opinion. Keeping the stuff out of the river would prevent it.

59. But outside of that you would not like to express an opinion?—No, I would not.

60. *Mr. Tunks.*] I think you said the water remained on your land in 1907 for about three weeks?—Yes, I think about three weeks.

61. That was clean water—ordinary flood-water?—Yes.

62. That had nothing to do with the silting-up of the Ohinemuri?—I cannot tell you why the water came, but from its inability to get out of the Ohinemuri.

63. Or the Waihou?—Yes, one of the two.

64. You do not suggest that it was due to silting-up of the Ohinemuri?—The Ohinemuri or the Waihou.

65. In that flood, so far as your land was concerned, there was no evidence of mining tailings?—Except the white deposit: whether that was mining tailings I could not say.

66. You say that you got that at the back of your place in 1907?—Yes.

67. You do get floods in the Waihou from time to time?—We have not been flooded.

68. Never before 1907?—No.

69. And not since?—No.

70. Prior to the flood of 1907 have you ever experienced any flood?—We have not experienced any flood.

71. Never before?—No.

72. Do I understand that the 1907 flood was the only time your land has ever been flooded?—By extraneous water apparently coming from the Waihou River.

73. You know something about the flood of 1907: was it not a fact that the water in the Ohinemuri itself remained there for a comparatively short time?—I do not know how long.

74. *The Chairman.*] In 1907 were you up the river?—I was at Turua.

75. You did not come up the river or study the question?—No, I could not get up.

76. How long was it before the river got down to its normal level?—Probably two weeks.

77. The fact of the water remaining three weeks on your place was not due to the flood in the Ohinemuri or Waihou?—It took three weeks for the water to get off the land which had come on to it in that flood. We had to clean the drains out in order to clear the water. I am speaking from memory when I say three weeks. It may not have been as long as three weeks. It was three or four days after the flood in the Ohinemuri that the water came across the Netherton district on to our land. My son took some photographs of the main road at the time which would show you the condition of that road at the time.

78. Could you post them to us, marking on them what they are?—Yes.

79. *Mr. Clendon.*] At the back of you are the Awaiti and Piako Streams?—Yes.

80. Are you not aware that as a result of this flood in January both those streams were a perfect sea of water for three or four weeks—miles in width?—Yes, I believe they were.

81. Are you not aware that there is a distinct fall to your river from both the Piako and Te Awaiti Streams—as a result of a survey recently made in the Piako?—I do not know from my own knowledge. I may say that at Kerepehi the land is much higher.

82. In 1907 was there a road or track from Turua to Kerepehi?—There was a tram-line.

83. Was it possible to walk along that tram-line dry-footed, even though your place was under water?—No, I do not think so.

84. It was a distance of four miles?—Yes.

85. Was not the flood just as bad on the Hikutaia side of the Waihou in 1907?—I was not there.

86. You know the county sustained a considerable amount of damage by the flood of 1907 washing away bridges, &c.?—I do not remember any—not this side of the Kauaerangi River. There were slips on the Coromandel Road. I do not recollect bridges being carried away.

87. As an old resident, are you not aware that the flood of January, 1907, was the biggest flood there has been for, say, forty years?—It is the biggest I remember, because we were never flooded before.

88. With regard to the indications of tailings that you saw down the river, did you make any personal examination of them?—No, the County Council has some samples.

89. *Mr. Mitchelson.*] That evidence will be produced at the Thames?—Yes.

90. *Mr. Clendon.*] You have taken no soundings of the river?—No.

91. Do big timber-vessels get right up to your place?—Yes.

92. Just as readily as they did in former years?—So far as I know.

93. *Mr. Hanna.*] What effect has a heavy north-west gale upon the tide up as far as Turua: it brings it up with great force, does it not?—Yes, it backs the tide up.

94. Do you know that when the tide comes up like that it is very much discoloured?—It is not clean.

95. Does it not bring up a lot of material from the foreshore of the Thames Harbour?—I could not say. It comes past the Thames, but whether it brings it off the foreshore I could not say.

96. Does it bring it from the gulf or the Moanataiari tip?—I could not say: I am not an analyst.

97. You know there are large quantities of stuff deposited from the Moanataiari tip, &c.?—Yes.

98. Is it natural to suppose that it should bring it?—I do not see why it should. The Moanataiari tip is not in a direct line.

99. But supposing it floats westward out into the harbour, does not the tide bring it along with it?—The tide sweeps along the foreshore, and then it comes across a shallow bank. The river runs more in a westerly direction there.

100. Do you have deposits of that material at Opani Point?—I do not know what material it brings in.

101. Still, it brings in material from the Moanataiari tip and the Thames foreshore up as far as Opani Point?—I would not like to say that.

102. *Mr. Mueller.*] How far is the tip from Opani Point?—Three or four miles, I suppose.

103. You remember the 1907 flood that has been mentioned, and the flood of last March: do you know whether the 1910 flood—whether during that flood the Waihou was in heavy flood or was only the Ohinemuri in heavy flood?—Only the Ohinemuri.

104. *The Chairman.*] Was it hearsay only as far as you are concerned?—Hearsay. I was not on the Waihou myself at that time.

105. *Mr. Mueller.*] About the back of Netherton is there not a fairly defined ridge running right down to Kerepehi?—That may be so.

106. *The Chairman.*] At what part of Netherton does the ridge commence and end?—From the Netherton School I think about a mile and a half or two miles before the ridge commences.

107. You know that land personally?—Yes.

108. You know the land right across to the Awaiti?—Yes.

109. *Mr. Clendon.*] You told us that this land of yours was submerged for about three weeks, and after the water went away you noticed white scum on the vegetation?—Yes.

110. Is it not a fact that the longer the water remains the more apparent is the remaining material on the vegetation?—Yes.

111. Is it not reasonable to suppose that after a flood of three weeks remaining on the land you might expect to notice scum remaining on the vegetation?—Very likely.

THOMAS NEPEAN EDWARD KENNY examined. (No. 15.)

1. *Mr. Mueller.*] Your name is Thomas Nepean Edward Kenny, and you are an authorized surveyor residing at Paeroa?—I am.

2. You were for many years County Clerk and Engineer of the Ohinemuri County Council?—Yes.

3. You gave evidence before the Mines Committee at Wellington in 1907 in connection with this same question?—Yes.

4. The evidence which you then gave you now practically confirm?—Yes.

5. You made a statement at page 19, question 154, with reference to the depth of soundings taken by you below the Railway Wharf at Paeroa. Since you gave that evidence you took soundings about a month ago?—No; opposite Gould's. I came up in a launch and I stuck there.

6. Can you say what the depth of water there was within the last month: was it less than 2 ft.?—Yes; that is, the ordinary depth of water when there is no flood and dead low tide. There was no flood on at all. I believe it was dead low water.

7. *The Chairman.*] Your evidence is that practically since you gave evidence three years ago there is now less depth of water?—There is very little depth of water. I was coming up in a launch, and we stuck there. You will notice my evidence before the Committee. I went afterwards to see the place, and I found 2 ft. of water.

8. You did not reduce your soundings to any data?—No, I did not go there for the purpose of sounding.

9. *Mr. Mueller.*] In your evidence before the Committee, at page 21, you mention the shallow place at the mouth of the Ohinemuri and the Waihou, and at the bottom of the same page you refer to a bank at the mouth of the Ohinemuri. That bank is not actually at the mouth of the Ohinemuri?—No, it is lower down. It runs from the Hape Creek. It runs down there.

10. Therefore when it is stated that it is at the mouth of the Ohinemuri and Waihou it means a little below the Junction?—Yes.

11. At the top of page 22 you refer to getting some silt about three-quarters of a mile above the junction of the two rivers. In what river was it that you got that silt?—In the Upper Waihou, above the Junction.

12. *Mr. Vickerman.*] Upon the west or east bank of the river?—On the left or west bank.

13. In your evidence before the Committee you also say, at page 24, question No. 45—you were asked, "Was not that January flood the biggest flood you ever saw?" and you replied, "That is a very difficult question to answer. Personally I do not think it was. I think a flood in about 1886 was higher. Barring that, this was the biggest flood." Do you want to explain that in any way?—What I meant was that in 1886 there was more water came down than came down in January, but the January flood I think actually came up higher.

14. *The Chairman.*] Do you mean that the beds have shallowed and narrowed, and that there is less cross-section than there used to be?—Yes, I presume that is the case, because there was not so much flood as in the 1886 flood. I remember the 1886 flood particularly. It was after a considerable amount of rain.

15. *Mr. Mueller.*] At page 25, question 76, the question and your answer are as follows: "They are not asking for any particular course of action to be taken?—No; but they have expressed their willingness to assist in this way: They are prepared to give up a portion of their gold duty, provided the Government consider it necessary to take a certain proportion of the gold duty in order to meet this difficulty." That was the idea of the Council at that time?—Yes, and I represented them.

16. Would you kindly state what your own personal idea is?—I take it that is beside the question.

17. *The Chairman.*] What are your personal views?—No; they should stick to it as long as they can; they should not give up the gold duty.

18. Why do you think that?—Because my opinion is that the gold duty is for the roads and works that the county had to carry out for the benefit of the mines. If the gold duty is utilized for that purpose, as far as I can judge, it means using the greater portion of it; otherwise the roads in the mining district would have to be made out of ordinary county revenue.

19. Why not?—Because the gold duty, I take it, was struck for the express purpose of assisting the mining districts in the way of roads.

20. *Mr. Mueller.*] You have seen that plan before [Exhibit 9]. It was prepared by William Tetley?—Yes.

21. Unfortunately this plan has got no date on it. Mr. Tetley was Foreman of Works of the county for some time?—Yes.

22. Could you state what year this plan must have been prepared?—I could not say, but the evidence could be easily obtained from the County Council by finding out when Mr. Tetley's connection with it ceased. It would be prior to that, but the exact date I cannot say. I think Mr. Tetley must have left the service of the County Council about 1891.

23. You think you would be safe in saying that this plan was prepared long before 1895?—Yes.

24. This plan shows the section of the river from the present traffic-bridge down to Snodgrass's Wharf?—Yes.

25. It was prepared in connection with information required in regard to a proposed wharf which was to be erected below the present traffic-bridge?—It was to be discussed.

26. Here you see a portion of the plan marked "Rock"?—Yes.

27. Is that the same rock that was referred to in your evidence before the Committee?—Yes.

28. This other plan is a subsidiary plan showing cross-sections?—Yes; the two plans go together.

29. As far as the rock is concerned, the cross-sections 10 and 11 show the rock?—Yes.

30. *The Chairman.*] The rock is between 10 and 11?—Yes. [Plans put in—Exhibit 9.]

31. This plan was produced for what purpose?—The proposed wharf at Paeroa, just below the bridge.

32. *Mr. Moresby.*] You have made many observations from time to time with regard to this river, as shown in your evidence given before the parliamentary Committee?—Yes.

33. You have observed certain points on the river from time to time?—Yes, I live on the river.

34. Since you gave your evidence before the Committee, have you made any further observations or examinations?—Yes.

35. Recently have you made any?—None except when I went up in my boat the other day.

36. You or your son have a launch, and you are frequently on the river?—Yes.

37. Taking the river down as far as Te Puke Wharf, have you noticed any material changes in the river since you gave your evidence previously?—I have noticed the bank extending down the river. I am referring to the place opposite the boat-shed, where the boats used to lie always in comparatively deep water.

38. There is an accretion to that bank just below your house?—Yes.

39. Limiting yourself to the Ohinemuri River, have you noticed whether the banks are pinched in since you gave your evidence?—Yes, very much.

40. Do you consider that that river is able to carry as much water now as it did when you gave your evidence before the Mines Committee?—It will carry as much water, but it will not take the same amount of flood-water to go over the banks.

41. Are you able to say whether that river has filled up on the bed?—Yes, in places.

42. Right down to the Junction?—Yes.

43. At the Junction itself, referring particularly to that island which has formed at the Hape Creek—has that island got much bigger?—Very much bigger since the photograph was sent to the Mines Committee.

44. Have you got any of the negatives of those photographs?—Yes.

45. Would it be possible to get copies from the negatives?—Yes, I think so.

46. You say that the island is getting bigger: has it risen or got longer?—Both. Last summer between the original island-bank and our bank it was out of your depth. Now I do not suppose there is 2 ft. of water. That is since last summer.

47. It used to be out of your depth?—Yes, we used to bathe there.

48. Has it extended down the stream at all?—Yes, a good deal within the last two or three months.

49. In your opinion, is this an obstruction to the navigation of the river?—Undoubtedly.

50. *The Chairman.*] The bed of the Hape Creek—has that risen very considerably?—Yes, it has closed very much.

51. *Mr. Moresby.*] You see the small steamers of the Northern Steamship Company—the "Rotokohu," &c.—have they any difficulty in getting through this place to get to Ohinemuri?—I have not noticed lately, but about six months ago she could only get up on the top of the tide—I mean, to go up the Waihou.

52. *The Chairman.*] Ten years ago, opposite Hape Creek, what part of the river did the big steamers come up by?—They came quite close in: you could from the bank touch hands with the passengers.

53. Is it not true that people have handed letters on board?—Yes; I have seen a man jump aboard. There was deep water close in to Hape Creek where now there is none.

54. *Mr. Moresby.*] I think you know the river right across from your house at the Hape to the other bank?—Yes.

55. Has any corresponding change taken place in the river in any other place?—I do not think so.

56. What was the greatest depth that you found recently, during the last two or three months?—I have not sounded, but I have never touched anywhere. I should say there is about 4 ft. of water in the channel.

57. The channel is fairly close in, what channel there is?—Yes.

58. Generally, in your opinion, is the junction of the two rivers still filling up: is the bottom of the river getting shallower?—I should not think so; on account of the two currents coming together there there is always a scour from the Waihou. Of course, as the channel gets contracted the tide will naturally scour it deeper.

59. Between your house, and going down as far as Te Puke, can you say whether the river has pinched in at all?—I cannot say much about that. I could not speak with any certainty.

60. Can you say anything with regard to the floods in the Paeroa Township itself? Are the floods better or worse than they were formerly?—Worse.

61. Are they more frequent than they were, say, ten years ago?—Before that January flood we had not a flood of any consequence for three or four years before.

62. Was the last flood worse than any flood we had previously?—It was 2 in. higher at my place—that is, at the Junction.

63. Were you in the Paeroa Township when the flood was on?—No.

64. Have you any knowledge of what damage was done to gardens, buildings, and business premises?—I cannot speak of that personally.

65. I think you have considered the remedial measures that should be adopted with regard to improving the river, and also lessening the danger to the Paeroa Township and the flooding of the land?—No.

66. I thought you had gone into that rather fully?—No.

67. Have you formed any opinion on it yourself?—No.

68. With regard to the gold duty, at the time you were in the Council, did they assist prospectors?—Yes.

69. Out of what money were they assisted?—The gold duty according to statute is county revenue. They were helped out of county revenue.

70. Are you able to give us to what extent that help was afforded?—No, I could not do so now; but it was done.

71. Did the County Council assist prospecting by making roads and tracks to the different mines out of county revenue?—Yes.

72. I think you know of your own knowledge that the roads in this county were expensive to keep up—most of the main roads?—They used to be.

73. Upon the roads leading to the mines, over which machinery had to be carried—had money to be expended on those roads?—That was in the old times. I do not know how far the railway has relieved that now.

74. But where there is no railway?—Yes, that is so.

75. Are you able to tell us the number of miles of roads?—No.

76. *Mr. Tunks.*] A good deal of reference has been made to this island opposite your place—this new island: can you tell us what it is composed of?—I know that it is mining tailings.

77. Why are you sure?—Because I went into the question very particularly when I was a witness before the Mines Committee. I took samples of mining tailings opposite my place and right up to Mackaytown, and at different places on the river as far down as Netherton, and also samples of the sand up the Waihou, because the question was raised that it was sand from the Waihou that came down.

78. Did you take any sand from this particular island, and test it?—No: the island as it was then is feet below the present island.

79. You are judging by the similarity of appearance?—Yes.

80. It was similar to the substance that you tested at that time, but you did not make any actual experiments?—That is so.

81. Now you tell us that from that island across the river it has shallowed a good deal?—Yes.

82. Can you tell us what that shallowing has been caused by—whether it is sand from the Waihou or tailings?—No. I have not been examining this question. I have had nothing whatever to do with it. I speak only as a person living on the bank of the river. I was formerly employed by the Council, but I have not since been employed by any one to make observations or experiments.

83. Had you experimented formerly for the section across the river at that time?—No.

84. So that you cannot say what the condition of the river-bed was?—No. The thing was to consider what the river was bringing down, and that is what I directed my attention to. I presume you are speaking of the condition of the River Waihou opposite my place. I am speaking generally of the Waihou and Ohinemuri up as far as Mackaytown.

85. Did not your investigations show that a considerable amount of river-silt had been brought down by the Waihou River?—Yes, and that is evident now when the water is low. At the island at the mouth of the river it is visible to the naked eye. The Waihou sand is visible to the naked eye—it is always on the roll.

86. Would you not expect to find a considerable amount of Waihou sand on that island?—Yes, at the base of it.

87. So that if there is any shallowing of the river from the base outwards that would probably be Waihou sand?—Not necessarily.

88. But probably?—Not, even probably.

89. Why not?—The Waihou sand, in my opinion, is always going down the river, and then the silt comes and deposits as it goes: it is much heavier. My own theory is that if you could get a section of the river now you would find a deposit of Waihou sand, and above that a bed of tailings, and then probably another layer of Waihou sand. But in the old times this was always on the move. If a steamer stuck in the river for a quarter of an hour, the working of the screw would make a change then. It will not do that now. You get on one of the banks and you cannot clear it with the screw.

90. You attribute that to mining tailings?—Yes. The test is easy. You can test it in a test-tube. Leave them for a day or two, and then turn them over. The Waihou sand will roll back, and the other will not roll back.

91. You suggest that the mining tailings will cohere, but the river-sand will not?—Yes, especially the finer stuff.

92. *The Chairman.*] The present tailings—what has been coming down in the last few years?—Yes, in the last few months I should say the tailings have become more adherent.

93. *Mr. Tunks.*] Can you tell us whether prior to 1895 there was any flood on the property now known as McKee's?—I know there has been a flood there, but I could not state the date; but the whole place was covered.

94. Was there not a big flood in 1886?—Yes, but I was not living down there then.

95. You have had a flood up to your verandah-steps?—That was the highest flood except the January one and this one in March. These two were higher than the one before 1895. The latter was not as high. The boat was tied to the verandah-post, but it was prior to 1895.

96. The following are questions 154 and 155, and your replies, in your evidence before the Mines Committee: "Then, again, I think you made a statement that you have had floods in the Upper and Lower Waihou when there was no flood in the Ohinemuri River?—Scarcely that. I think I said Waihou floods and Ohinemuri floods. The Waihou floods are when the Waihou is

in bigger flood than the Ohinemuri. 155. I was informed—and I want to know if the information is correct—that during the flood in January, I think it was, the flood-waters continued to come from Piako; and I think Mr. Laughlin gave it in evidence also that the Piako water came into the back part of his land when there was no actual flood in the Ohinemuri—that is, the flood in the Ohinemuri had gone down, but the water continued to come from the Piako and flood his land?" You have seen nothing since to alter your opinion with regard to that?—Nothing to alter my opinion as there expressed.

97. That would be due simply to the water of this watershed—the Waihou River's own watershed—without any assistance from the Ohinemuri?—No, I did not say that.

98. Is that not so?—No.

99. Is there not sufficient water in the watershed of the Waihou to cause that flood?—My evidence is that the Ohinemuri backed up as far as the Ngararahi Block.

100. Question No. 160 and the answer are as follows: "I understood the affidavit to say that it was after three days' flooding in the Waihou that the Piako broke over?—It was flooding for several days before the water began to fall." What does that refer to?—That refers to the water breaking from the Piako over to Netherton.

101. The Piako water came over into Netherton?—Yes.

102. Question No. 161 and the answer is as follows: "I have been informed that in, I think, the January flood, the water both in the Waihou and Ohinemuri had decreased, but still the water came over from the Piako side and flooded some of the low-lying roads about the Netherton district?—That is what I have heard, but I do not know it of my own knowledge." There has been nothing since to alter that opinion?—No; that was hearsay, of course.

103. You do not approve of the County Council paying any of the gold duty for this purpose. You say that was intended for roads and tracks in assisting mining prospecting?—Yes.

104. Do you think that the revenue is fairly spent on gasworks, or baths, or bowling-greens?—I do not know.

105. *Mr. McVeagh.*] You state in your evidence before the Mines Committee that that island commenced to be formed in 1884. That would be formed from a deposit of pure alluvial silt?—No; it started from a willow catching in the bank, and rubbish and stuff came against it, and gradually formed an island.

106. Consisting of pure alluvial silt?—Probably, and of Waihou sand.

107. That is what I mean by alluvial silt. You joined the County Council in 1886?—Yes.

108. Do you know when the River Board was formed?—No, I cannot remember.

109. Can you give us an approximate idea?—No; I should think about 1888 or 1889.

110. When did either the River Board or the Ohinemuri County Council take steps to deal with that island?—They never did as far as I know.

111. That is a matter that I think might have been easily dealt with?—That is a matter for the County Council to explain, not me.

112. Did I understand you to say that the island consists mainly of mining tailings?—Not the bottom of it—the upper surface.

113. What would be the depth of the tailings on that island?—I do not know.

114. *The Chairman.*] Have you ever dug into it?—No.

115. *Mr. McVeagh.*] When you were Clerk of the County Council, were you also County Valuer?—No.

116. You were here at the beginning of the activity of the goldfields?—Yes.

117. About 1895?—Yes, I was here then.

118. There has been a vast increase given to the values of property in this district?—Yes: there is no doubt the mining industry has given a great impetus to the district about Karangahake, but the principal increase of values about here is due to the dairy industry.

119. The dairy industry started within the last ten years or thereabouts?—I do not know.

120. It started subsequently to the Proclamation declaring the river to be a sludge-channel?—I should think so.

121. With regard to these plans, I see from the cross-sections that they appear to have been taken where the water was very deep. May I take it that Mr. Tetley was instructed to look for specially deep water?—Naturally, I suppose he would look for deep water, as it was to bring the water up to the place where vessels might berth.

122. *The Chairman.*] The cross-sections are taken at regular intervals from Snodgrass's Bridge down. At least they are taken at fairly regular intervals, such as any engineer would take?—There was no picking and choosing.

123. *Mr. McVeagh.*] Since those plans were prepared, you say that the banks have been contracted somewhat?—I do not know that I have said so. I believe they have been.

124. Where has the water got to?—The whole bed of the river has risen.

125. The same quantity of water is flowing down the river as before?—Yes: but the permanent level is considerably higher.

126. As a result of that, you have got a more rapid flow of water?—The rock indicated in the plans was uncovered: to my knowledge it was about 8 in. out of the water, and now that has not been seen for years.

127. Do you say that the same volume of water flows down the river as before?—I did not say that. On account of the denudation of the bush the water comes down more quickly.

128. *The Chairman.*] There are more freshes, you think, but the average volume coming down is less?—Yes, I should think so.

129. So that for a period of twelve months the same volume of water approximately comes down?—I should think so.

130. *Mr. McVeagh.*] Are you acquainted with the Waihou River?—I have been up there occasionally.

131. When were you last up there?—I should think about two months ago.

132. How far up did you go?—I should think, about a mile and a half.

133. You noticed a very luxuriant growth of willows on both sides?—Yes.

134. In your opinion, do they check the progress of flood-waters?—Where they lean over into the river.

135. That is the same also in the upper stretches of the Ohinemuri River?—Not so much.

136. But there are willows growing there?—Yes.

137. Would not the removal of those willows tend to diminish the flood?—Is not that a matter for an expert to give an opinion upon? My own personal opinion is that undoubtedly they would check the flow of water.

138. Do those willows go back as far as Matamata?—I do not think so.

139. Do you know the character of the country through which the Waihou flows?—Yes, but I do not know very much about it.

140. What is the character of the soil?—I do not know.

141. Can you say whether the Waihou River carries down with it extremely fine sand?—As far as my experience goes it is the reverse. When I got samples of sand from Mangaiti it struck me as being too coarse to be a fair sample, and I sent for another sample, but it was the same. Mangaiti is about five miles from Te Aroha.

142. We have information that sand of an extremely fine character is found in the Waihou—fine enough to go through a 60-mesh?—I should be surprised if it was so.

143. If that is so, there is a quality of silt coming down the river that you know nothing about?—Undoubtedly.

144. The Waihou flows for a considerable distance through country of that character?—I do not know.

145. At whose instance was the River Board originated?—At the instance of the Ohinemuri County Council.

146. It is coterminous with the county boundary?—I believe so.

147. What was the idea in calling it into existence?—To keep the authority of the Thames Harbour Board to their own place, and not charge wharfage up here. They were wanting, I believe, to charge rates for the wharfage up here. They built a wharf up here, I believe.

148. That checked their move?—Then we got control of the river as far as the boundary of the county.

149. Did you hold meetings after that?—Yes.

150. What was done at those meetings?—The minutes were confirmed.

151. What did they confirm?—Simply that there was no business to do.

152. Were you Secretary of the River Board?—Yes.

153. Was it a salaried office?—Not as far as I was concerned.

154. Did they have their accounts audited?—There were none. No business was transacted.

155. *Mr. Mueller.*] There has been a lot of mention of this island at the commencement of the main Waihou River: you think it was formed by the branch of a willow catching?—When I first knew it, it consisted of nothing more than a bit of willow growing out of the river.

156. That willow would naturally collect any branches that drifted down?—Yes; that is how it formed in the first instance.

157. And ultimately it formed into an island?—Yes. I think it was after 1886 that I first noticed the willow.

158. Could you give us the date when you went to live at the Junction?—No.

159. You knew this willow-branch when first you went to live at the Junction?—Yes, as far as I can recollect.

160. Can you state whether the deposit of something on this island has increased during the last few years at a greater rate than previously?—Yes. For years after the two islands were connected you could not get on to them except at dead low water. There was no soil; only rubbish. The groin was put across there by Captain Sullivan. It is between the left bank of the river and the top island; and then another groin was put down further.

161. Formerly the island was of such a nature you could not get on to it?—It was just a mass of willows.

162. Before you gave this evidence in Wellington you say that you took tests or samples from those islands and from Mangaiti?—Not from this island, but from the Hape.

163. And also at Mangaiti?—Yes.

164. What was the result, to your mind, of your investigations then as to the composition of that island?—I think it was easily distinguishable. The real Waihou sand was taken at Mangaiti, so that there would be no question as to there being anything else in it. As I said before, if you turned the test-tube over, the Waihou sand came down again quite freely, but the other stuff would not.

165. You have noticed from your own experience a difference in the bottom of the river?—Yes, there is a difference in the composition. Formerly, when bathing, when you touched the bottom with your feet you felt that it was composed of shifting sand; latterly the bottom of the river has become stiffer.

166. *The Chairman.*] Do you know the Hikutaia bank, where the cutters come up to take sand?—No.

167. When you first knew both rivers what was the state of the willows?—There were some willows then, but not as many as now. Some were pretty big trees even then.

168. And the River Board never planted any willows?—No.

EDWARD STEPHEN COCK examined. (No. 16.)

1. *Mr. Mueller.*] Your name is Edward Stephen Cock, and you are a son of Mr. Frederick Cock, a previous witness?—Yes.

2. You have resided on your father's land practically all your life?—Yes.

3. You are managing the farm for your father now?—Yes.

4. You have had to do with the cattle, horses, cows, and calves on this farm all your life?—Yes.

5. The last flood you lost several calves?—We lost one in the last flood, and we lost five calves, one mare, and two cows in the last three years.

6. The mare and the cow were lost through getting bogged and being drowned?—Yes.

7. What happened to the calves?—The first three that died we did not know what happened to, but we examined the last two. The first one we opened was full of coarse grasses mixed with silt. That substance was inside the two we opened.

8. Was that not a hard cake?—Yes, in a sort of a ball.

9. Did you break it to examine it?—Yes; it was coarse stuff with silt all through it.

10. In one of these calves did you find more than one of these lumps?—Yes, there were four in one of the animals.

11. What size would these balls be?—The biggest would be a little bigger than my fist.

12. Have you any doubt of the cause of death of these animals?—No doubt at all. Stoppage caused by this accumulation of stuff.

13. Have you noticed any of the cows when they have been brought in to milk with this stuff adhering to their mouths?—Yes, in a regular cake; and the horses' hair round their mouths had little balls rolled up in it.

14. Have you yourself taken that stuff off?—Yes.

15. For how long past have you noticed this accumulation of stuff in the animals' mouths?—Just this last big flood I noticed it particularly. I refer to the March flood.

16. Previous to five or six years ago did you notice any of that accumulation round the mouths of your cows?—No.

17. *Mr. Clendon.*] How many other calves had you at the time these calves died?—About a dozen.

18. Only two of them were affected?—We only opened two. We opened them directly they died.

19. In what part of the body did you find the lumps?—In the stomach or bowels.

20. What was the composition of it?—Coarse grass, and silt mixed with it.

21. Any slimes?—It is what is deposited there at present.

22. Was there anything injurious in the lumps, as far as you know?—I could not say that.

23. How do you know what caused the death of those calves?—I reckoned it was stoppage caused by these lumps.

24. Did you notice any signs of inflammation about the bowels?—They did not have the use of their bowels. We tried to doctor the last one that died.

25. There has been silt on your land for some years?—Yes.

26. Why has it not affected your cattle in previous years?—We have lost some in previous years, but we have never examined them.

27. Have you heard of any other people losing cattle from the same cause?—No.

28. *Mr. Mueller.*] You have noticed the horses and cows have had this stuff deposited around their mouths, as well as the young stock?—Yes.

STEPHEN FISHER examined. (No. 17.)

1. *Mr. Mueller.*] Your name is Stephen Fisher, and you are a dairy-farmer residing at Netherton?—Yes.

2. You own 344 acres of land?—Yes; part of the Te Arawakapekapeka Block Nos. 1 and 2, and part of Kaikahu No. 4. It is below the creamery.

3. That is all agricultural land?—Yes.

4. You supply milk to the Netherton creamery?—Yes.

5. Of that 344 acres, how much has been flooded?—The whole of it was flooded in 1907 except 2 acres.

6. How long have you been in the district?—Sixteen years.

7. And previous to 1907 was that land subject to floods?—Not in my time.

8. In January, 1907, there was a large flood?—Yes.

9. The water remained on your land for how long?—For about three weeks.

10. In September of last year there was another flood?—Yes.

11. How much land did that flood cover?—About 250 acres of my land, and it remained on the land for about a week.

12. The damage in the 1907 flood—did that destroy grass on your land?—Yes, it destroyed the whole of the grass that was under water. It left nothing alive.

13. Did you lose stock through starvation in consequence of that flood?—Yes, following on the flood.

14. About how much value of stock?—I should think about 50 pounds' worth of stock.

15. Did you dispose of any of your stock after that flood?—There was no sale for cattle after that flood in this district.

16. Did you replough and resow the land after that flood?—About 150 acres, and I surface-sowed another 100 acres.

17. About how much an acre did that cost you?—Quite £2 an acre. Grass-seed was very dear at the time. The reploughing and resowing cost about £400.

18. That was in hard cash and labour, apart from the loss of stock and the loss of your milk cheques?—Yes.

19. Was that land in such a state before the 1907 flood that you would not have required to replough it or resow it if the flood had not taken place?—I should not have had to replough it.

20. *Mr. Mitchelson.*] There was a good sward of grass on it?—Yes.

21. *The Chairman.*] How old was the sward?—About ten years.

22. *Mr. Mitchelson.*] Clover with it?—Yes, clover, cocksfoot, and rye-grass.

23. *Mr. Mueller.*] Previous to the 1907 flood can you give us an idea of how many head of stock you could carry on that land?—Before the flood I was milking forty-five cows. I had a good number of young stock. I had no stock for fattening purposes. I had a number of young heifers and calves.

24. You kept stock purely for dairying?—Yes.

25. And after that flood what would the land carry in the way of stock?—It would carry scarcely anything. I had to go into the bush and chop down bush and willows for my cattle.

26. Can you give us an idea of what you consider your loss through the falling-off of your milk cheque?—To the best of my recollection I got £48 for the December month. The January cheque was very small, and there was nothing after that. The milk cheques should have continued to the middle of June under ordinary circumstances.

27. What would you say that you lost per month?—When the flood came I was getting £48. I think £30 per month for five months on an average. In that season I think I lost £150 in shortage of milk cheques.

28. And the following season, did this have any effect on your milk cheques?—Yes, the cows milked very poorly the following season. The new grass had a very bad effect on them. This is the first season I have recovered since the flood—that the cattle have got back to their proper milking again.

29. That was on account of them not having proper feed during the winter?—Yes, and having all new grass when the summer did come. The new grass had a very bad effect on them.

30. Did you suffer through the loss of pigs?—Yes; I had to dispose of a number of pigs at a very small price.

31. You had to dispose of them because you could not feed them?—Yes, I should have had £50 more for pigs that season if the flood had not come.

32. Would that loss continue into the next season also, in proportion?—Yes, I had not nearly so much milk in the next season. I think in the next season I was eight shares short supply at the factory. We have to supply so much butter-fat, according to the number of shares we hold. I think there were eight shares in 1908 that I did not receive a dividend upon, because I had not supplied the necessary butter-fat. In 1906 I had to take up an extra nine shares owing to the additional supply of milk.

33. Can you tell us what was the cause of the flooding of your land, and where the water came from?—I can tell you where I feel certain it came from. It came from the Waihou River.

34. Why do you say that?—Because I took a canoe close to my back door and went through the bush. I followed up the flood-waters.

35. *The Chairman.*] What part of the Waihou did you come out at?—Just above the flax-mill.

36. *Mr. Mitchelson.*] Was the water running with any strength?—It was not running very quickly.

37. *Mr. Mueller.*] It was covering a large extent of country?—Yes, there were miles and miles of water.

38. *The Chairman.*] What distance was that? How long did it take you to get there?—Seven or eight hours.

39. Did you see water coming across over the river-side?—There was a sea of water. I could see the willows on the bank of the river. The water was coming through from that direction. There was a general flow down towards my land.

40. *Mr. Mitchelson.*] At that time was the water covering the land towards Piako and Te Aroha?—Yes, one sheet of water.

41. *The Chairman.*] Can you see any distance from this lagoon, or is it all bush?—The bush has been worked for mill purposes. I went up as far as the south-east side of the lagoon.

42. *Mr. Mueller.*] From your observations during the time of this flood, can you state where the water that came over your land came from? Did it come from the Waihou River?—I fully believe it came from the Waihou River.

43. You have some brothers residing at Netherton?—Yes, Joel and Amos Fisher.

44. Have you got a statement from them?—Yes.

45. You know your brothers' land?—Yes.

46. Do you know whether their estimate of their damage is within the mark?—It is within the mark. [Exhibit 10.] Their statement is as follows: "We have been residing on the river for seventeen years, and our property never suffered from flood until three years ago last January. At that time we suffered the following loss through the flood: Estimated loss of milk, £450; cost of ploughing and laying down 250 acres in grass, £500; loss and damage to stock, £150; cost of grazing stock, £60: total, £1,160. The reason of the flooding we consider is the silt choking up the river in the upper reaches about Paeroa and Junction, and causing the Waihou to overflow its banks. The flood last winter was running over our property for three weeks, and was the cause of great damage. We had to graze our cattle for about two months.—FISHER BROS. May 24, 1910."

47. *The Chairman.*] What is the acreage of that block on which the damage has been done?—I cannot state from memory. I think it is about 500 acres.

48. *Mr. Mueller.*] You know the land, and what they have suffered?—Yes.

49. You say the estimate is an underestimate, if anything?—Yes.

50. Can you state whether your brothers' land was seriously or in any way affected by floods prior to 1907?—No, it was not.

51. You have been in occupation of this land for seventeen years?—Yes, about that.

52. *Mr. McVeagh.*] When did you start to supply the factory?—I supplied Mr. Spragg first, about eight or nine years ago. That was before the company was formed. I started to supply when the Netherton creamery was established.

53. Are the drains in the land fitted with flood-gates?—No.

54. How many drains have you got through your property?—I have two main drains running east and west through my property.

55. What is the length of those drains?—I think that one drain is about 90 chains, and the other is about 80 chains. They are large drains—one is about 6 ft. deep and 9 ft. at the top—not all the way—and the other is 7 ft. on top and about 4 ft. deep.

56. Have you any smaller drains?—A lot of small drains.

57. What length?—About 18 chains long, running from one main drain to another.

58. Your brothers, I suppose, have many drains?—Yes, many miles. There are three of 80 chains, and a very large number of smaller drains.

59. I think when you and your brothers took this property it consisted of kahikatea forest?—Not all of it.

60. It was very wet, and you found it necessary to drain the land?—Yes.

61. Where did that water come from when you started to drain it?—From the heavens.

62. Did not that water extend a good way back?—Yes, for many miles.

63. How far back did it extend?—Right up to Morrinsville.

64. From the Awaiti Stream towards Netherton there is a fall, is there not?—Yes.

65. *The Chairman.*] Do you mean to say that there is a fall from the Awaiti Stream all the way to your land? Do you mean to say that the Awaiti is at the top of a hill?—No; it is all flat country, but there is a general fall from east to north. The watershed is about 50 chains from the Awaiti River.

66. *Mr. McVeagh.*] Have you been further up the river than the flax-mill?—No.

67. Not far enough to see whether the waters of the Waihou came across?—No.

68. Do you know anything of the waters of the Piako coming across country to the back of the Netherton district?—No; I should think such waters would go out to sea.

69. Do you know whether water flows from Waikaka to the Awaiti River?—I do not know.

70. *Mr. Mueller.*] As regards these drains that have been mentioned: you say that you have two main drains through your property, and your brothers have three main drains. Those main drains, I presume, go into the Waihou River across your property?—Yes.

71. You drain your land into the Waihou?—Yes.

72. At the time of the big flood of 1907 did the water come on to your land from those drains or from the back country?—The water ran off our land into the river.

73. Does the tide affect the Awaiti Creek?—No.

74. *Mr. Mitchelson.*] Mr. Bagnall said in his evidence that after the 1907 flood they put up a stop-bank, and that stop-bank prevented the water getting on to their land in the 1910 flood. You say the water was over your property in September of last year for a week?—Yes.

JOHN MORRISON examined. (No. 18.)

1. *Mr. Mueller.*] Your name is John Morrison, and you are a farmer residing near Hikutaia?—Yes.

2. You own 150 acres, part of the Kaimanawa Block?—Yes.

3. Your land is not affected particularly by the floods?—No.

4. Have you got a river frontage?—Yes, 22 chains.

5. You have been on the river for about forty years?—Yes.

6. You know the river from Puriri to Paeroa?—Yes.

7. You have been on the river almost daily ever since?—I had to do all my business by the river for the first ten years. There were no roads then.

8. In later years you have been supplying milk to the Netherton factory?—Yes, since it was made a co-operative company. I joined it then.

9. During that time you used a launch on the river?—Yes; I had the first launch that ever was on the river.

10. Previous to that you had pulling-boats?—Yes.

11. What is the carrying-capacity of your milk-launch?—About 2½ or 3 tons.

12. What did the launch draw?—At full speed she would draw 3½ ft., at half-speed she would draw less.

13. You were daily on the river at all stages of the tide?—Yes.

14. When first you started your launch on the river, how long ago was that?—I think it was eight years ago.

15. During the first few years of that time did you find any difficulty in navigating the river with your launch?—None whatever.

16. Have you noticed any difficulty since?—I have stopped running for twelve months. I could not go at low water now, especially in February and March, when there are less freshes in the river. During the last three years they have got worse and worse up to twelve months ago.

17. Could you previous to that take your launch loaded at low water up the river without touching bottom?—She might merely touch at times.

18. What has been the cause of this difference in the depth of the river, in your opinion?—The *débris* from the reduction-works.

19. You see steamers going past every day?—Yes.

20. Can the steamers get through at half-tide?—No; it must be well past half-tide when they pass my place, to enable them to pass.

21. Could they pass your place at half-tide in previous years?—Yes, before the Ohinemuri was declared a sludge-channel.

22. Do you know at what state of the tide the "Luna" steamer came up?—Between three-quarters and high tide.

23. You have known the steamers coming up to Paeroa to get stuck in the river?—Yes, I have been on steamers when they stuck in the river. They stuck in the reach below the Netherton creamery.

24. You have noticed there is a change where the deepest water is?—Yes.

25. Can you state whether that deep place has been contracting during the last few years?—There is no doubt about that. At my wharf six years ago she had 3 ft. 6 in. at low water, and now she takes the ground every time she comes alongside.

26. What is doing this?—The silt in the river. I have some samples here. They were taken from the sides and bottom of the river. No. 1, wet, and No. 1, dry, were taken from my place close to the wharf. I lifted it from the bottom of the wharf at low water. I shook it up at first. I expected to find some sediment on the bottom, but it all ran out. I put it in that bottle, and dried the other half in the sun. No. 2 was taken from the bed of the river. I gathered it in a four-gallon benzine tin. No. 2 was taken from the deepest channel.

27. *The Chairman.*] Was this taken immediately after a fresh?—Yes, after the big fresh—after the railway was burst. No. 3 was taken as close to the water as you could possibly get. No. 4 represents a deposit from four gallons of water. I took the water from the middle of the river. There was a little fresh on at the time. I let the stuff settle forty-eight hours, and that is the result. [Exhibit 11.]

28. Can your son Malcolm corroborate you in your statement regarding the navigation of this river?—I think so.

29. You are speaking of the river as you found it during the last eight or nine years?—Yes.

30. These samples you have shown us—have you had them tested or examined in any way?—No one has seen them except myself.

31. Have you only one sample from the bed of the river?—Yes; but I can get you any amount of it.

32. *Mr. Clendon.*] What is the distance from your place to the creamery where you deliver your milk?—About two miles and a half.

33. What is the average width of the river between your place and the Netherton creamery?—I cannot say.

34. Is the water salt at your place at high tide?—No, not for five miles below it.

35. Have you ever taken systematic soundings between your place and the creamery?—Yes, lots of times.

36. For what purpose?—I sometimes do some fishing, and I took my soundings when fishing.

37. When did you take the last soundings?—About a month ago. I took the soundings with a pole. I can remember the depths.

38. The whole of the soundings you took were confined to the water immediately opposite the wharf?—Yes.

39. At what state of the tide did you take the soundings?—Low water.

40. Are you aware that the captains of the "Taniwha" and "Waimarie" can turn their steamers round in the river at half-tide?—No, they cannot.

41. If they say they can, what would you say?—I would say they were making misstatements.

42. You say that these boats could come down at half-tide before the Proclamation and at three-quarter tide once?—There were none of these boats running at that time; there were only the "Ruby" and "Pearl"—small boats.

43. What boat was running at the time of the proclamation of the sludge-channel in 1895?—The "Paeroa."

44. How much did she draw?—I do not know.

45. *The Chairman.*] What is the rise and fall of the tide at your place?—It depends on the state of the river above.

46. What is the greatest rise?—I took the measurement on the 14th May, and there was 10 ft. of a rise. The tide this morning was exactly 10 ft. An ordinary tide would be about 7 ft. The whole thing depends on the state of the river above.

47. What would it be there in springs if there was no fresh?—Seven feet.

48. What would it be at the lowest neap tide.—I suppose 5 ft. or 5½ ft.

49. *Mr. Clendon.*] Is there not less fresh water in the months of February and March than during any other months in the year?—Yes, as a rule.

50. *Mr. Mueller.*] Can you state from your personal observation whether the bottom of the river has changed at all in its nature?—Yes: when I was on the river for over thirty years I could take a pole and shove it straight down, but now I have to bump the pole down to get through the crust. There are soft and hard layers alternating in the river.

51. *The Chairman.*] How much higher do the tides come up now than they used to come up at high springs?—Nine or ten inches.

52. For how many years?—In the last two or three years only.

HUGH GILLARD examined. (No. 19.)

1. *Mr. Mueller.*] Your name is Hugh Gillard, and you are a farmer residing at Netherton?—Yes.

2. You own 96 acres of leasehold land?—Yes.

3. It is close to Arthur Wight's property?—Yes; my place is on the north side of the road, on the water front.

4. Is your property affected by the floods?—Yes.

5. Did you notice a deposit of slime on the grass?—Yes, after a flood.

6. Does that cause injury to the feed and to the cows?—Yes, a good deal.

7. How long have you been there?—I have been on that place eighteen months, but I have been in this district ten years.

8. Have you known Mr. Wight's property for the last ten years?—Yes.

9. And you know the river opposite that property?—Yes.

10. Have you seen cattle walking across the river to Mr. Wight's property?—Yes.

11. Last summer?—Yes; I have had my own cattle cross to his place also.

12. Have you noticed a difference in the bottom of the river, whether it has become solid?—During the last two years the river has filled up a good deal.

13. Can you take your horses right to the water's edge?—I could not at one time, but I can take them down now. In previous years the banks were so soft that animals would not attempt to go down to the water's edge, but now it is hard, and the animals walk across.

14. Is the deep channel as wide as it was years ago?—No.

15. Is there anything by which you can state that for certain?—I have taken measurements myself.

16. Have you had to extend your fences further into the river?—Yes: to prevent my cattle wandering on to other people's land.

17. As the silt has extended the banks of the river, you have had to extend your fence?—Yes.

18. How far from the river-bank have you seen a deposit of actual stuff on the ground?—Half a chain.

19. Have you suffered loss through the loss of crops—grass, oats, and potatoes—and also the loss of feed?—Yes.

20. Have you seen the cattle and horses cross the river on more than one occasion?—Yes.

21. How much of your land does the water extend over?—Over the whole of it.

22. *Mr. Mitchelson.*] What was the thickness of the deposit half a chain from the river?—It was not a great thickness. Of course there was a sort of slime all over the place.

23. *Mr. Tunks.*] You have been in the district some ten years?—Yes.

24. You remember the big flood of 1907?—At Waihi.

25. You knew the extent of that flood?—Yes.

26. You knew when you took this property that it was subject to flooding?—Yes.

27. Can you tell us when you took your last measurement of the river?—About two months ago, just before the fresh.

28. Which one was that?—At the end of March.

29. When were your previous measurements made?—About two months before that.

30. All your measurements have been made within the last four months?—Yes.

31. What length of lease have you got of this property?—I would rather not say.

32. *Mr. Mueller.*] Do you intend to exercise your purchasing clause?—No.

33. *Mr. Tunks.*] Is your leasehold interest for sale?—It is no good to me or anybody else.

34. Why did you take it up?—Because I had an idea it was going to improve.

35. Were you near Netherton when the flood was on?—No; if I had been, I should not have been there to-day.

36. I suppose you have drains on your property?—Yes.

37. To what extent?—Four drains right through my property, and one right round.

38. What is the size of your largest drain?—It runs from 6 ft. to 3 ft. at the back.

39. *Mr. McVeagh.*] You knew of the previous flood of 1907?—Yes.

40. You took that into consideration when you were fixing the rent?—Yes.

41. You had no flood-waters in 1910 from the back of Netherton?—No.

42. Where did your flood-waters come from?—They broke over at the Junction, and came right through.

43. The position is this: When you took up the land you knew you were taking up land liable to flooding?—It would not do so if the river was clear.

44. It was not cleared at the time, and you knew that?—Yes.

45. You knew of the strong agitation regarding the silt?—Yes.

46. You knew of the delegation that went to Wellington, and the petition regarding the silt?—Yes.

47. Yet you had sufficient faith to take up that land?—Yes.

48. How long has your lease to run?—I decline to say.

49. Have you a lease in writing?—Yes.

50. What rent are you paying for the place?—That is my business, too.

51. *Mr. McVeagh.*] When did you see cattle crossing the stream?—From last November up to the present time, and I saw a horse crossing a few weeks ago.

52. What was the state of the tide?—Low tide.

53. *Mr. Mueller.*] Do you know the person who previously occupied that land where you are?—Yes, Styles.

54. Do you know why he left that land?—No.

RALPH STOCK examined. (No. 20.)

1. *Mr. Mueller.*] Your name is Ralph Stock, and you are a dairy-farmer residing at Netherton?—Yes, on Komata North. I have 200 acres of land.

2. What frontage have you got to the river?—Thirty chains.

3. During the last three years has your land been subject to floods?—Very much so.

4. Previous to that?—Previous to three years ago I never saw a flood. Just in the bend, at spring tides, and with a fresh in the river, the water may have covered my place to the extent of an acre and a half, but no further. As soon as the tide went out the water went away. It was very rare.

5. During the last three years what area of your land has been flooded?—In that flood three years ago every bit of the land was flooded. I do not think there was half a chain but what was flooded. I had the flood in my house. It left a big deposit of silt. I have raised my house 2 ft.

6. How long have you been in the district?—In the immediate district between ten and eleven years; but I have been on the river twenty-eight years.

7. Do you remember a flood in September last?—Yes.

8. Did that flood your land?—Yes. About 20 acres were not flooded. That flood was not so high as the 1907 flood.

9. Did those floods leave layers of fine slimes over the land?—The 1907 flood completely killed all vegetation, and there was a big loss of cattle and pigs. After the September flood I had to resow a part of the land at the back of my place.

10. After the 1907 flood did you practically have to resow the whole of your land?—At that time it was not drained so well as it is at the present time, and I was dependent on the back land for feed for the winter stock. After that I had to sow it.

11. After the 1907 flood you did sow your land?—Yes, the greater part of it.

12. After the 1909 flood you had to resow part of it?—About 50 acres.

13. *The Chairman.*] Was that surface-sowing?—Yes.

14. *Mr. Mueller.*] Your means of livelihood is the dairying?—Yes.

15. What difference did that 1907 flood make to your livelihood?—It practically crippled me for the time. I had practically no milk after it.

16. And after the 1909 flood was your milk affected?—The milk was on the increase then, and it did not increase as it should have done. It did not affect the milk-return as much as the previous flood.

17. Have you lost cattle or pigs by drowning?—In the flood in March I had twenty pigs drowned. I had no idea of a fresh when I went to bed that night. We had practically no rain to warrant a fresh.

18. Did that last March flood destroy your winter feed for the coming winter?—It ruined all my grass, and I had crops of swedes which I had to use. I put the cows on what I was relying on for the winter. I have been feeding them with hay for more than a month now.

19. *The Chairman.*] Was that hay that you have grown yourself?—Yes.

20. *Mr. Mueller.*] Previous to three years ago was your land flooded?—I have never seen a flood since I have been there, nearly eleven years.

21. Is there any of the land that has been practically rendered useless on account of the deposit of tailings?—Yes, I imagine from 8 to 10 acres.

22. You can do nothing with it?—No; because if I clear it and plough it and try to get it into grass, a fresh comes along in the meantime and ruins everything.

23. Do you own a launch on the river?—Yes.

24. Do you carry milk in your launch?—Yes.

25. To the Netherton creamery?—Yes.

26. You are very often on the river?—Yes, every day.

27. And at all stages of the tide?—Yes.

28. Can you say from your experience with your launch on the river at all stages of the tide whether the river is shallowing between your place and the Netherton creamery?—Most decidedly. When I got the launch four years ago I could go down at any state of the tide to the creamery and not touch at spring low tide. Now in three miles you must touch for a mile and a half.

29. Four years ago were you able to go full speed at low water?—Yes.

30. *The Chairman.*] What draught is your launch?—2 ft. to 2 ft. 6 in.

31. Do you remember the "Chelmsford" being stuck between your place and the creamery last month?—Yes; she stuck opposite Thomas's place, practically in the channel. Yesterday morning the "Waimarie" stuck practically in the same place.

32. *Mr. Michelson.*] What state of the tide was that?—The tide was running out. She just managed to crawl over the spot.

33. *The Chairman.*] I suppose you could fix the spot to half a chain?—It was almost opposite Thomas's Wharf. Where there was 4 ft. opposite my landing ten years ago there is none now.

34. How far is it from the creamery to your property?—About three miles. The "Waimarie" stuck about half a mile below my place.

35. *Mr. Mueller.*] Have you taken any samples?—Yes, from my wharf. It was from 2 in. to 3 in. deep on my wharf. [Sample produced.] That is a sample of a deposit left by the last flood.

36. Is that wharf near the channel?—Yes. The channel is being forced over to my side of the river. The river took the land at Robinson's, came right across mine, and went into the river again further down.

37. *Mr. Tunks.*] How long have you had this property?—Between ten and eleven years.

38. And the 1907 flood was the first flood you noticed?—Yes.

39. Have you taken any soundings or measurements opposite your place?—No, I cannot say that I have. In summer-time I know that where the launch lies she was never aground, but now she is sometimes aground.

40. Do I understand you to say that the channel is coming over towards your side?—Yes.

41. Then it is getting deeper towards your side?—No, I cannot say that.

42. Have you made an examination of the river-bed to see what it is composed of?—No; but I know that the bottom is hard.

43. *Mr. Clendon.*] Is your property leasehold or freehold?—Freehold.

44. Which bank are you on?—On the right bank.

45. When did you acquire the freehold?—Seven or eight years ago.

46. Have you any objection to tell the Commission what you paid for the freehold?—I would rather not.

47. What was the Government valuation last year?—I think it is £1,800.

48. What is the area of the freehold?—One hundred and sixty-three acres.

49. There is a very sharp bend of the river at your property?—Yes.

50. Is it not a fact that near sharp bends in the Ohinemuri River the channels are frequently changing, particularly after heavy floods?—I do not think so: it has never changed since I have been there.

51. When you say you thought the "Waimarie" stuck, was she coming up or going down?—She was coming up. It was about 9 o'clock. The tide was running out.

52. These are particularly low tides, are they not?—They are not very high.

JAMES THOMAS examined. (No. 21.)

1. *Mr. Mueller.*] Your name is James Thomas, and you are a dairy-farmer, residing at Netherton?—Yes; I own 117 acres of freehold land—part of Koronae No. 3 Block and part of Komata North No. 1A No. 5 Block.

2. What river frontage have you?—Twenty chains.

3. You supply milk to the Netherton creamery?—Yes.

4. How much of your 117 acres is affected by floods—at the 1907 flood?—It was practically over the whole of it.

5. Is the bank of the river high or low at your place?—What we term a high bank.

6. Opposite that bank can you state how deep the silt deposits are?—Yes, I put a hole down 5 ft., and got tailings down the whole distance. I am speaking of between high-water mark and low-water mark.

7. Are both banks filling?—Yes.

8. Can cattle walk down further into the river than they were able to walk five years ago?—They can go 30 ft. lower down from my fence than they used to do. I have had to extend the fence there to stop them. That is in summer-time, dead low water. When I put up the fence it was almost on the edge of the bank.

9. Was your land flooded in March last?—Yes.

10. Was there any that was not covered in March?—About 8 acres was not covered. The cattle had to live on that for five days—the rest was under water.

11. At the end of that period, were they in poor condition?—Yes, they began to fall away pretty considerably.

12. Did this same flood damage a 12-acre paddock of yours?—Yes.

13. What was in that 12-acre paddock?—Different sorts of grasses and clover.

14. Had that been recently sown?—It was a paddock I had recently ploughed and sown.

15. Had you to resow that paddock?—I did not plough it a second time—I just went over it. It cost me for grass-seed and labour about £10 to resow that land.

16. Did the rest of the farm suffer from the flood?—Yes, the whole of the farm suffered.

17. How many cows were in milk prior to that flood?—Thirty-one.

18. And what effect did that flood have on your milk cheque?—It blew me out. I have just turned the cows out now. I should have milked them for another two months.

19. How long was it before the grass could be eaten by the cows after the flood receded?—It had a dirty-yellow slime over it when the water receded, and the cows went down considerably in condition in consequence, and I have turned them out two months earlier than I ought to have done.

20. What has been your loss?—It is hard to say. I could not make a definite statement what I did lose.

21. *The Chairman.*] This time last year, were you milking the same number of cows?—No: twenty-six.

22. Do you remember what cheques you were getting last year from the twenty-six cows for this month?—I cannot remember, but I could let you know.

23. *Mr. Mueller.*] During the last three years, did you have three floods in your place?—Yes.

24. January, 1907, last September, and last March?—Yes.

25. Was the effect of the 1907 flood such that you had to go off your farm and work elsewhere?—I had to turn the cows straight out, and go to work and earn wages.

26. You expended your wages in restoring your land?—It was not until the following November that I could afford any expenditure in money on the land.

27. Could you put your loss into figures?—I consider that I lost £100 for the rest of the 1907 season.

28. And, apart from that, I suppose your land was not of such a good carrying-capacity the following season as it ought to have been?—Not until I got it grassed.

29. *The Chairman.*] The silt killed everything?—Yes.

30. *Mr. Mueller.*] Do you know the old Maori steps in the river?—Yes.

31. What were those steps erected for?—For the Maoris to get down at low water and get water for cooking purposes. I should say that about 6 ft. has filled up from low-water mark.

32. How far does that extend into the river?—About 25 ft. At the steps there is about 6 ft., and that slopes down to nothing. That would be about 25ft. at low water—25 ft. from the steps.

33. *The Chairman.*] Is that deposit sandy, or slimy, or muddy?—It is set too solid to be muddy; you have to dig at it with a shovel.

34. It is not sand?—No.

35. *Mr. Mueller.*] Do you own a launch on the river?—Yes.

36. You take your milk to the creamery every morning?—Yes.

37. How long have you been navigating the river with the launch?—About eight or nine months.

38. What does your launch draw?—A little more than 2 ft. if loaded.

39. Have you any difficulty in getting about the river at low tide?—At very low tide it takes one man to steer and another man to feel his way with a pole.

40. Have you ever done the feeling part with the pole?—Yes.

41. What sort of a bottom has the river?—In the very deep places it is hard, but when you get out of that it is softer—you can sink into it.

42. Have you had any experience of the navigation of the river previous to the eight months you have had this launch?—Nothing in particular. I have been aground with a flat-bottomed boat with a load in it, and have had to get out and push it along.

43. During the whole of the five years have you been taking milk to the creamery?—Yes.

44. Can you say whether the channel during the five years has narrowed or not?—I could not say.

45. *Mr. Tunks.*] How long have you been in the district?—Eight years.

46. You were here at the time of the January flood?—Yes.

47. Was that the first time you had seen a flood in the district?—Yes.

48. You say that the bottom of the river has hardened in places: have you any idea what the bottom is composed of?—It is hard in the deep water. It has been hard ever since I had the launch.

49. Do you know what it is composed of?—No.

50. *Mr. McVeagh.*] When did you take up your property?—About five years ago.

51. Have you drained it?—Fairly well.

52. What length of drains have you got?—About 50 chains.

53. How high is it above the Waihou bank from low-water mark?—It might be 11 ft.

54. What is the difference in the rise and fall of the tides?—In the middle of summer, in the big spring tides, there is a rise and fall of about 8 ft., and in the case of the small tides about 3 ft. less than that. Farmers considered it the best summer they had seen, because they were always getting a shower when they wanted it. That was until the flood.

55. Have you any idea of the rainfall for December?—Not the slightest idea.

56. You say you noticed this deposit on your vegetation: may that not have been ordinary alluvium?—I do not think so.

57. What is the difference between the ordinary flood alluvium and that deposit that is on your place?—The ordinary flood alluvium is soft.

58. When did you have experience of the ordinary flood alluvium?—Not on my place at all.

59. Where did you have any experience of the ordinary flood alluvium?—In different places at the Thames, but not farming. At Tararu.

60. Was Tararu under water?—The creek-banks. I lived about a mile and a half up from the creek-mouth.

61. Did you go and feel that alluvium?—I ran about in it with my bare feet.

62. You can detect the difference between the feeling of soft alluvium with your feet and the substance up here, feeling it with your hands?—Yes, to my way of thinking.

MALCOLM MORRISON examined. (No. 22.)

1. *Mr. Mueller.*] Your name is Malcolm Morrison, and you own land at Netherton?—Yes, 149 acres, part of Komata North No. 1. My east boundary adjoins Mr. Thomas's place. I have a water frontage on the western front. My place is portion of 1A1, Lot 2.

2. You are below the creamery?—Yes.

3. Is your land affected by floods?—Not to any great extent. This last flood came over the bank. It went off in a day or two.

4. Did the last flood do any damage to your grass?—Yes, to a certain extent.

5. Have you known that land for a considerable number of years?—Yes, I have been on it since I was ten years old.

6. Have you known it to flood previous to two or three years ago?—Not to the extent it is now doing.

7. You know your father's land?—Yes.

8. And you have heard what he said as to the navigation of the river?—Yes.

9. Can you corroborate what he has said in regard to the land and the navigation?—Most decidedly.

10. *Mr. Clendon.*] You know the land in the Wharepoua district?—I have heard about it.

11. Are you aware that some of the farms in the Wharepoua district were under water for at least two weeks as a result of the 1907 flood?—No.

12. You did not hear that land over there was under flood?—No.
13. You are not far from the Hikutaia Stream?—About two miles and a half.
14. Is it not a fact that farms along the banks of the Hikutaia Stream have been flooded more during the last few years than in previous years?—Not that I am aware of.
15. Could you say they have not?—No.
16. *The Chairman.*] How do you get your milk to the creamery?—By launch.
17. Have you noticed any variation in the river?—During the last few years the depth of water has become less and less.
18. In the channel itself did you notice any variation?—I have never taken soundings in the channel.

CLARKE JOHN VEDDER examined. (No. 23.)

1. *Mr. Mueller.*] Your name is Clarke John Vedder, and you own land adjoining Mr. Thomas's?—Yes; 117 acres, part of Koronae No. 3 Block. I have 20 chains frontage to the river.
2. Has your land been injuriously affected?—Yes.
3. Have you suffered loss in the same manner as Mr. Thomas?—Pretty well.
4. How did you get your milk to the creamery?—In a small pulling-boat.
5. Can you state whether the navigation has altered since you went there?—Yes, by the sides of the river filling up.
6. Has the deep-water channel become narrower?—Yes.
7. You have heard Mr. Thomas's evidence?—Yes.
8. Can you corroborate what Mr. Thomas has said?—In most things.
9. *Mr. McVeagh.*] When did you measure the deep-water channel?—I never measured it; but there is a great difference between what it is at the present time and what it was three or four years ago. You can notice it with your eye, without measuring it.
10. Where did you observe it three or four years ago?—Just below my house and Mr. Thomas's.
11. What was the width of it three or four years ago?—I could not give you the measurements.
12. Have you any approximate idea of the width of the channel?—I put up the wharf between three and four years ago, and it was 2 ft. in the water at low water, and now there is 5 ft. fully of what they call silt and tailings between the wharf and the water. We have got to lengthen the wharf. The river is narrowing from bank to bank.
13. Have you noticed the material that is causing this narrowing?—Yes. I believe it to be tailings.
14. Might it not possibly be something else?—I do not think so. It is the same as the other stuff that is deposited along the river.
15. How do you distinguish between tailings and flood alluvium?—One is a different colour from the other.
16. When did you take up this land?—I think between five and six years ago.
17. *The Chairman.*] Who owns the land immediately opposite yours?—Mr. Moore.
18. Is the river pinching immediately opposite you in the same way as you describe?—Yes.
19. To a greater or lesser extent?—It is more so than in front of my house.

PAEROA, THURSDAY, 26TH MAY, 1910.

Mr. Myers, with Mr. Tunks, said he appeared for the mining companies.

CHARLES OHLSON examined. (No. 24.)

1. *Mr. Mueller.*] You are a labourer residing at Paeroa?—Yes. I have been here for eighteen years.
2. And during that time have you spent much of your time on the river?—Yes, a considerable portion of my time.
3. Have you taken soundings for different parties?—I have been with different parties taking soundings. I cannot remember the first year I took soundings, but it would probably be about 1895, when Mr. McArthur became Engineer.
4. Were you taking samples for a company?—Yes, an Australian company.
5. From your knowledge of the river during the last fifteen or sixteen years, can you state whether the floods now are more severe or less severe than they were?—They are more severe.
6. What do you attribute that to?—The tailings are silting up the river.
7. Can you compare the depth of the river between those early times and the present time?—Yes: there are places where eighteen years ago there was 10 ft. or 12 ft. of water, and there are only a couple of feet there now.
8. How far down the river have your observations taken you?—I used to take soundings below Kenny's—between Thorp's Bend and the Junction—in the Ohinemuri principally, and below the Junction.
9. What will be the effect if nothing is done as regards the river?—It will silt up altogether if they go on much longer.
10. Have you had experience as regards the deposit of fine slimes on the grass?—Yes.
11. What has been the result of that?—You could see it lying on the top of the grass, and it works itself amongst the grass on top of the soil.
12. What effect has that on the feed of the cattle?—So far as I can see, it injures the cattle. They cannot help eating it when they are eating the grass.

13. How does that affect their milk-capacity?—It injures the milking.

14. How far down the river have you noticed tailings in the sides of the river?—As far down as the creamery at Netherton. It may be further down.

15. What effect on the channel has the use of the river by the steamers made?—They stir it up and keep the channel more open. Every fresh the sand is shifted: you may find deep water at one place one time, and then another flood comes and there is a shallow there.

16. What is your experience as regards the navigability of the river?—It used to be navigable at one time, but it is not navigable now. I am referring to the Ohinemuri River, and the Waihou for half a mile below the Junction.

17. *Mr. Myers.*] For what purpose did you take soundings in 1895?—I could not tell you.

18. You attribute the more severe floods to the tailings silting up the river: do you mean tailings in the bed of the river?—Yes.

19. Are you speaking now of the river below the Junction?—A portion of it.

20. Then, according to you, whatever your opinion may be worth, the river as far as you went below the Junction has been silted up by mining tailings in the bed?—There may be a little Waihou River sand amongst it, but you can easily distinguish the difference.

21. Do you say that during every fresh the stuff that is on the banks and in the river shifts?—Not on the bank, but in the bed of the river. If there is a big flood they shift from the bank into the river.

22. Supposing no more silt is put into the river, do I understand you to say that damage will still happen to the surrounding land whenever a fresh occurs, shifting the stuff that is now in the river?—If you do not put any more stuff into it it will not do any more damage.

23. *Mr. Clendon.*] You say that the floods have been more severe in the last few years: have you compared the rainfall of the last few years?—No.

24. Do you know anything of the treatment of tailings?—No.

25. *Mr. Mueller.*] Do you remember looking for a section-peg just below Kenny's?—Yes.

26. What did you have to do to find that peg?—I had to dig into the tailings-bed.

27. How deep did you dig?—Probably about 8 ft.

28. Do you remember what state the river was in in previous years where you dug that 8 ft.?—I put a peg there about eight years ago. That peg was 2 ft. 9 in. out of the ground, I think. It was about 15 ft. up from the bank.

29. What was once the bed of the Waihou River opposite Kenny's is now filled up by a big bank?—Yes.

GEORGE BUCHANAN further examined. (No. 25.)

1. *Mr. Myers.*] You are chairman of the Silting Association?—Yes.

2. How long have you been chairman?—About a fortnight before last Christmas I was elected.

3. It is part of the association's case—is it not?—at this inquiry that the bed of the Waihou River below the Junction has been raised by the silt from the batteries of the various mining companies?—I am not aware that they put forward a case. Mr. Mueller stated it for them.

4. I want to know whether or not your association alleges that the river below the Junction has been silted up by stuff from the batteries?—Most decidedly it has been below the Junction. It is visible.

5. For the case that the association makes I understand that you mainly rely upon tht evidence of the farmers who have already been called?—Also on the evidence of the townspeople.

6. Have you during the present year had any examination or investigation made by an engineer or engineers?—Yes, the association has.

7. Who was the engineer?—Mr. Metcalfe, of Auckland.

8. Has your association made any arrangement to call him as a witness?—Not as ——.

9. Did Mr. Metcalfe furnish a report to your association?—Yes.

10. I ask you to produce it?—Here it is. [Exhibit No. 13.]

11. Mr. Metcalfe apparently is of opinion that, even if the river-bed below the Junction has been raised, the bed consists of Waihou sands, and not tailings. Do you know if that is so?—I was not with Mr. Metcalfe when he went down the river. The method of taking the samples at that time was by a large jam-tin, or something of the sort, at the end of a long pole. It was merely surface sand. They did not go down underneath the surface. There may be, of course, layers of tailings and sand deeper down.

12. Do I understand that you, the chairman of the Silting Association, are challenging on that point the opinion of Mr. Metcalfe, the engineer appointed by the association to make this investigation?—No. We have only a limited amount of money, and that is why Mr. Metcalfe has not been called to Paeroa.

13. In your evidence the other day you put in a report from Mr. Montgomery?—Yes.

14. Why did you not put in Mr. Metcalfe's report at the same time?—I do not know.

WILLIAM HENRY EMETT examined. (No. 26.)

1. *Mr. Mueller.*] You are a carrier residing at Paeroa?—Yes.

2. How long have you been carrying on your present business here?—For the last fifteen or sixteen years

3. In the course of your business you have to do with all sorts of building-material—bricks and lime?—Yes.

4. Did you get good building-sand in the Ohinemuri River a few years ago?—Yes, ten or twelve years ago.

5. Have you been able to get any of that sand in recent years?—Not except with a lot of trouble. It is well covered up.

6. Whereabouts in the Ohinemuri River did you get this building-sand?—You could get it almost anywhere, but the easiest place to get it was at the back of the present butter-factory, and about a mile from this side of the Junction Wharf. Those were the easiest places to get down to the water's edge with a dray.

7. What was that sand used for?—Mostly brickwork. It was fine sand.

8. For how many years past have you been unable to get it?—I do not think there has been any sand got out of the river during the last ten years.

9. Did you get some punt-loads of sand above the Junction in the Waihou?—Yes, within the last twelve months. Most of it came from Mangaiti, twenty miles up the river, which is the easiest place to load a barge.

10. What is the nature of that sand?—It is inclined to be too coarse. Generally the trouble is to get it fine enough for building purposes. It is all right for asphalt and concrete, and it is used in Paeroa streets for asphalting and concrete. Most of it is too coarse for building purposes.

11. Did you try to get any sand close to the Junction?—Yes, one punt-load. It used to be a good place to get sand at in years gone by—just a short distance from the Junction in the Waihou; but what I got there recently the architect and builder would not accept. It was half tailings.

12. *The Chairman.*] Who was the architect who condemned it?—I think it was Mr. Bray, the County Engineer, who condemned it. I had a contract to supply a butter-factory with sand, and I was informed that that sand would not do at all.

13. *Mr. Mueller.*] Why?—It was said there was too much silt in it. While it was wet it did not appear to have any tailings in it, but when it dried it turned white. It had the feel of sharp sand. We took it at low water.

14. You know the difference between what you call Waihou sand and tailings and silt?—Yes, there is a great deal of difference.

15. *Mr. Moresby.*] You are used to making roads?—Yes.

16. Do you consider the stuff you took down close to the Junction would make good roads for light traffic?—I am doubtful about that. I think even with light traffic the top would keep cutting up.

17. You know the Piako side of the Waihou River?—Yes.

18. Is there any handy metal that you can get there for making roads?—No.

19. Do you not think this stuff would make good light roads in that country?—Not long since a mile and a half of road was made there—a very good road too—but it was not the present sand in the Waihou that was used. The sand out there is a white pumice sand, and makes a good solid road.

20. The sand in the Waihou is good coarse material?—Yes.

21. Do you not think it would make good roads in that class of country on the other side of the Waihou?—I could not say.

22. You consider it is equal to the stuff on the railway-line used as ballast between Paeroa and the river?—Yes.

23. *Mr. McVeagh.*] When you started as carrier here fifteen or sixteen years ago, how many teams did you have?—Probably two or three for a start.

24. You began to increase them, I suppose, very soon afterwards?—When the boom-time came along I increased them.

25. How many horses were you running then?—From twelve to sixteen. We took on carrying to Karangahake and other places.

26. I suppose you were doing eight to ten times as much work as when you started?—No.

27. How much more?—About double the work.

28. That continued for some time?—Yes; it was a different class of work. The work in the town increased very little.

29. There were more people coming here?—Of course the town was gradually increasing all the time.

ARTHUR CHARLES HUBBARD examined. (No. 27.)

1. *Mr. Mueller.*] You are chairman of directors of the Thames Valley Co-operative Dairy Company?—Yes.

2. You are a farmer residing at Komata?—Yes.

3. I think the farm belongs to your family?—Myself and my brothers.

4. How much land have you got there?—Six hundred and sixty-five acres.

5. Did you have that property thoroughly drained?—Yes, it is fairly well drained.

6. Tile drains or open drains?—Both. I should like to mention that the Komata Creek is being used as a sludge-channel.

7. *The Chairman.*] Those drains are all for the Komata Creek?—No.

8. *Mr. Mueller.*] There is one drain that empties into the Komata Creek?—That portion of our land below the railway-line is low-lying, and we have tile-drained a portion of the land, and these tile drains lead into outlet drains. The open outlet drain empties into the Komata Creek.

9. *The Chairman.*] Did you put any flood-gates on it?—No. Until about twelve months ago there was always a good outlet through the open drain. We had to clean it out periodically. At the beginning of last autumn or winter, as usual, I let a contract to have it cleaned out. The contractor had made a start on the work when a fresh came along and lodged a deposit of silt in the drain. I think that happened about May or June. It was an ordinary fresh. I had to pay the contractor extra to go over his work and remove this silt-deposit.

10. What did it consist of?—Mining tailings principally.

11. Fine or coarse?—All sorts. You could find some fairly coarse and some fairly fine stuff.

12. Do you think those tailings came down the Komata?—Yes.

13. And not from the Waihou River?—No.

14. *Mr. Mueller.*] Did he complete his job?—Yes. Shortly after he completed it another fresh came, and there were more tailings in the drain. I allowed that deposit to remain there last winter. I had already shifted these deposits twice. There is not much fall in that country, and if there is any deposit in the outlet drain the tile drains will not do their work. This deposit in the drain is caused, in my opinion, by the water overflowing the banks above, and also by filling in at the mouth of the drain.

15. Was the water overflowing above and also entering at the mouth of the drain?—Yes.

16. And that is from the creek?—Yes, the creek and these drains form three sides of a square. At one time the area enclosed in that square we considered was some of our best cropping-land.

17. What area was enclosed in the square?—About 50 acres. There was very little apparent risk in cropping it. We had no trouble in harvesting our crops. We very rarely had a flood on it that could do any harm. In January, 1907, 25 acres out of the 50 acres was in oats and potatoes. Nearly the whole of the 25 acres was under water. Twenty acres of the 25 acres was in oats, the remainder in potatoes. The oats were damaged by the water, but the damage was intensified by the deposit of silt lodged in the sheaves. We reckoned we should have about 35 tons of potatoes off the 5 acres. We took about 14 tons; the remainder were rotten. We only sold about 10 tons. We considered we lost about £100 on the potatoes and £150 on the oats.

18. *Mr. Myers.*] Damaged by the flood?—No, the damage by the flood was intensified by the silt. I would like to explain that we had another paddock of oats on the same land, on high ground. It was damaged to some extent. We were able to sell it as chaff. The greater part of the chaff on the area below was unsaleable on account of the silt in the straw.

19. *Mr. Mueller.*] It was whitewashed?—The silt was right through it.

20. Describe the Komata Creek as regards the silting-up?—When we took over the property seventeen years ago it was a beautiful clear stream, with plenty of fish in it. Deep holes abounded in it. The lower sloping bank formed a natural fence in many places.

21. Was the creek 10 ft. down from the bank generally?—Yes, but there was a lower stop-bank of 2 ft. or 3 ft., and a sloping bank of perhaps 8 ft. or 10 ft. The sloping bank always carried good feed. At the present time most of the big holes have been filled up, and the sloping bank of the creek is covered with tailings.

22. Which came down the Komata?—Yes; that is, for about half the distance down our boundary. They might have come from the mouth of the creek, but the slope is too great to allow many to come up the creek.

23. Do you know when Komata was declared a sludge-channel?—It is a query whether it is a sludge-channel.

24. Was it excluded from the original Proclamation?—The intention was to exclude it. I have taken several legal opinions on the subject, and they do not all agree.

25. You say that about half your boundary has been affected in this way?—The lower half.

26. *The Chairman.*] Why was not the upper half affected if it comes down to the river?—There is too much fall from the Komata Reefs battery. I understand there is a fall of about 400 ft.

27. *Mr. Mueller.*] From the road down to the Junction of the creek with the river it is fairly flat?—Yes, and the creek is affected for a distance up by the tide. There are deposits of silt along the creek to where it is affected by the tide. It comes within 20 chains of the road.

28. On account of that you had to fence?—On account of the holes being filled and the sides changing I had to fence.

29. What is the acreage affected by the flood?—About 200 acres.

30. *The Chairman.*] In addition to certain silt on the banks of the creek above—a small amount?—The creek will break over above the railway-line. It does not do any damage; the water gets away because there is plenty of fall.

31. *Mr. Mueller.*] You are suffering from the want of local knowledge on the part of those who drew up the Proclamation?—Yes. At one time very little damage was done by the floods; when there was an overflow from the Komata Creek we very seldom had an overflow from the Waihou.

32. Have you noticed what length of time the water remains on your land compared with what used to happen?—During the January 1907 flood the water remained long enough on a portion of our land to kill all the grass.

33. Had that happened previously?—No, never.

34. Have you noticed any of the slimes or silt on the vegetation?—I noticed it particularly after the last March flood.

35. What effect has that had upon cattle?—I have not noticed any effect on the cattle on the portion of the land I am speaking about, but the cattle would not look at the grass upon which the deposit was lodged until some considerable time afterwards, when the deposit had washed off.

36. Have you had to remove your cattle?—Yes, frequently off the low-lying portions. That is of late years.

37. You carry on dairy-farming as well as cropping?—Yes, generally all-round farming.

38. Have the floods had any particular effect on your dairy receipts?—We are in that position that if the low-lying ground is flooded we can shift the stock on to the high land.

39. You have a considerable area of high land?—Yes.

40. Can you give us any idea as to what effect the flood has upon the value of, say, that 200 acres?—If it were not subject to floods I consider I could make it just as valuable as the high land.

41. And what difference in values is there now, roughly?—I consider that the high land in its present state and the land about the house and the railway-line is worth about £30 per acre.

42. And the other land?—About £10.

43. Subsequently to January, 1907, did you suffer damage by floods on your farm?—Not to the same extent, because it came at a different time of the year.

44. Are there other lands in the vicinity of yours that are similarly affected?—Yes, nearer Paeroa, and the Natives' land on the northern side of the creek.

45. Have you anything further to say with regard to your own personal damage?—No; I am not making out a case for compensation or anything like that.

46. You have been here seventeen years, and during that time you have taken an interest generally, and latterly particularly, in connection with this question?—Yes.

47. What observations do you wish to make in connection with the matter?—I consider that the fact of the river being silted up is depreciating the value of our property very considerably.

48. Are you speaking for yourself only or for the district?—For the district generally.

49. You have had an intimate knowledge of several other cases besides your own?—I am familiar with most places about here, especially about Paeroa, that are affected.

50. In what way were you interested in those other places: did you do any work on them?—When we first came here we had the only mowing-machine and reaper-and-binder in the district, and all the farmers used to get us to cut their crops. I usually did that work myself. For about nine years previous to 1893 I was in the habit of cutting the crops of Messrs. Buchanan, Cock, Bertelsen, and other farmers. I came from Mangere, just outside of Auckland, which is considered a good farming district, but I found the crops down here were much better than they were at Mangere. Mangere is a highly cultivated farming district.

51. Do you remember the nature of the land right adjoining the river?—At that time most of the cleared paddocks about here were on the river-beds, and they grew grass right down to the water's edge.

52. Did you also cut at Mr. A. J. Thorp's?—Yes.

53. And now what is the position?—In company with Mr. Buchanan I visited a lot of these paddocks subsequent to the flood of March last. On one of Buchanan's paddocks where I formerly cut hay there was after the flood a depth of tailings extending for about 4 square chains, the deposit being from 6 in. to 18 in. deep. I also visited Barrett's paddock adjoining Buchanan's. There was an area there of 3 chains by 12 chains, the deposit being 3 in. and in places 2 ft. deep. These visits were made on the 4th April. At A. J. Thorp's place on the Te Aroha Road we found a good deal of silt in the middle of a big paddock we used to cut. The deposit varied from 1 in. to 9 in. in depth. It would be very hard to give the area, because there was a slight deposit of silt over most of the paddock. There were 12 or 15 acres in the paddock. At George Crosbie's, opposite Bertelsen's, a little lower down, I found a deposit extending over about 2 acres, but the whole farm seemed to me to be affected with the deposit. At Mr. Bertelsen's place, at the back of the house, there was a deposit to the depth of from 2 in. to 24 in. In one place Bertelsen dug down about 2 ft. 6 in. At the same date we took a deposit from the floor of an old shop in the township. These samples have been sent to Mr. Pond for analysis.

54. Does the land about here require draining before it is worked?—You want to go in for intensified farming, and drain it thoroughly. It is heavy land. By "intensified" I mean it wants to be drained thoroughly, and the drains kept open. It is different to rolling country. When it is in grass it does not want any more attention.

55. Is it land that will stand cropping to a great extent?—I have seen paddocks in the Netherton district, and they told me that they had taken nine crops of oats off them in succession without manure. I have taken three crops, and I have found the third one every bit as good as the first one. We never have to put artificial manure on the land for our white or straw crops here. They grow too rank as it is without manure.

56. What is the position now as regards cropping at Netherton?—The experience of the Netherton people after the 1907 flood was that it was not safe to crop their land.

57. What effect has that had financially upon the farmers?—They stand a great risk of losing the whole of their crops, and it also interferes with what you might call scientific farming—that is, carrying on a rotation of crops.

58. What effect has that upon the selling-value of the properties?—There seems to me to be a boom in farming land all over the Dominion just now with the exception of this district.

59. How does it compare with adjoining districts?—The chairman of directors of another dairy company has given me some of their experience. About October last they took over another company's business. That company had about thirty certain suppliers. Since then six of those people have sold their properties.

60. Out of thirty freeholders at Manawaru there were six sales, and on this side there were only three sales in the same period?—Yes.

61. You live only a few miles from the Township of Paeroa?—Yes, about three miles.

62. You are often in the township?—Yes.

63. Which was the highest flood as far as Paeroa Township is concerned?—Either 1907 or that of March last.

64. When did you take the silt from the floor of the shop in the township?—On the 4th April, after the March flood.

65. Was your attention then drawn to other premises in the township?—Yes, to those of Jones, the saddler, where they shovelled the silt out at the back door. I was also shown a deposit over the tennis-courts in the domain. I think the heap is down there now if the members of the Commission wish to measure it. The deposit was about ¼ in. deep, distribufed quite evenly over the whole of the courts.

66. Did other portions of the township come under your notice?—Yes, various portions.

67. What effect has that had upon the value of property in the township?—I do not know that that flood had any particular effect on the value of property, but the continual flooding I am

certain depresses the value of property in this township. We have got a lot of fine farming country all round here. Paeroa is the junction of the Thames-Waihi and Auckland Railways, and is the prospective junction of the Pokeno Railway. I consider we should have here one of the finest inland towns in the Dominion. A short time back some lots were put up for sale, and there was a little competition for the higher sites, but none for the lower.

68. As chairman of the Thames Valley Co-operative Dairy Company, can you give us some particulars of the working of your company?—Our turnover last year was £51,000. We consider the quality of our butter to be second to none in the Dominion. All our butter is exported from New Zealand, and is graded by Government Graders, and the total average grade was made up at the end of the season. For three seasons running we have been once first and twice second out of all the factories in the Auckland Provincial District. This year if we are not first we are coming out within a fraction of it. Our average grade this year is higher than that of New Plymouth or Patea. Our average this year is 93·16; New Plymouth, 93·12; and Patea, 93·4. The totals have not been made up yet, but we think we shall be first. In addition to this we have won numerous prizes in competitions with our butter. Our output last year was about 400 tons of butter. We export part, and sell the remainder locally.

STATEMENT HANDED IN BY THE CHAIRMAN OF THE THAMES VALLEY CO-OPERATIVE DAIRYING COMPANY.

As far as net returns are concerned there is very little between local price and export price; therefore we are not in any way dependent on the mines for a market. We appreciate the market they provide, and cater for it, but consider we should be able to operate just as successfully if it did not exist. The success of a co-operative dairying company is gauged by the amount they can return to their shareholders for their milk or butter-fat. Comparison will show that other companies who have no local market, but export the greater part of their output, can return to their suppliers as much per pound of butter-fat as we can. Thames Valley Dairying Company, last year, 10·98d.; Stratford Company, 10·83d.; Midhirst Company, 11·69d.; Cambridge Company, 12·5d. and 10·62d.; Ballance Company, 11·12d.

Comparison of Prices received this Season, since 1st September, for Export and Local Sales of Butter.

Export.—Thirteen shipments, prices ranging from 111s. to 129s. per hundredweight. Quantity, 4,816 cwt.; value, £28,509 2s.; average gross price, 118s. 6d. per hundredweight. Average charge for freight, commission, insurance, &c., 10s. 4d. per hundredweight. Average net return, 108s. 2d. per hundredweight, or 11·55d. per pound. Returns of four small shipments to come to hand: these will not materially affect average price.

Local.—Wholesale price—September and October, 1s. 0½d. per pound; November, December, January, February, 11½d. per pound; March and April, 1s. 0½d. per pound. Average gross wholesale price, 1s. per pound. Deduct 2½ per cent. from this and pay delivery, railway, freight, storage and handling, pounding and wrappers, extra clerical work; take credit risks, bad debts, &c. Wrote off £470, 31st May, 1909: Principal ones—Waihi Workers' Co-op., £140 9s. 6d.; other goldfields storekeepers, £110, £50, £60, £48 respectively.

These figures show conclusively that we could carry on just as profitably for our shareholders if no local market existed. Erroneous ideas prevail as to the profits of a co-operative dairying company. Our balance-sheet for the year ending 31st May, 1909, showed these to be £4,793; but this amount is simply the difference between the amount advanced to shareholders month by month and the net amount realized for butter-fat treated.

The business of the company has been increasing, but it would increase much more rapidly were not a great deal of the land on the river-banks becoming so subject to floods and damage by tailings.

The average price of butter on the Home markets has been steadily advancing for the last few years; to this is directly attributable the prosperity of the dairy industry in this district and the whole Dominion.

Total Amounts paid out to Suppliers at Netherton Creamery.

Season.	December.	January.	February.	March.	April.	Falling-off.
	£	£	£	£	£	£
1905–6	713	653	520	489	387	326, or 45 per cent.
1906–7	1,275	910	574	445	267	1,008, ,, 178 ,,
1907–8	881	883	689	632	522	359, ,, 40 ,,
1908–9	1,098	1,007	782	674	592	506, ,, 46 ,,
1909–10	1,210	1,042	725	694	522	688, ,, 56 ,,

Amounts paid to Individual Suppliers, 1906–7.

Affected by Flood.

	December.	January.	February.	March.	April.
	£	£	£	£ s. d.	£
Fisher Bros.	155	108	46	1 9 8	...
Adamson, F.	47	34	20	1 0 0	...
Moore, W.	73	47	24	12 0 0	...
Robinson, I.	54	34	21	17 0 0	5
Stock, R.	29	21	12	12 0 0	10
Thomas, J.	27	20	11	9 0 0	...

Amounts paid to Industrial Suppliers, 1906–7—continued.

Not affected by Flood.

	December.	January.	February.	March.	April.
	£	£	£	£ s. d.	£
Alexander, A. K.	47	45	38	43 0 0	35
Morrison, W.	41	35	28	31 0 0	23
1909–10.					
	£	£	£	£ s. d.	£
Fisher Bros.	118	111	74	73 0 0	58
Adamson, F.	36	36	27	22 0 0	15
Moore, W.	74	62	40	32 0 0	10
Robinson, I.	60	52	36	30 0 0	15
Alexander, A. K.	72	61	44	46 0 0	44
Morrison, W.	55	42	30	31 0 0	25
Stock, R.	52	53	35	35 0 0	25
Thomas, J.	44	39	25	23 0 0	17

Total Amounts paid out to Suppliers at Hikutaia Creamery.

Season.	December.	January.	February.	March.	April.
	£	£	£	£	£
1906–7	345	260	215	226	208

Falling-off, December–April, £137, or 39 per cent.

,, at Netherton creamery, corresponding period, 78 per cent.

69. *Mr. Myers.*] When you took up your land at Komata, was there much bush in the neighbourhood?—Yes, on the hills.

70. Has much of that bush been felled?—Yes; there is always a quantity being cut.

71. And that process of felling the bush has been going on for the last seventeen years?—Yes, to a greater or less degree.

72. Would you expect that to make any difference to your land?—It is generally understood that if you cut down the bush on the hills the water will come down quicker.

73. You say about 200 acres of your land was affected: how much of that was swamp land when you went there?—I could not give you the exact area.

74. A considerable area has been drained?—Yes.

75. Taking into consideration the felling of the bush and the sinking of the drained swamp land, do you think those two causes would affect your land to any extent?—The area of swamp land I have drained is outside the 200 acres that was flooded. It is not the swamp land that is affected. I consider there is sufficient fall off our place to allow that flood-water to get off if the Waihou water did not back up the Komata water.

76. Your land used to flood—did it not?—before these rivers were proclaimed sludge-channels?—Yes.

77. Are there any willows in the Komata?—Yes, a good number.

78. Do you think they affect the question at all so far as you are concerned?—They do not help the water to get away.

79. Do they not conduce to the accumulation of silt?—Yes; but there is plenty of silt to be found where there are no willows.

80. I suggest to you that they also conduce to the backing-up of the waters?—I admit that is correct.

81. Have you ever taken any steps with a view to having the willows cut down or removed?—Not so far.

82. Do you not think that the cutting-down or removal of the willows would to a considerable extent reduce the injuries of which you complain?—They would to a certain extent.

83. Do you not think the three things I have mentioned have a very great effect in producing the injuries, assuming the injuries to exist?—No.

84. What is it you blame then? What do you say the damage is caused by?—The damage caused by the flood-waters would not be so great if there was not silt with it. The flood-waters of a creek like the Komata would enrich our land if it were not for the silt.

85. Do you not think that if the willows did not cause the accumulation of silt you would not have so much to complain of?—I admitted that before.

86. You have spoken of the falling-off of the receipts of your dairy company between December and April: is there not a natural falling-off between those months?—Yes. Particulars in the figures I have given to the Commission.

87. *Mr. Clendon.*] Did you take any steps to oppose the making of the Komata Stream into a sludge-channel?—At that time I had no interest in the property. It was my father's property.

88. Did your father take any steps to oppose the Komata Stream being declared a sludge-channel?—He was under the impression it was exempted. I remember assisting him to draft a letter asking if it was exempted.

89. When was that?—When the matter was mooted.

90. Did your father make any claim for compensation?—No. He was under the impression that the Komata Stream was exempted.

91. Does not a quantity of *débris* come down the Komata Stream with every flood?—Yes.

92. What is the value of your property at the present time?—Fifteen pounds per acre is what we were asking for it.

93. What was the value of it in 1895?—It would be simply a guess on my part. Approximately it would be from £8 to £10 per acre.

94. I think you sold the property, or agreed to sell it, a year or two ago?—I have been trying to sell it for several years.

95. What price did you put on it then?—£13 10s. per acre.

96. Can you mention any property in this district the Government valuation of which has gone down since 1907?—I understand the valuation was made in 1907. There has been no valuer round here since then.

97. Was there a valuation last year?—Within the last two years.

98. How did that valuation compare with the previous valuation?—An increase.

99. What percentage?—I suppose there would be an increase of 20 per cent. in our case.

100. Was there any property the valuation of which was not increased?—I have no details of the valuations at all.

101. Within what period was the 20-per-cent. increase?—Between last year and the previous valuation. I consider that any increase is represented by improvements—tilling, draining, and clearing. In some cases we paid as much as £2 per acre to have clearing done. There are four men on the property improving it to-day.

102. Outside the making of drains, have any of the settlers done anything at all to make provision against an overflow of the land by water, except Mr. Bagnall at Turua?—Yes, Mr. Nichols and Mr. Cooper have.

103. Any one else?—I am not aware of any one else.

104. Would not a stop-bank on your property effectually keep back an overflow from the Waihou? Is there an overflow from the Waihou on your property?—The overflow from the Waihou comes in from that creek at Mr. John Thorp's, and I want to stop that; I have to erect a stop-bank to keep the water back on my neighbour's property.

105. You used to go about the district cutting crops: how long ago is it since you ceased generally to do that work?—About nine years.

106. It was about nine years ago that the creamery was established?—Yes.

107. The settlers took to dairying instead of cropping their land?—No; previous to that the New Zealand Dairy Association dealt with the creameries.

108. Since the advent of the dairying industry the cropping of the land has diminished considerably?—Yes.

109. How long were the oats and potatoes submerged?—Twenty-four hours.

110. That would be quite sufficient to ruin the crops?—The potatoes were ripe at the time, and the oats were in stook.

111. What age were you when you left Mangere?—About twenty; but since then I have been all through the North Island, and I have been over some of the best farms.

112. The butter-factory here has never been in such a flourishing condition as it has reached to-day?—The dairy industry throughout the Dominion is in a very good position at present.

113. How does the condition of Paeroa to-day compare financially and otherwise with its condition in 1895?—We had a mining boom at that time—wild-cat mining.

114. *Mr. Mueller.*] You did not cease cropping because of the dairying?—No.

115. How has the price of butter been ruling in London lately compared with ten years ago?—My experience is that we are getting a higher average for our butter in the London market every year.

116. That has a great deal to do with the success or otherwise of the company?—Of course it has.

117. In connection with the stop-bank which it has been suggested you might erect to stop the water flooding your land, have you any idea what length of country would have to be covered to be of any use?—It would have to be miles long—from the railway-line right down to the junction of the Komata Creek, and then it would have to go up the creek.

118. The water from the Waihou and the Komata join about your place, so that you would have to keep them both out?—Yes.

119. To what extent did the land flooded previous to 1895 compare with the floods now?—Formerly the water did not stay on the land for such a length of time.

120. Did it reach such a height?—There was nothing to back it up at that time. The Waihou River water did not come in in those years.

121. Your land has been flooded because of the Waihou backing up?—That is the conclusion we have come to.

122. The Waihou allowed the Komata water to get away?—Yes.

123. If you cut down the willows on the Komata Creek you say that would probably allow the silt to get away. If so, where would that silt go to?—Into the Waihou.

124. Would that improve the draining-capacity of the Waihou?—I do not think so.

125. As regards the felling of bush, has there been much felled on the Komata Creek or in that neighbourhood?—There are hundreds of thousands of acres of virgin bush there at the present time.

TUKUKINO HUNIA examined. (No. 28.)

1. *Mr. Mueller.*] You were born at Ohinemuri, and you have lived at Komata about thirty years?—Yes.

2. What interests have you as regards land in this district?—My ancestors' land, 222 acres, Komata North. The stream is the boundary between Mr. Hubbard's property and my place. Forty acres of my property is below the railway-line. I have 50 acres on the bank of the Waihou, commencing at the mouth of the Komata Stream, and running down the river to opposite McKee's, about 10 chains from Rangiora. I have a son who is interested in 10 acres, portion of the Huhuraumati Block, one part of it touching the Waihou.

3. In regard to the last piece of land, did any one agree to lease it?—Yes, it was leased; but the lessee (Cassrels) has given it up on account of the floods. That land is subject to floods, and the flood-water deposits silt on the land. About 3 acres is liable to flood. In the case of the Komata land, a great deal of damage has been done; all along the bank of the river is damaged. In former years the bank of the Komata Creek was about 7 ft. high. That was good land.

4. What was grown on it in previous years?—Potatoes, corn, kumeras, melons, and oats.

5. What can be grown on it now?—Nothing can be grown along the banks at the present time. Most of it has slipped into the creek. The Komata Creek at the present time is full of silt. About 6 acres is damaged of the 222 acres, and about 3 acres of the 50 acres. The water overflows the 40 acres below the railway-line. The 50 acres on the bank of the Waihou was all covered.

6. Formerly were there fish in the Komata Creek?—Yes, plenty of eels and whitebait; but since the mill has been erected at Komata the eels have all been destroyed.

7. Was the water used for drinking purposes?—Yes; and now we have to drink tank-water. In the summer-time the tanks get dry, and we have to go about a mile up the creek and carry the water down from a stream.

8. Do you remember steamers or barges coming up the Komata Creek?—Yes; they used to come about a mile up the creek. There is not enough water in the creek for steamers to come up now. Some parts of the creek are only a foot deep.

9. Were you employed to clear out drains in the vicinity?—Yes, we cleared out Mr. Hubbard's drain twice. We cleared nothing but silt out of the drain. It was about two spades deep. The drain continued silting up after every flood. There is sand and tailings in the drain now.

10. Can you tell us the nature of the banks of the Waihou opposite your land years ago compared with what they are now?—The banks in former years were very steep—in some places about 8 ft., and when the tide was out about 10 ft. Just now the banks are all full of silt, extending out for about 30 ft. from the original bank. In the 50 acres the drains leading out to the Waihou are all full of sand at the mouth. We have to be continually clearing them out. Owing to the silt, the fences have to be continually shifted out.

11. *Mr. McVeagh.*] What would you sell the land for now?—Some of it is worth £8 an acre, and the rest about £12 an acre.

12. How much of it is cultivated?—About 100 acres?—The oats were taken out in March, and two acres of potatoes in April.

13. How many tons did you get?—About 6 tons. There were about 2 tons good, and the rest were bad.

14. Do the Natives milk any cows?—Yes, and supply milk to the factory. There are twelve milking at the present time. I was milking sixteen in the summer.

15. What difference would it have made to the milking and the crops if the land had not been flooded?—The cattle would have been in better condition, and the crops would not have been damaged.

WILLIAM BETTIS examined. (No. 28A.)

1. *Mr. Myers.*] You are a master mariner, and you are master of the steamer "Waimarie"?—Yes.

2. Trading between here and Auckland?—Yes.

3. How long have you been trading between here and Auckland?—Close on twenty years; about twelve years on the "Waimarie."

4. What is the draught of the "Waimarie"?—Six feet light—3 ft. 6 in. forward, and 6 ft. aft.

5. Loaded?—We generally load her to about 7 ft.—that is the deepest.

6. Prior to being in charge of the "Waimarie," what steamer were you in charge of?—The "Ohinemuri." She was 350 tons gross. Her draught was about 6 ft. 6 in.—that is, in the after end. She only drew 2 ft. 6 in. forward.

7. How long were you in charge of that steamer?—Two years.

8. Then you were in the "Paeroa"?—Yes. Her draught was about 6 ft., and about the same forward, light. She was only 54 tons register. I was trading in here about two years. I was in charge of the "Ruby" for about seventeen months. She was 32 tons register, her draught being about 6 ft. aft and very near the same as the "Paeroa" forward. I was also in the "Patiki," 27 tons register, draught about 2 ft. 9 in.

9. Your present vessel, when loaded, draws up to 7 ft.?—Yes.

10. And you come up the river as far as what point?—Te Puke.

11. Can you give any idea of the margin that you have as a rule?—It varies with the tide, flood-water, and all sorts of things. I do not suppose I have a foot of margin, except at very high spring tides, when I am loaded—that is, in the most shallow place.

12. Is there a well-recognized channel?—Yes; the channel has been much the same for years—that is, the same course.

13. What do you say with regard to the depth?—It might be 6 in. or a little more shallower than it used to be years ago. I think it is about 6 in. shallower.

14. How many years ago?—Twelve or fourteen years ago—that is, as far as Te Puke.

15. Did you come up the river the day before yesterday?—Yes.

16. Did you have any difficulty in bringing your vessel up on that day?—We had a pretty thick fog in the mouth of the river.

17. But, leaving the fog out of the question, did you have any difficulty?—It was a rather anxious time, because the tide was ebbing when I got here, instead of flowing, as it should have been.

18. Did you stick at all coming up the river?—We touched the bottom at Te Puke ferry. We were late on the tide.

19. You used to come higher up the river, as far as the Junction?—Yes, about six years ago.
20. Why did you cease?—Because the river was getting too shallow in the neighbourhood of Mr. Kenny's, near the Junction.
21. Were there other reasons?—Not that I know of.
22. You say that from Te Puke downwards the river is only about 6 in. shallower; do you find any increased difficulty in coming up the river?—No, not as far as Te Puke.
23. I mean, do you find any greater difficulty than you found at the time when you first started with the "Waimarie"?—No.
24. Do you find any greater difficulty than you did years ago under the same conditions of tide?—No, not as far as Te Puke.
25. You have known this river and district for a great many years?—Yes.
26. Can you say anything with regard to the liability to floods in this neighbourhood?—We have had floods over the banks some years ago—very high floods.
27. Did you know of high floods in this district prior to 1907, for instance?—Oh, yes!
28. Do you know of any place near Hikutaia from which people have been in the habit of removing sand for building purposes?—Yes, opposite Cryer's landing.
29. Has there been much sand taken away from there?—Yes, hardly a week goes past but a vessel takes sand from there. It has been going on for years.
30. I understand that there is some suggestion made that the fishing down the river has been spoilt of late years?—We took a good number of fish from Turua before the last Court-day. Probably the people who are fishing know better than I do.
31. Is your own fish-carrying trade as great as it was?—Since January, when the Warden's Court was making inquiries, we have not been carrying fish.
32. Up to that time had there been any diminution?—No, not as a general rule. There are not many fish caught in the river. There never have been.
33. Prior to January, used you to see the people fishing, and, if so, in what neighbourhood?—Yes, at Turua.
34. Have they been fishing there since?—There have been one or two boats, but as a rule they do not fish during the winter months.
35. Apart from the little incidents you have mentioned, has your steamer stuck at all in the river?—It is a long time since I stuck in the river besides the time you mentioned. If everything is favourable we do not stick.
36. *Mr. Vickerman.*] It is three years since you lost a trip?—Yes, over three years.
37. *Mr. Moresby.*] The suggestion was made yesterday that you stuck opposite Thomas's?—No, we did not stop. The river fell over a foot when we passed Thomas's. That did not give me much water. The tide was running out there.
38. Since you gave evidence last time there has been another flood: has that made any difference?—There has been a good deal of sand coming down on the banks below Te Puke.
39. That last flood was a pretty heavy one?—Yes. I was not here, but it must have been a bad one. Below Te Puke it is pretty bad. A lot of sand has accumulated along the banks down there.
40. Can you say anything about that portion of the river between Te Puke and the Junction?—No, not since my last trip. I have not been there even in a small boat.
41. Supposing the river at Te Puke Wharf got silted up, is there any other place the steamer could go to between Kopu and Te Puke?—No, I think not. I think if we left Te Puke we should have to go right down to Kopu.
42. The fact of the steamers coming up and down the river has the effect of keeping the channel open?—It has a tendency that way. Both the "Waimarie" and "Taniwha" have twin screws.
43. These two steamers were built specially for this trade?—Yes.
44. What is the freight to Paeroa and Kopu?—6s. 6d. to Kopu, and 8s. 6d. to Te Puke.
45. Is the Kopu freight the same as the Thames?—Yes.
46. Is there wharfage to pay at Kopu?—Yes.
47. *Mr. Clendon.*] You can run to Kopu at any tide?—No; we cannot get into the mouth of the river at low water.
48. Between Kopu and Te Puke there are many places you stop at on the river-bank when required?—Yes.
49. At Netherton is there deep water?—Yes.
50. What is the distance between Netherton, where the wharf is, and Te Puke?—About four miles.
51. Are there any other places between Netherton and Te Puke where you stop?—Yes, when the tide is in we sometimes go alongside the settlers' wharves.
52 In the months of February and March I think there is less fresh water in the river than in any other months in the year?—Yes, I think so.
53. Since the establishment of freezing-works at the Thames I think the bulk of the fishermen take their fish to the Thames?—Yes.
54. Of course you come in in all weather into the river?—Yes.
55. Have you noticed the effect that a north-west blow has in bringing silt into the mouth of the river?—I would not say that it brings silt in, but it thickens the water very much.
56. *Mr. Mueller.*] You say that since the last big flood you have noticed tailings on the banks?—Yes, sand; but not more than before. You can seen it right down both banks as far as Netherton.
57. Do you say that you did not see any before the last flood?—There was a small quantity. There is always a certain amount of sediment on the bank.
58. As far as you can see, this deposit of sand is in the river along the bank?—It is right down as far as the water goes.

59. I suppose you remember the river when there were pretty steep banks?—It has not altered so much below Netherton. Up here it has.

60. From Te Puke down are there not places where there is a fair deposit of sand where previously there was a bank?—Yes, since the last flood.

61. You have only noticed that accumulation during the last few years?—Yes.

62. Presuming that that accumulation were to continue, and gradually got bigger and bigger, I think it would be only the scour of your propellers that would keep it down?—If it keeps on increasing it will gradually fill up.

63. You would have to plough your way up?—Yes.

64. Right down past Kopu, at the mouth of the river, there is a shallow place?—Yes, there always has been.

65. What time of the tide do you usually pass there?—At the present time, I suppose, at about four hours ebb.

66. Can you cross that at more than four hours ebb?—Yes, at a little more than that. It is about an hour and a half within low water that there is a chance of sticking there.

67. Can you state whether that shoal is becoming affected at all in later years?—I do not think so. To the best of my knowledge it is not getting any shallower.

68. It very seldom happens that you get down there too late?—Very seldom.

69. Previously, when you came to the Junction, you very often got down too late?—That is so.

70. You know Robinson's place, at Waimarie Bend?—Yes.

71. Is not that getting shallower?—It might be just on the bank, but there is a deep bend there. We run quite close in there.

72. Have you not to go closer there than you used to do, on account of the bar extending out at the Waimarie Bend?—No; we always had to take the whole sweep coming round that bend.

73. Since you gave your evidence previously your views on this river have slightly altered?—Yes, since the last flood.

74. You stated then that above Te Puke the tailings affected the bed of the river, but below that they had not?—Yes.

75. What is your opinion since the last flood?—I said it is on the banks of the river. There is no difference in the channel so far as I know, but the channel might be 6 in. or a little more shallowing on the bed a bit.

76. So the river has been affected to that extent?—There is no doubt about it.

77. You know a number of people who own launches on the river?—Yes.

78. They have to travel the river at all stages of the tide, and every day?—Yes.

79. They would know the river pretty thoroughly—the portions they travel over?—They should do so.

80. If several of those who have launches state that in their experience in the last few years the river has been shallowing and the banks have been contracting by this deposit, you would not say that was false?—No; we have not the same chance of seeing it, but if the water shallowed to any extent we must notice it.

81. For the last three years you have never seen the river at dead low water?—No.

82. Within the last five or six years have you not had the experience of having to lighter some of your cargo?—Not since we have been coming to Te Puke.

83. Coming up the other day, did you not shallow near the Netherton creamery—the day before yesterday?—I was late on the tide.

84. The steamers which run on the river now—have they not got special water-tanks forward?—Yes, but we never use them. Since we have been running to Te Puke we have never used the tanks at all, except for the ship's use. We formerly used them for trimming the ship.

85. *Mr. Myers.*] Sand, you say, has come down on the banks of the river since the last flood?—Yes.

86. Has the channel been affected in consequence or not?—I could hardly say for certain.

87. I understood you to say that, as far as you could tell, there had been no effect upon the channel itself?—No, except you went a long time back.

88. That is, extending over a period of twelve or fourteen years?—Yes.

89. Have you ever sampled the stuff before this?—No.

90. You are not able to say whether the 6 in. of matter consists of Waihou River sand or tailings?—No, I could not say what it is composed of. I know it is sand.

91. *Mr. Vickerman.*] Do you think there is any change in the outside bar, where you make for the gulf?—I could not say, because we go out on the half-flood, and come in at the same state of the tide. We very seldom take soundings unless the weather is very thick.

92. They say it is much harder there than it used to be?—They say that, but I do not know.

93. *The Chairman.*] You say that if the river at Te Puke was silted up you would have to go down to Kopu. What do you mean? Supposing they removed Te Puke Wharf half a mile further down?—There is very little difference in the river between Te Puke and Thomas's or the creamery: it would not be worth while.

94. Therefore the determining feature is the Waimarie Bend?—There is another very shallow spot between the creamery and Robinson's.

95. You say it may have varied 6 in. below there?—Yes, it may have.

96. You get the same depth of water in the channel. May we take it that the channel is no shallower?—Unless we get stuck or sound for ourselves we should not know. The tide is generally well in.

97. Supposing there is no fresh in the river and there is low tide, do you then get less width than you used to get?—It is hard to say. We have a mark on Te Puke Wharf which is a guide for the time of leaving. We generally leave when the tide is at that mark, and when we get down to those places the tide has lifted, say, 18 in. or 2 ft.

98. What is the narrowest width of the channel?—At Te Puke it is not much wider than the width of the ship.

99. What is the width of the narrowest place further down?—There is a place where we have to keep very close to the bank, close to McKee's. We have to follow where the deep water is.

100. With your twin screws, do you not see discolouration in the water after the vessel?—Yes.

101. What colour?—Just sand.

102. Pretty well the same colour as on the bank?—Yes, it varies.

103. Where do you lose the whitey-blue colour?—When we get lower down, the water gets very muddy through the tide-action.

104. How far down do you get the whitey-blue colour? How far down does the colour at Te Puke follow you?—Pretty well wherever you go.

105. There is no real change of colour?—No. There is more mud at Kopu. It is a light muddy colour—a cream colour, very near.

FREDERICK ADAMSON examined. (No. 29.)

1. *Mr. Mueller.*] You are a farmer at Netherton?—Yes. My land is Sections 7 and 3, Block XI. The school is on one of my sections. The area of the land is 98 acres and 100 acres. That land is at Netherton. I have two other blocks, one of 70 acres—No. 2—and another of 150 acres. It is above No. 7, on the opposite side of the river.

2. How long have you been there?—Twenty-one years.

3. You carry on dairying?—Yes; before the 1907 flood I was milking forty-seven cows.

4. Did that flood affect you?—Very much.

5. How much of your land was affected by that flood?—The whole of it.

6. What effect did that flood have upon your cows and your milking cheque?—By the statement which Mr. Hubbard handed in to the Commission it will be seen that there was a big reduction. I had to shift my cows. The flood affected me right into the next season. The flood last September hardly did as much damage, because it was a dead time of the year, but I had to shift the cattle away. I had a little flood in March, but not quite so bad.

7. How many cows have you been milking recently?—Forty last season.

8. How many could you have milked if the land had not been flooded in 1907 and last September?—I should have been milking about eighty this season.

9. Can you put in figures your loss in consequence of flooding?—Depreciation of land, £400; loss of hay, £40; pigs, £50; cows, £15; stumping and breaking up of 30 acres of land, £5 per acre; and sowing in grass, £150; loss in milk cheques, £200.

10. You have no river frontage?—No.

11. Where does the water come from that goes on to your land?—From the Waihou River.

12. Do you know the river opposite the Netherton creamery?—Yes.

13. Has that narrowed?—Yes, considerably. There is a bank of tailings there 26 ft. wide and 3 ft. deep. I have here a sample taken 4 ft. deep from the surface, and a sample taken below low-water mark, also one taken from the bank. [Exhibit No. 16.]

14. *The Chairman.*] This stuff taken below low-water mark—how did you get it?—I reached down below low-water mark with a shovel. The sample taken from the bank was taken right opposite the creamery.

15. *Mr. Mueller.*] You have been in the district twenty-six years. Can you compare the floods of years ago with the floods now?—Prior to 1907 we had no floods on my land.

16. You own a launch and you are often on the river in your launch?—Yes.

17. What has been your experience as to the shallowing-up of the river?—There is shallowing-up in some places. Places where you used to be able to get along all right at one time you can hardly drag along now.

18. You know Mr. John Morrison?—Yes; he has 170 acres on the Ahipukahu No. 2, opposite my land, the block the school is on.

19. What can you say about Morrison's land as regards flooding?—It is a high piece of land. I never saw it flooded until the 1907 flood.

20. In that flood damage was done to his property?—He lost the biggest part of his cows through starvation—having no feed for them.

21. Do you know how many cows?—Not exactly: eight or nine, I think, and also two calves. He lost the milk of his cows. He was milking thirty-two at the time.

22. Did he suffer in the 1909 flood?—Yes; last September.

23. Did he suffer in the flood of March last?—Yes, more than I did; but the water came a different way that time.

24. Did he have a part of his land resown?—Yes, he had to resow it. I have never known his land flooded until 1907.

25. *Mr. Myers.*] You say you lost £40 in hay—destroyed or carried away by the flood?—Both.

26. Pigs, £50: how many pigs?—Forty or fifty. They were not all drowned.

27. How many cows?—I lost three cows from starvation.

28. Was there any special object in preparing these figures?—Simply to give the Commission an estimate of our loss.

29. You have got down here, "Stumping 30 acres of land"?—If it had not been for the flood I should not have had to stump that land. The flood killed the grass on the land, and I had to stump, plough, and sow it.

30. Would the stumping reduce or increase the value of the land?—It would increase its value.

31. You have 148 acres altogether?—Yes.

32. How long have you owned the whole of that land?—I have not owned some of it very long —within the last two years.
33. How much of it had you at the time of the 1907 flood?—Two blocks—107 and 98 acres.
34. What is the length of your lease?—Fourteen years for the 70 acres.
35. What is the rental?—£36 a year.
36. At what did you value the 98 acres after the flood of 1907?—The Government valuation was £9 an acre.
37. What is your valuation?—About £15.
38. What do you value it at now?—I would not care to take less.
39. What did you value it at in 1906?—It should have been worth about £18.
40. What was the Government valuation then?—I do not know.
41. Do you honestly suggest that it has decreased £3 per acre in consequence of the 1907 flood?—Yes, because it is only weeds and rubbish now.
42. How many acres has been destroyed, in your opinion?—198 acres, the whole of it.
43. Why did you not put it down at 18 times 198, instead of £400?—(No answer.) [Statement put in, Exhibit No. 17.]
44. *Mr. McVeagh.*] When did you get your launch?—About three years ago.
45. Just before the 1907 flood?—Yes.
46. Do you run her yourself?—Yes.
47. What is her draught?—About 2 ft.
48. Do you carry milk for yourself only, or for others?—I use the launch for pleasure. I take my milk to the creamery by road.
49. You said that the term of one lease was fourteen years: what is the term of the other lease?—Seven years for the 150 acres.
50. Is that at £30 a year?—Fifty pounds.
51. Was the 1907 flood the January flood?—I think it was.
52. Mr. S. Fisher's sworn affidavit is that there was a rush of water from the Piako: is that correct?—I cannot say. It may be correct.
53. Do you say there was no water from the Piako at all?—There was no water from the Piako.
54. Did you go out to examine it?—No.
55. Did you go out in the Awaiti direction?—Yes.
56. When?—When the flood was on
57. When the whole countryside was covered with water?—Yes.
58. I think it was coming from the Waihou River for miles?—Yes.
59. How long have you been at Netherton?—Twenty-one years.
60. You have been frequently at Paeroa?—Yes.
61. You say this is the first flood you have had at Netherton?—Yes, in our district.
62. Do you get floods at Netherton when there are floods at Paeroa?—Not always.
63. Will you tell me why that is?—No, I cannot tell you why that is altogether.
64. If you had floods in the streets at Paeroa, you would have floods at Netherton?—Not always.
65. And you cannot tell why that is?—No.
66. Have there been floods in Paeroa to your knowledge?—Yes, several.
67. How far back have there been floods, in your memory?—I could not answer that.
68. Before the boom commenced?—I could not answer that.
69. Did you take up the second lease after the flood?—Yes, both of them.
70. And your freehold land has been totally destroyed?—The 1907 flood destroyed all the grass I had on it.
71. After that bitter experience why did you take up further land?—To grow flax. I could not grow grass, so I thought I would try and grow some flax.
72. What flax have you made provision for growing?—I can dispose of 40 or 50 tons there now.
73. Are you growing flax there now?—On the 70 acres.
74. What are you growing on the 150 acres?—Nothing; but there is a bit of flax growing on it.
75. Did you put flax there?—No, it is natural.
76. When did you take up those two leases?—Just before Christmas I think it was.
77. And the other one about the same time?—No; that was about twelve months ago.
78. *Mr. Mueller.*] In the 1907 flood you went towards the Awaiti?—Yes.
79. Have you any doubt as to where the waters were coming from in that flood?—No.
80. Where do you say they were coming from?—From the Waihou River.
81. *The Chairman.*] I suppose by the "Waihou River" you mean the upper Waihou?—Yes, above the Junction.
82. *Mr. Mueller.*] The September flood: where did that water come from?—From the same place.
83. And the 1910 flood—last March?—That came from the Puke way. I did not suffer very much from that flood.
84. *The Chairman.*] On which of these sections is your house?—On the 98-acre section, near the school.
85. Were you flooded out of the house?—No; very nearly.
86. Why do you say that the water did not come from the Awaiti?—It came from the Waihou River into the Awaiti Lagoon, and from the lagoon on to my land.
87. *Mr. Vickerman.*] Did not the ridge at Kerepehi cut off the water from your place?—No. There are two ridges there: the water comes down between these two ridges.

ALFRED KENYON ALEXANDER examined. (No. 30.)

1. *Mr. Mueller.*] You are a farmer, residing at Netherton?—Yes.

2. You are chairman of the Netherton branch of the New Zealand Farmers' Union?—Yes.

3. You own land at Netherton?—Yes, a little bit below Netherton: 323 acres, Te Iringa-o-Porori Block.

4. You supply milk to the Netherton creamery?—Yes.

5. Has your land been affected by flooding and by silt?—Not by the silt; it has been affected by floods.

6. Have you a frontage to the river?—Yes. I have a wharf there which I erected about three years and a half ago.

7. What was the state of the banks at that time?—They were all soft mud. I had to wear gum boots to put the piles in.

8. What is the state of the bank now at the place where you wore gum boots?—It is firm.

9. Can cattle walk on it?—Yes.

10. Could they have walked on the bank at the time you erected the wharf?—Not without getting bogged.

11. Your wharf is below Netherton?—About two miles below the Netherton Wharf.

12. Roughly, how far are you below Te Puke Wharf?—I should say from nine to ten miles.

13. Years ago was there a bank below your wharf that was used for any special purpose?—Yes, there was a bank of sand. I have seen settlers taking sand away for concreting purposes. It was called Deputation Snag or Bank.

14. How far below your wharf would that be, roughly?—I suppose 6 or 7 chains. It continues for about 20 chains.

15. Do they use that now?—No.

16. Why not?—Because the tailings in it makes it absolutely useless for that purpose.

17. *The Chairman.*] Do they take it for any other purpose?—No.

18. *Mr. Mueller.*] When you went there, what was the nature of that bank?—It was all pure river-sand. If you stood on it you could work into it to a certain extent, but you cannot do that now. Now it is firm.

19. Do you own a launch?—Yes.

20. You use it yourself?—Yes, practically every day of the week, and at all stages of the tide. I take my milk to the creamery in it. The launch draws 2 ft. empty, and about 2 ft. 10 in. when loaded.

21. About how long have you been using your launch on the river?—About two years and eight months.

22. Previous to that, did you have anything to do with a boat on the river?—Yes, I took my milk up in a flat-bottomed boat for about fourteen months.

23. From your experience of the river, what is the position with regard to the navigation?—It is getting more difficulty every day at low tides.

24. Do you keep your launch at the wharf?—Yes.

25. What depth of water have you there?—About 4 ft. There was a little more before I had the launch, and up to the last twelve months there would be about 4 ft. 6 in.; but now there is about 18 in. to 2 ft. of fresh water in the river when it rises.

26. From that point do you find it easy to get into the channel?—No.

27. The end of your wharf is not in the river?—No. I have about 25 ft. from the wharf: I have to go towards the western bank in very low tides.

28. Since when have you noticed that shallowing?—Since the September flood in 1909—practically within the last six months.

29. Was any of your land flooded during the last flood?—Yes; the river broke right across the bank at the Waimarie Bend.

30. How long was your land flooded?—It was ten days before it all got away, and what did not run away soaked through.

31. *Mr. Mitchelson.*] How long was the Waihou River bank-high? You say it was on your property for ten days?—The property is lower at the bank, and it takes some considerable time to get away.

32. Are there no drains through it?—Yes; but the drains were full up.

33. *Mr. Mueller.*] What effect did the last September floods have on your cattle?—The floods destroyed the pasture for months, and it meant that I had to either sell the cattle or keep them to starve. I sold some of them.

34. Other people were doing the same at the same time?—Yes.

35. Can you estimate the damage you suffered in the matter of cash?—It would be a hard matter for me to estimate my loss. I lost the grass, and I did not resow because I had not the money, and I had to take the chance whether it would grow again. The loss in growing-capacity of the land is such that I cannot estimate it at the present time.

36. Have you noticed the bottom of the river, in your navigation up and down, by poling?—Yes, I am constantly poling to find the deepest water.

37. What can you state about the bottom of the river?—It is practically hard. It is very firm in places, and in other places it is not quite so firm

38. Do you remember producing the report of Mr. Aston, chemist of the Department of Agriculture, when a previous case was before the Warden?—Yes. [Department of Agriculture: Annual Report, 1909: Chemistry Division. B. C. Aston, Chief Chemist to the Department. Pages 459 to 464.]

39. *Mr. Tunks.*] You have told us that this deposit of tailings is now useless. Since when have the settlers ceased to use it?—Within the last two years,

40. *Mr. Clendon.*] Was not the effect of the 1907 flood to materially alter the bed of the stream in many places?—I could not say.

41. Are you not aware that settlers at Hikutaia suffered as a result of the flood of 1907 just the same as the settlers up here did?—Not that I am aware of.

42. *The Chairman.*] Where do the settlers get the sand from now to do concrete and other work?—They generally go down to the bank at Cryer's Landing.

43. Do they get any from any place above that?—Yes; there is another place about half a mile above that. I have seen scows loading there.

PAEROA, FRIDAY, 27TH MAY, 1910.

THOMAS NEPEAN EDWARD KENNY recalled. (No. 31.)

1. *Mr. Mueller.*] You wish to make a statement concerning an old photo. you have found?—Yes. I believe that in my evidence before the Mines Committee I stated that the island at the junction of the Waihou and Ohinemuri Rivers commenced to form somewhere about 1884. Last night I found an old photo. taken by myself, not before 1888 and not after 1889, which shows that at that time there was no trace of the island there. The matter I referred to in the Mines Committee's report, questions No. 1, on page 21, and No. 29, on page 23.

2. This old photo. was taken by yourself?—Yes. [Exhibit No. 18.]

3. Can you show the exact position on the map where this old photo. was taken from, and what it is supposed to represent?—It was taken in the Upper Waihou, above the junction of the two rivers. The low point is the point between the Ohinemuri and Waihou Rivers.

4. Was the island that is marked on the present maps at all in existence when that photo. was taken?—No.

5. So that at the time that photo. was taken there was absolutely nothing where that island is marked?—Absolutely nothing.

6. Here is another old photo. you have found that was taken by yourself?—Yes. [Exhibit No. 18.]

7. What does this represent?—The steamer "Ruby" lying at the Wharf Street Wharf, at Crosby's Hotel corner.

8. Do you know the date at which that was taken?—No, I cannot remember.

9. *The Chairman.*] What were you standing on when you took the photo.?—On a sandbank just above the island—a place where people went picnicking.

10. Was there any water behind you?—No; the sandbank was on the bank itself.

11. Can you draw a line on the plan showing the centre-line of that photo.?—Yes. [Witness did so.]

12. *Mr. McVeagh.*] You remember I asked you about the big flood in 1898?—Yes.

13. I have here a printed newspaper-extract taken from the *New Zealand Herald* of the 24th June, 1898. It states, speaking of the Ohinemuri River, "The river now rose very rapidly, and the noise of the angry torrent could be heard a long distance off. Soon the old wharf and the Railway Wharf were covered, and the river broke its banks at the Esplanade and near Mr. Forrest's timber-yard, so that the town was completely flooded. Belmont Road, from the Royal Mail Hotel to the railway-station, and thence on to the Puke, was nothing but a vast sheet of water, its depth, as it rushed down each street, being from 12 in. up to about 3 ft. or 4 ft., that being the depth of water near the railway-station." Is that a correct account of that flood?—I cannot say that.

14. Have you any recollection of the place being flooded to such a depth?—There have been frequent floods on the Belmont Road—any number of them.

15. It is stated to be from the Royal Mail Hotel to the railway-station?—Yes, and often water comes up there from the Wharf Street drain.

16. This water came across at the properties of Messrs. Porritt, Coote, and Cochrane, because this extract proceeds, "In the afternoon matters took a very serious turn for the upper township populace, as the river, which was then carrying a full complement of water, was backed up by the tide, and, as a consequence, overflowed its banks in several places. The first point where the water broke away was near the fine premises of Messrs. Porritt, Coote, and Cochrane, and in a very short time the newly laid-off grounds of Messrs. Coote and Porritt were entirely under water—in fact, boats were taken right across the main road." Do you recall that?—No; that happens in every flood. In almost every moderate flood you find 2 ft. or 3 ft. of water near where Mr. Porritt lives at Buchanan's Bridge. You will also find the lower town flooded when Paeroa is not.

17. Has that not been always so during your recollections?—From hearsay. I have never crossed over in a flood. But that was a big flood, and I do not recollect whether I was up or not. It came very rapidly, and rose very rapidly in the Waitekauri.

18. It further states, "Fences were washed away by the flood, and nice gardens destroyed. and, looking over Paeroa from the firebell-tower and Primrose Hill, scenes of great devastation were to be witnessed everywhere"?—You can see that in almost every flood now, and I should not be a bit surprised if it was so then.

19. The report states, "The families of Messrs. Saunders, Knowles, and Bush had to be removed by means of a boat, and when it is stated that when Mr. Saunders's wife and family were being rescued from the house the boat passed over the top rail of the fence, some idea may be gathered of the depth of water in that neighbourhood?—That is straight across the river, adjacent to Mr. Niccol's property, and that has always been subject to floods. Several people have had to

shift from there on account of the water getting into their houses, and not in exceptional floods either.

20. The report further states, "All the out-districts have been completely cut off, and none of the coaches arrived here to-day, with the exception of a buggy carrying mails from the Thames. The conveyance was pluckily driven through by Mr. A. Crowther, who had several narrow escapes along the road. Mr. F. Dryland also essayed to drive Mr. Short's big coach through to the Thames this morning, and eventually reached Puriri. He then saw that the bridges were simply floating, and, in consequence, he turned back. He informed me that Hikutaia was in a fearful state of flood, and the horses were almost swimming in front of Mr. Scott's farm." Do you recall all that?—I do not, but still it was a very severe flood, because it came down very rapidly.

21. In substance that report does state what was the fact, that there was a very large flood about June, 1898?—Yes, an exceptionally severe one for a short time. Mr. Claude Purchase told me that the Waitekauri Creek, where his house was, rose 20 ft. in twenty minutes. Mr. Purchase was a surveyor, and resident there.

22. That accounts also, I suppose, for the Ohinemuri rising very rapidly here: you would expect that?—Yes. Mr. Purchase's idea was that there had been a cloudburst up the Waitekauri Valley.

23. *Mr. Mueller.*] You know Tarariki and Doherty's Creeks, between here and Karangahake?—Yes.

24. Are these creeks crossable in even a comparatively small flood?—I do not know about Doherty's, but I know Tarariki is often not.

25. Would the water coming over by Porritt's or Coote's, or at Buchanan's Bridge, come through the township?—Not necessarily. If it got to a certain height it would come in below from the river, but not down the road. There is high land between Porritt's and the township.

ASHER CASSRELS examined. (No. 32.)

1. *Mr. Mueller.*] You own land on the banks of the Ohinemuri River?—Yes.

2. Where is that land?—I have about 14 acres at the Junction. I have about 427 acres on the Mill Road on the Ohinemuri—Piraurahi No. 1 and No. 7; I have another piece of land higher up towards Paeroa, called Koromatua, and some others, about 67 acres in all. I have another little block of about 12 acres in all, near the railway-station.

List compiled from Plan (Exhibit No. 20) of Land near Paeroa owned by Asher Cassrels.—Near Junction: Ouekaharau, 8a. 19p.; Huepakari Nos. 1 and 2, 6a. Near railway-station: Opatito No. 2, 7a. 3r. 27p.; Momonatui, 3a. 2r. 26p. On Kuaoiti Stream: Te Manuka No. 2, 24a. 1r. 26p.; Koromatua Nos. 1A and 2A., 33a.; Pukateawainui No. 1, 4a.; Ngaruawahia, 3a.; Papaturoa No. 9, 3a. On Upper Waihou: Piraurahi No. 1, 382a. 7p.; Whiunga, 45a. 2r. 12p.

3. What has to be done to bring that land into cultivation and use?—Some of it, near the Junction, has been in cultivation for a good few years. It is in grass. As to Piraurahi, formerly I could not do very much because the title was not completed, but since the title was completed a certain amount of trouble commenced, because water used to be on the road and lodged there. A few years ago I gave the County Council authority to cut a drain through into the Ohinemuri on the condition that they put in a flood-gate and put a bridge across the drain. The flood-gate was put up after a certain time. Between the time that they made the drain and built the flood-gate we had a heavy flood, and it brought in a lot of silt on the land and road. That would be within the last three or four years. After that the flood-gate was put up.

4. *The Chairman.*] What is a satisfactory flood-gate from your point of view?—I am no engineer, but, anyway, the last flood took the gate away. I was going to put in a large drain about 8 ft. at the top and 4 ft. at the bottom and as much depth as I could get—about 3 ft. 6 in. or 4 ft. But when I saw the flood-gate washed away I came to the conclusion it would be no good. The reason is this: If it was all ploughable land it would be bad enough for the silt to come on it, but you might manage to plough it in; but, as most of our land here is alluvial, if the silt once comes in to any thickness you might as well say good-bye to the land, because you cannot plough or top sow it. The silt will not take any seed: they do not like one another. I might say my land would have been all covered with silt if it had not been for the scrub growing there which arrested the silt.

5. *Mr. Mueller.*] What is the value of the land?—If there was no trouble with the silt I think as farming land it would be worth now, in the rough state, £10 per acre. I know an Auckland agent told me he could get me that price for the land until I told him of the trouble with the silt.

6. Do you know any land that was sold at that price?—I know land sold some years ago not very far from it at £10 per acre.

7. How long ago was that?—About twelve years ago.

8. Can you show us the section on the map?—Yes, it is Kaipakakohi. I may state there was no road on the map in those days.

9. In the 1907 flood you lost some special amount?—When talking about floods I have been in many floods here, big ones and small ones, but in early years the floods from the Ohinemuri only lasted twelve hours. The tide would back it up, and as soon as the tide went out you could get across. The Waihou floods lasted a little longer in a north-westerly wind. But of course these floods used to do some good, as they brought down a good alluvial deposit

10. But coming down to the 1907 flood?—I was then an unfortunate farmer, but I did not farm the land myself—I had some one with me. I had about 7 acres of oats on my Koromatua section, which was all cut and stacked and ready to put in the loft; but the flood came and took it right over the fence.

11. How long did that flood remain on the land?—On the most of my land the flood went off in about twelve hours, but on the low-lying land it stayed a fortnight. It was in the middle of the summer.

12. Can you estimate your loss that was directly caused by the 1907 flood?—I have every confidence that £150 would not repay me for my losses in that one flood. Of course that piece of land was most exceptional land. It is nearly the pick of Ohinemuri. After the water subsided I could do nothing with the low-lying land until the following year, when it was put down in grass again.

13. I suppose you will confirm the evidence that has already been given by other witnesses in regard to the floods of 1907, 1908, and 1910 bringing down silt which used not to be brought down before?—Yes.

14. And you know the evidence that has been given in regard to the silting-up of the river, and you confirm that evidence?—Yes; I came up in 1869 in a big vessel, and she came up as far as Pereniki's Bend.

15. You might tell the Commission the history of the cellar in the Criterion Hotel?—The old place was built in 1875, and it stood until 1896. During that time I had a cellar dug in the ground, and whenever there was a flood the most water I had was about 12 in. on the floor in the winter-time, and it used to stay at the same height with the river. But I was surprised to see in the last flood, which came in March, that the cellar was nearly full of water, and it may be there still. You can see the silt lying on the second step down in the Criterion. I have never seen water in my life there before the last flood.

16. When was that cellar concreted?—In 1897.

17. So that prior to 1910 that cellar had not been flooded?—Not to my knowledge; and I have been in Paeroa the whole time. I might also say that in the early days there used to be a drain to take the water from a creek that ran from the swamp to the domain. When the drain was filled in, a culvert was put in to drain that water off, but now there is no trace of that culvert to be seen. It is quite buried. Also, in the old bridge I used to be able to see certain of the lower bolts at low water, but now they can never be seen because the river has risen at the site of the old bridge.

18. *The Chairman.*] How many feet has it risen there?—Right through from the Junction about nine miles I consider that on an average the river has risen 6 ft.—some places higher, some places lower.

19. You imply that is principally tailings?—Yes. About 1902 a gentleman who had some interest in a silting claim told me he heard from a captain that there were 9 ft. of tailings at the bend. Since then more tailings have been put in, so I do not think 6 ft. is above the mark.

20. *Mr. Mueller.*] In 1901 did you have some correspondence with the Government on this question?—Yes; this is it. [Exhibit No. 21.]

21. *Mr. Myers.*] It comes back to this: that in the 1907 flood you believe you sustained a loss of £150?—Yes.

22. I suppose that every flood which absolutely covers a property means temporary damage, at all events, to that property?—To a certain extent.

23. You have referred to the Criterion Hotel—you own that hotel?—Yes.

24. Is that worth as much now as it was in 1907?—Of course it is not.

25. Do you attribute that to the flood or to the drought?—Of course it has depreciated, as any property of that description must do when a district carries prohibition.

26. *Mr. Clendon.*] As an old resident you are aware that the willow-trees have increased in size and number during the last ten years?—Thank God they did! If it had not been for the willow-trees the whole country would have been ruined.

27. You do not attribute any damage from the floods to the willow-trees?—I do not.

28. Your property that was principally injured was the farm below the railway?—Yes.

29. Are there not a number of drains coming down the Te Aroha Road which rise very rapidly when there is a flood, and the water goes across your property? A big proportion of the water which submerged your lands came down from the hills?—Yes.

30. It did not all come from Waihi?—I should not like to say so, but the silt came from Waihi anyway.

31. Did you take any steps at any time to prevent your land from being flooded?—I think nature has done it for me.

32. Apart from nature, what have you done?—I have drained.

33. You said the water remained on your property: is not a portion of your property an old kahikatea swamp, full of holes and stumps?—No, it is not.

34. This last flood that filled your cellar rose very rapidly?—I was not here, but I saw enough of it when I returned.

35. When did you acquire the freehold of this Junction land?—In 1880-odd.

36. Would you mind telling us what you paid for it per acre?—I paid as much as £40 per acre for some of it. There are 14 acres in the block, and it was acquired at different times. I could hardly tell you now what I paid for the lot.

37. You spoke about the river-bed being raised: you have never personally examined the river-bed?—No.

HAORA TARERANUI examined. (No. 33.)

1. *Mr. Mueller.*] You are a Native chief of Ohinemuri?—I am one of the chiefs of this tribe, and I have large interests in the land here.

2. Has your land or the lands of your tribe been affected by the floods and silt?—Yes.

3. You remember giving evidence in Wellington before the Mines Committee?—Yes.

4. Do you confirm what you then stated in Wellington?—Yes; but I wish to explain a little more, because I do not think I then gave all the facts I should have given.

5. What do you want to add to that evidence?—One new fact I would like to explain to the Commission is that in previous days I used to be able to crop my ground for about nine years in succession. Now I cannot crop the ground more than two years. The reason that has happened is this: At the present time you cannot see the sand and silt in the grass until it is ploughed up, and then when it is dry it blows up in a dust. My land previously was never covered to any extent by floods, but at the present time it is pretty well all covered by floods. Last time the water came right up to my house, which is the first time I have known the water to come up there.

6. And since 1907, when you gave that evidence,, have you and the Natives suffered serious damage?—The Natives have not gone in for cropping so largely as they used, because if they did it would only be waste of time. In previous years I used to crop very largely my own place. I cannot do that now, because it seems a waste of labour owing to the floods.

7. Do you remember the Natives of the Ngatitamatera Tribe petitioning Parliament in connection with this matter?—Yes. It was about two years ago. I cannot remember the exact date.

8. Is this a translation of that petition?—Yes. [Exhibit No. 22.]

9. What was stated in this petition was the Native case in connection with this matter?—Yes.

10. *Mr. Moresby.*] Since you gave your evidence in the House in 1907 do you consider the floods are worse or more frequent?—Since 1907 or a little previous to that the floods have been more frequent, and higher, and larger. There is a place called Makomako, and in the late floods the water overflowed there for the first time in my life. It is on the Moananui flats. I am speaking for the people at Moananui.

11. Are they able to crop their lands now?—Yes, they are able to do so, but we find it useless, because we cannot get any benefit from the crops.

12. *Mr. Tunks.*] To what extent did the water in the last flood overflow at Moananui Flat?—I cannot say, because I did not measure it. The whole land was covered.

13. Did it go across then towards the Te Aroha Road —Yes. It came along the railway-line across the road down to the Waihou.

PAORA TIUNGA examined. (No. 34.)

1. *Mr. Mueller.*] Do you represent Native tribes?—Yes.

2. In what part of the district do your tribes own land?—Some of my tribe have interests in the Rangihapara Block, which is situated below the mouth of the Ohinemuri River. It is below the Hape Stream.

3. Do you own land near the big Waihou?—Yes, Te Awaiti No. 1A and Waihou West No. 4.

4. You know that land between Waihou and the Awaiti Creek?—Yes.

5. In time of flood can you tell where the water comes from which flows down near Netherton?—From the Ohinemuri. The Ohinemuri overflows first of all, and then the Waihou water comes down and helps it to go down towards Netherton.

6. *The Chairman.*] Does any part of the water get over from there to the Awaiti Stream?—Yes.

7. What did the Natives know of the issue of the Proclamation declaring the rivers to be sludge-channels—did they get any notice?—There was no notification to the Maoris; but on that notification being made Sir Donald McLean said there was to be no infringement of the Natives' rights.

8. In what year was that?—When the goldfield was opened. He also said that the Natives were not to infringe on the goldfield rights. The miners were also to be allowed freedom to get timber for fencing purposes. Mr. Mackay conducted the proceedings.

9. You have heard what Haora has stated in evidence?—Yes.

10. Do you confirm what he states?—Yes.

11. *Mr. Moresby.*] You lived for many years on Awaiti No. 1A?—Yes.

12. Is that land quite close to the big lagoon?—Yes.

13. Is the land on which your whare is situated at Awaiti on the high ground?—Yes.

14. Is there a high ridge of land which runs along by your house for some distance?—Yes.

15. Have you ever known the waters of the Waihou River to come right over the high ridge of land into the big lagoon?—No.

16. Is there a road which comes from Kerepehi to your kainga?—Yes; it was an old road that Mr. Mackay declared a public road.

17. Does that road traverse the high land between your place and Kerepehi?—Not all the way. The length of the road goes along the lower parts after it leaves my place.

18. At what portion of the Awaiti Stream do you say the waters of the Waihou go into it?—In 1907 the waters from the Ohinemuri and the Waihou overflowed the whole of my land at Awaiti No. 1A.

19. But it did not go over the place where your kainga is?—Yes, right over to the Awaiti, and then from there it went towards Netherton.

20. Do you remember, when the flood was at its highest, Chief Judge Seth-Smith and Judge MacCormack going on your land?—Yes: that was in 1907. We had to convey them in canoes to the paddocks.

21. At the time of that visit was not the land quite dry where your house is?—No; it was all under water. Only Wani's place was dry.

22. How far does the tide come up the Awaiti Stream?—The tide raises the level of the Awaiti about a foot. For about a mile past my kainga it is tidal, and then it spreads out to where the lagoons are.

23. How far up the Waihou does the tide go?—The Waihou is tidal as far as Mangaiti. The river is tidal, but it is not noticeable on account of the current.

24. *Mr. Clendon.*] Did you not hear from your friends in the year 1895 that there was a notice in the local papers stating that this river would be proclaimed a sludge-channel?—I did not hear that.

25. Does not the road from your kainga to Kerepehi run along the bank of the river?—Yes—that is, the old road.

26. Is not that road under water from the end of May until about the beginning of October?—Yes.

27. This lagoon you have told us about runs north and south?—Yes.

28. Is there not a little stream coming down and feeding that lagoon from the southward, parallel to the Waihou River?—Yes, but it runs into another lagoon in the tea-tree.

29. And that lagoon overflows and fills this lagoon?—Yes.

30. *The Chairman.*] What is the height of the high land on which you camp between Awaiti on the west and Waihou on the east?—About 5 ft. or 6 ft. or more. It had a width of about a mile, and is about three miles long.

31. Is there a low place at the south end of it?—Yes, at Mangaiti.

32. What is the height of that low-lying land at Mangaiti?—In some places it may be 5 ft. and in other places less above the water-level.

33. *Mr. Clendon.*] Were you at Awaiti on the 14th of this month?—Yes.

34. Did you notice two streams of water at the flax-mill overflowing from the Waihou in the direction of Awaiti?—Yes.

35. There was no other stream overflowing on the Waihou between there and the Junction, was there?—There was another stream, Tuawhati.

36. *Mr. Mueller.*] Have you at any time seen the water from the Waihou overflowing towards Awaiti at a point above Tirohia where there is a bit of a cutting on the road?—Yes, I have seen that drain overflowing, but that water does not reach Awaiti.

37. Where does it go to?—That water perhaps goes over towards Waitoa.

JAMES MACKAY examined. (No. 35.)

1. *Mr. Mueller.*] You have been in this district for how many years?—I have known this district since January, 1864.

2. You have heard the evidence given by Haora and Paora as regards the Native race?—Yes.

3. Is there anything you wish to add to that as regards the Native race?—They did not describe the losses that other Natives besides themselves have sustained.

4. Can you simply state that you know of your own knowledge that the other Natives have sustained losses?—Yes, very great losses, especially the Natives close to here on the other side of the river.

5. Is there anything further you wish to add as regards the Native race?—About the boundary of the lands ceded for gold-mining in the Ohinemuri agreement of March, 1875, I may say I was here at the time with Sir Donald McLean. These Natives were all Land League people, and they were very much afraid of their lands being taken away, and that the ceding of a small portion for the goldfields would open all the rest, and they were assured by Sir Donald McLean and myself that the only lands which would be used by the miners or taken by the Government would be those included in the agreement. I may say that the whole of these Native settlements on the banks of the Ohinemuri are outside the boundaries of the goldfields ceded, because it only came to Mackaytown on this side of the river, and to Raratu on the other.

6. And the use of the river for navigation and fishing purposes was never mentioned to the Natives?—No; on the contrary, I put a clause in that the Crown should have the right to use the river-bed down to the boundary inside the agreement, but outside of that it was supposed to be in the hands of the Natives. We agreed we would not interfere with any of their rights or lands outside the western boundary of the agreement.

7. Have you anything to say particularly about the Proclamation in 1895 as regards the Natives?—I know nothing about it. I was not here at the time it was being discussed. Had I been here I should have protested against it. From the time I came back I have made one continuous protest against it.

8. When you say you protested, did you do so on behalf of the Natives or yourself?—On behalf of myself as well as the Natives. My wife and daughter are interested in the land here.

9. Can you confirm what you have heard of the evidence that has been given before this Commission as to the damage caused by floods?—Yes, because I have taken a great interest in the question.

10. What is your knowledge as regards the damage to your family and the district generally?—So far as my family is concerned they have not sustained any great loss, because the silt does not go on to our land; but we have lost cattle on land we have on the west side of the Waihou, because the cattle get caught by the flood and have nothing to eat, and stand there until they become exhausted and fall down into the water. We lost seven cows.

11. *The Chairman.*] Is that flood due to the silt or to natural causes?—The flood on the other side of the Waihou is caused by the waters of the Waihou overflowing, but any flood from the Junction up to Mackaytown is caused by the silt—that is to say, it is aggravated by the silt. We were always liable to floods, but the silt has made a great difference. It has narrowed the river and filled it up, with the result that, whereas years ago it took two days of solid rain to make a flood, now we get a flood in six hours.

12. You knew the Ohinemuri and Waihou Rivers before there were any willows?—No. There were a few willows at Mr. Thorp's. I believe his father in coming from Home brought them from Napoleon's tomb.

13. Except these few at Mr. Thorp's you have seen the whole of the willows grow on the Ohinemuri and Waihou Rivers?—Yes. Most of the willows down the Waihou going towards the Thames have grown from branches broken off higher up.

14. In your opinion, are the floods higher now in consequence of the existence of the willows?—I do not think the willows affect the Ohinemuri much.

15. Why?—They are not, as a rule, growing down in the water. The place most affected with willows is on the Waihou River below the Okahukura Native settlement, close to the Tirohia Railway-station.

16. Then, in your opinion, the Waihou River below Okahukura has been materially affected by the growth of willows?—Yes.

17. *Mr. Mueller.*] In what way?—In the first place they are growing so close that it is as much as the steamers can do to get through. They are weeping-willows, and all the branches hanging down in the river within 20 ft. of the bank stop a certain amount of water.

18. *The Chairman.*] Has that, in your opinion, increased the height of the floods?—I think it has tended to increase the overflow of the Waihou, which runs down to Netherton and to the Awaiti Stream.

19. Do you think it has had any effect in raising the bed of the river?—Not there.

20. Anywhere else?—I think, down about Mr. Thorp's place the willows have helped to gather and stop the silt. Taking the Waihou from the Junction up to Te Aroha, there is very little difference in it. There is a place where we used to ford the Waihou River near Mangaiti. I have asked the steamer-captains and also the Maoris whether there is any alteration in the depth there, and they say it is the same as it was.

21. Do I understand from you that in a flood the waters of the Waihou have always been in the habit of joining the waters of the Awaiti?—Yes. I can say that in August, 1864, I had to wade through from the Waihou River to the Awaiti Stream.

22. Have you any idea as to whether it is worse now than in 1864? Is there more risk of the water breaking through now from the Waihou into the Awaiti than there was thirty years ago?—I do not think there is any difference now, except that the willows may tend to put it there. But there is an additional factor. The water runs over from the Ohinemuri to the Waihou, and banks it up for a considerable distance.

23. Do you know that of your own knowledge?—Yes.

24. Since when?—A good long time now. I might mention that at the time the flax-mill was put up I had a great deal to do there getting the Natives to cede flax rights: so I took particular notice of it.

25. When was the flax-mill put up?—About seven or eight years ago. I would mention in this connection that the owner of the flax-mill had to make a road back to Awaiti for the purpose of getting his flax out. The bank of the Waihou is a foot or two higher than the land at the back, which is all swamp, and by cutting through this bank directly the river rises the water begins to go through the cutting, and that contributes to the water going through to Netherton.

26. So that, as a result of this road which has been cut, the water now gets in back to the Awaiti and to Netherton?—It does not get to the Awaiti, but it goes back to Netherton. There is a ridge of dry ground about a mile and a half long, and that runs into the flat land that used to be covered with fern.

27. Supposing you go past Paul's settlement, what do you get?—Some miles of swamp nearly to the Kerepehi.

28. We were told there is a ridge running out from Kerepehi?—Only a short distance. There must be about four miles of swamp between this flat fern land and the high land between Kerepehi.

29. *Mr. Mueller.*] Do you know the nature of the river at the Junction?—I do. It is right alongside my place. We have land extending down to the Waihou River.

30. Does the present condition of the Junction contribute in any way to the flooding of Netherton?—Very considerably.

31. Why?—There is a shallow formed there which, I think, partly owes its origin to a groin which was put in to straighten the Waihou and make a better channel for the steamer. I believe that assisted in catching silt and forming the island.

32. Do you know whether the flooding at Netherton has been more serious and more frequent in recent years?—It has. I may state that below the Junction it is very seldom the Waihou itself overflowed its banks right down to the mouth of the river. All the water that floods Netherton is from the overflow of the Waihou between Tirohia Railway-station and the Junction.

33. You say that the floods have been more frequent and more severe during later years: would you say that the increase in the flooding was caused by the willows in the upper Waihou or by the obstruction at the Junction? What is the cause of the very frequent flooding of recent years?—Both are factors in the case.

34. Which would you say was the main factor?—It is difficult to say. The willows have contributed, no doubt, but there is no silting going on in the upper Waihou. There was a little for a time, when they were making drains at Te Aroha; but that *débris* was composed of pumice sand, which does not settle like these tailings. It is always moving.

35. *Mr. Cotter.*] You know intimately the present condition of the river from the Junction up to Paeroa and above it?—Yes.

36. I will take you to that part of the river above this traffic-bridge. You have told us that, in your opinion, the accumulation of silt or tailings there has not been very greatly contributed

to by the willows?—To a small extent. I think anything done by the willows in the Ohinemuri is a mere bagatelle. The silt has done and is doing the damage.

37. So far as that accumulation of tailings is concerned, do you consider it dangerous to the flooding of Paeroa, or a negligible quantity?—It is the cause of the whole trouble. If you put in thirty or forty thousand tons of tailings a month, they must go somewhere.

38. Then, in any scheme in regard to the alleviation of this trouble, what, in your opinion, should be done in regard to this accumulation?—It is a question I have given a good deal of study to. First of all, being an old miner, I should not like to do anything to injure the mining industry. I am also an old farmer, and so I stand between the two.

39. For that very reason, and being such an old resident, I suppose you have as extensive a knowledge of the whole district as any one in the neighbourhood?—Yes. I actually dealt with the Natives for the whole of it.

40. You were the first Warden in this district?—Yes, and the first in New Zealand.

41. Well, it is because you have that extensive and intimate knowledge that I am asking you the question?—Well, my opinion is this: The silt should be picked up at the tail-races of the various batteries above Waikino, and should be carried out on to the vacant places and some deep swamps there are on what are called the Waihi Plains. Of course, there is plenty of room for all the tailings of these mines. But the Talisman and Crown Mines are in a worse position. They have actually no ground on which to stack their tailings, and what I would propose to do there would be to put a dam across not far from Doherty's Creek, and dredge out the tailings and take them in a flume to some piece of land which is to be acquired below.

42. In speaking now about the present and future products of these mines, are you speaking of the new treatment, or what they call the all-slimes treatment—the finer crushing?—I think the finer crushing will make things worse than the present treatment.

43. I should like you to look at these two meshes. I understand the coarse represents the old treatment, and the fine one represents the new. Now, in your opinion the finer crushing will result more prejudicially than the coarse?—Certainly, because it will be carried further over the lands.

44. You are not referring now to the navigability of the river—you are speaking as to the damage to adjoining properties in case of floods?—That is so; and, as to the navigability of the river, where it settles down it will very likely make shoals and shallows, because I believe it will settle down very solid.

45. Then, it is not your opinion that the all-slimes will be carried right out to sea?—I should be very sorry to see the Thames Harbour damaged.

46. Then, you think that if it was carried past this river it would damage the Thames Harbour?—Decidedly so. Why, even now when the tide is low below Opani Point the steamer drags through the mud. I was rather astonished when the captain of the steamer mentioned that yesterday. Formerly there was about 8 ft. of water there.

47. What do you attribute the muddy water to?—To the stuff coming down the river.

48. Not to anything from the Thames?—No; nothing from the Thames goes past Tararu Point.

49. And speaking of these remedial measures you mention, you were referring not to the old coarse tailings, but to the new finely ground slimes, or did you intend to refer to both?—I would stop them all if I could.

50. Then, practically you would revoke the Proclamation?—Well, there is no power to revoke it in the present Act.

51. But if there was power that would be your suggestion?—Yes.

52. Well, assuming that no more tailings come down at all, what about the tailings at present above the traffic-bridge? In your opinion these tailings as they at present exist are a menace to Paeroa?—Of course they are.

53. What would you suggest in regard to these?—They will have to go further down the river. You do not suggest that I or any other settler should give you an area of frontage on which to deposit tailings.

54. I am asking your opinion as to what should be done with the present tailings above the traffic-bridge. Do you know there has been a suggestion that all the willows should be cut?—That is quite right.

55. In cutting, would you include uprooting?—I do not think that would be necessary. I have noticed in the Piako that ring-barking killed them.

56. Do you think that uprooting would do any damage to the banks, and contribute thereby to flooding?—No: I think it would be better to cut them down, and take all the branches out of the river.

57. Do you think the silt already above the traffic-bridge should be allowed to go further down the river in time of flood?—It is difficult to suggest anything, because where is the money to come from?

58. Supposing you had unlimited money to do the thing in the best possible way, and then supposing you had a limited amount of money, what is the next best method, and so on?—Of course, it would be a good plan if they could remove these tailings and utilize them for raising the roads across the swamps of the Hauraki Plains. I do not see any other place for them to be deposited.

59. Do you think they should be removed?—Certainly, if possible.

60. *The Chairman.*] You have no intermediate scheme for reducing the evil between total removal and the present conditions?—It is a sort of work you must do completely if at all.

61. *Mr. Cotter.*] I want you to refer to the rather long stretch of river from the Junction to the traffic-bridge?—Yes.

62. You know the present condition of that part of the river?—I do.

63. Supposing the tailings which we know are all over the bed and banks of that river are allowed to go into the Waihou, what, in your opinion, will be the result of that so far as concerns navigability and flooding the properties adjacent to the Waihou?—I find the tailings, when they go down below the Junction, as a rule settle on the sides of the river near the banks, and there they stick.

64. Supposing the large quantity that now exists above the Junction is allowed still to go down into the Waihou, what do you think will be the ultimate result?—That the Waihou will just become a little stream going through a morass.

65. *Mr. Myers.*] Your occupation now is that of a farmer?—I am a land agent. I have been a farmer.

66. Do you happen to have any qualifications as a civil engineer?—No. I know a little bit about surveying, and I know a good deal about draining.

67. You said you had been mining?—Digging and prospecting; never mining in my life.

68. How long is it since you have been Warden?—I have been fifty years connected with the goldfields in New Zealand, in both Islands.

69. When did you cease your connection with mining either as Warden or in any other capacity?—I was last Warden on the West Coast in 1880.

70. Do you know anything at all about the methods which are adopted now in the batteries in these districts?—Not a very great deal. I have a general idea, of course, but I am not an expert in these matters.

71. *Mr. McVeagh.*] What swamps about Waihi do you suggest these tailings should be put into?—There is a large swamp, if you go along the old Tauranga Road, lying to the left.

72. How far out from Waihi?—It is below Waihi. It is some distance above Waikino. It is about a mile and a half back from the river to the northward of the old Tauranga Road. There is plenty more useless land there, because the dry land is not much good.

73. The swamp is a small one?—It is a fair size. I cannot tell you the area. I camped on it all night in 1865. I was there last about five years ago.

74. I am told it is dry now?—Very likely.

75. Is it a fact that the whole of the land on the Waihi Plain is a basin, and the slope is on the river? If you stack the tailings there, how are you going to prevent them getting into the river?—They will not run uphill.

76. Are the willows on the Waihou on the banks or in the stream itself?—They are mostly growing just on the edge of the banks. Some are higher than others. Some are right down on the water.

77. I think their position generally is very much the same as on the Ohinemuri?—Yes.

78. You have been here many years, and you have seen, I suppose, a great amount of clearing going on during your experience—the felling of bush and draining of country?—There has been a good deal, but not so much as you might have expected

79. Are there not timber companies operating in various parts roundabout this district?—There is no timber company operating close here. There is a good deal of timber at Hikutaia and Turua and Wharekawa.

80. What about the Waitawheta Gorge?—There is some good bush in that, and it has been cut for the Waihi Company.

81. Have you any information as to the depth of the water shown on the charts at the mouth of the Thames on the bank you speak of?—I had a cutter when I was in the Government service that drew 6 ft. 3 in. of water, and I was in the habit of entering the mouth of the Thames frequently, so I knew the river well.

82. How long ago was that—about 1875?—Before that.

83. Who navigated the vessel for you?—I had a sailing-master, but I could do it myself if necessary. I very often came up myself with a Maori crew. I last came up in the cutter about 1874, but I have been up and down in the steamer dozens of times since.

84. Have you any recollection after this lapse of time as to the state of the tide at which you navigated that cutter across the bank?—When the tide had made an hour or so you could do it all right.

85. *Mr. Hanna.*] Are you aware that a license has been granted to a certain company to work these deposits in the river from the Junction upwards?—Yes.

86. Taking your long experience of the river, if that company takes these tailings up at the rate of 500 tons a day, treats them through a very fine mesh, is that going to be beneficial to the river or not?—I do not know that it is going to make much difference, but if you make it finer you make it so that it will settle down and form permanent shallows.

87. For the sake of argument, we will assume that it will not settle?—I would not assume such an absurdity.

88. We will prove that your absurdity is a correct proposition?—All right.

89. *Mr. Mueller.*] Did you come in that cutter which drew 6 ft. 3 in. of water right up the Waihou?—Not as a rule. We used generally to go to Kopu, and then I pulled up the river in my whaleboat. It was an ordinary whaleboat.

90. Can you state from your earlier experience of the river up to the present time whether the lower Waihou, from the Puke to Opani Point, has been filling up?—I know the last time I was down at Turua I noticed at low water a much larger shoal than existed there formerly. I may state that originally there were only two places where we were liable to stick through being either too soon or too late on the tide. One was opposite Omahu Creek and the other was down Bagnall's Reach, below Puriri.

WILLIAM ATKIN NICCOL examined. (No. 36.)

1. *Mr. Mueller.*] You are secretary for the Silting Association?—Yes.

2. It has been mentioned during the course of this inquiry that something ought to have been done in regard to the clearing of the willows: can you tell us what your association has done in this connection?—Last year there was a sum voted on the estimates to clear the willows out of the river, and my association wrote to the Ohinemuri River Board asking them to get authority to expend the money in clearing the willows. The amount of the vote was £1,000.

3. Is that the reply your association got from the River Board?—Yes. [Exhibit No. 23, as follows: "17th September, 1909.—Memo. for W. Niccol, Esq., Hon. Secretary, Ohinemuri River Silting Association.—DEAR SIR,—I am instructed to thank you for your letter of the 27th ultimo, enclosing portion of Mr. Breakell's report upon the Ohinemuri and Waihou Rivers, and to inform you that application has been made to the Minister of Mines to authorize the expenditure of the £1,000 which appeared on the last supplementary estimates in the destruction of willows on the Ohinemuri River.—Yours faithfully, R. W. EVANS, County Clerk."]

4. Do you know whether the £1,000 was obtained from the Government?—I do not think it was.

5. So nothing has been done by the Board or county in commencing operations on the willows?—I know the County Council did some clearing of willows just below the Junction.

6. Did your association make application to the Mines Department for some reports?—Yes.

7. Is this a copy of a report by Mr. H. J. H. Blow, Under-Secretary for Public Works?—Yes. [Exhibit No. 24.]

8. Is this a copy of Mr. Breakell's report received at the same time?—Yes. [Exhibit No. 25.]

9. Is this a copy of a report by Mr. Stewart which your association got?—Yes. [Exhibit No. 26.]

10. Are these two letters which you have received as secretary of this association bearing on this matter [Exhibit No. 27]?—Yes. They were read as follows: "Auckland, 14th July, 1909.—Mr. W. Niccol, Hon. Secretary, Ohinemuri Silting Commission, Paeroa.—DEAR SIR,—At a meeting of our executive held on Friday last your favour of 29th May with regard to the depositing of mining *débris* in the Ohinemuri River was fully discussed, and I was instructed to write to you, stating that this association are communicating with the Minister for Agriculture, urging the necessity of taking immediate steps to prevent the silting-up of the Ohinemuri and Waihou Rivers, as they feel sure that this is the only measure that will save the valuable farming and dairy lands of the Thames Valley.—Yours truly, EDWIN HALL, Secretary, Auckland Agricultural and Pastoral Association." The other reads, "Paeroa, 2nd April, 1909.—E. W. Porritt, Esq., Chairman, River Silting Committee, Paeroa.—DEAR SIR,—For the information of the Committee I beg to state that I am prepared to remove the tailings from the Waihi Company's batteries to the Waihi Plains for the sum of 1s. per ton, and would be prepared to pay a substantial sum as a deposit on the contract; provided I secured a contract for a reasonable period, and that every facility was afforded me by the company. By 'every facility' I mean that my operations would rank as of equal importance to the company's operations.—Yours faithfully, WM. FORREST." Mr. Forrest is a contractor, and he was residing in Paeroa when that letter was written. I believe he has now one or more contracts in connection with the Auckland City drainage-works.

11. *Mr. Myers.*] Mr. Forrest's letter was presumably in reply to a letter from you?—No; he made the offer himself.

12. How did he come to make the offer?—He was a member of the Silting Association.

13. Had he been living here long?—Yes, about a dozen years.

14. What was he doing here?—I think he was contracting at that time.

15. *The Chairman.*] What class of contracting?—I think the last contract he had was for the Waikino water-supply.

16. *Mr. Myers.*] And was he doing timber-work?—He had a sawmill at one time.

17. Do you know whether he ever had any mining experience?—Not that I know of.

18. *Mr. McVeagh.*] How long have you had that letter?—About twelve months.

19. Was it entirely spontaneous on the part of Mr. Forrest?—I was not aware that it was entirely spontaneous, because the question of the disposal of the tailings had been discussed so often that Mr. Forrest said he was prepared to take them away for a certain sum, and he was asked if he would put that offer in writing, and he sent us that letter.

20. *The Chairman.*] Do you hold your meetings in public or private?—As a rule they are public.

21. Was the meeting public when this letter was received?—It was.

22. Was the letter published in the newspapers?—I am fairly certain it was.

23. *Mr. McVeagh.*] Did you communicate that offer of Mr. Forrest's to the mining companies?—No.

24. Did you ask Mr. Forrest himself to communicate it to the mining companies?—No.

25. Have you any other expert reports besides these which have been put in now?—No.

26. They comprehend all the reports you have on the silting question?—Yes, with Mr. Perham's.

27. *Mr. Mueller.*] Do you know whether the matter of that letter appeared in the local papers?—I am fairly certain it did. I will ascertain.

28. *Mr. Flatman.*] Have you had any conversation with Mr. Forrest since that letter was written?—He went away not very long afterwards, and I have not spoken to him since. I believe he was a member of the association when a reply came back from the Minister of Mines that the matter would be considered, and that the whole question was being gone into.

29. You do not know if Mr. Forrest is willing to take up the contract to-day?—I do not.

Mr. Mueller: That is the evidence which the association wish to place before the Commission.

The Chairman: In your opening, Mr. Mueller, you said you were going to prove that a large area of Native land was affected. You have not given us any statistics in regard to that.

Mr. Mueller: I did not go into figures as regards these last two Native witnesses. The plan shows a considerable area of Native land.

Mr. Hanna: I appear on behalf of the Karangahake Miners' Union. I will just make a very few opening remarks, and will then call certain witnesses. The number of witnesses is only three, and I propose, with your permission, to call one witness, who is the chairman of the Karangahake Miners' Union, and his evidence will be supported *in toto* by the other two witnesses. The reasons why the Karangahake Miners' Union desire to appear before this Commission and give evidence are summed up in two memoranda which have been placed before me. The first one is, "As a Miners' Union we respectively submit that the sludge-channel should be kept open, because there is no other way to get rid of the tailings from Karangahake." The second one is, "That, supposing the closing of the sludge-channel was brought about, it would throw hundreds of men out of work in Karangahake alone, and with their wives and families dependent upon them that would be most disastrous, and many would be rendered destitute." In commenting on the evidence which I will adduce, I am informed that this union represents all the miners in Karangahake. The membership is over five hundred. The union is a branch of the Thames Miners' Union. Evidence has already been brought before the Commission to show that the population of the Waihi, Karangahake, and adjacent districts is about ten thousand. I am advised that fully five thousand of that number, if not more, are actively engaged in mining operations in this district.

The Chairman: What area of land is included in that population of ten thousand? Are we to have census statistics?

Mr. Hanna: I am only following the evidence already laid before you. I intend to give some evidence of these facts. I am only taking it roughly that ten thousand is the total popula- years to effect the necessary alterations, and during that period the whole of these miners, with their wives and families, are actively engaged in mining-work. Their toil is a very arduous one, and if their work should cease and they should be thrown out of employment, they would have extreme difficulty in getting fresh or similar employment or in starting employment of a different character. These miners, after a very severe struggle, have managed to save a little money and have secured small cottages for themselves and their wives and children, and they submit they are just as much entitled to consideration as the farmers of the district. Shortly put, our contention is this: that the revocation of the Proclamation means this: There are a great many miners who prospect and dig and work on their own, and their *débris* is put into the river in the ordinary way. That body of men would be prevented from carrying on their ordinary work. Mr. Moresby informs me that according to the Year-book for 1909 the population of the Waihi district is 5,594, and of the Ohinemuri district 5,895, making a total of 11,489. I have referred to the small prospectors and single men who go working about the district. Sometimes there are men banded together in small bodies and in mining partnerships to work these mines, and these people would be debarred from carrying on their operations. And particularly there are tributers. A large number of men take tributes in these mines, and undertake to get out the ore at a certain price. They are charged for the treatment of that ore, and, of course, the charge for the treatment depends upon the facilities for the disposal of the tailings. If these facilities are taken away, then, of course, the cost of treatment becomes materially greater, to their detriment. Lastly, if it should be found necessary to revoke this Proclamation, it will mean a complete alteration of the mining machinery and plant which is at present utilized in treating the ore; and I am advised the result of that would be that it would probably take from one to two years to effect the necessary alterations, and during that period the whole of the miners, with their wives and families dependent upon them, would be absolutely without means of support unless they took up some other work. I do not think I need say any further. I propose to call the president, secretary, and treasurer of the union. I could have called many of the miners, of course, but I did not think it necessary. I think these are ample to give you all the information you require.

JOHN MCGREGOR examined. (No. 37.)

1. *Mr. Hanna.*] You are chairman of the Karangahake Miners' Union?—Yes.

2. What is the membership of your union?—The Karangahake Branch has a membership of a little over four hundred.

3. Do you know what amount of money was collected there last year as the total fund?—About £547.

4. Do you know what was distributed in accident and sick pay?—Close on £300.

5. So your union is active, and it looks after the members properly?—Yes.

6. What do you do yourself?—I am a miner.

7. What form of work do you do?—I am a tributer in the Talisman.

8. You contend that the Proclamation declaring the river a sludge-channel should not be revoked?—That is so.

9. Was this a unanimous resolution of the union?—We got up a petition in the place, which was signed by over five hundred.

10. Have you got that petition?—I have a copy of it. It really came from the Waihi Borough, but we made a few slight alterations in it. It is as follows: "The Hon. the Speaker and Members of the House of Representatives in Parliament assembled.—The petition of the undersigned inhabitants of the Borough of Waihi and the surrounding districts humbly showeth: 1. That the petitioners are vitally interested in the gold-mining industry carried on by the various companies in Waihi and Karangahake, their livelihood being entirely dependent thereon.

2. That previous to the establishment of this industry the country around was totally unoccupied, being from its barrenness quite unfitted for agricultural or pastoral holdings. 3. That in the year 1895, it being apparent that mining would be carried on for many years to come, His Excellency the Governor was advised by his Executive Council to proclaim the Ohinemuri and Waihou or Thames Rivers watercourses into which tailings and other mining *débris* might be discharged, which, after due notice according to law being given, was done, no objection having been raised. (See *New Zealand Gazette*, 4th April, 1895.) 4. At the time this was gazetted the number of farms fronting on the Ohinemuri River did not exceed six. 5. Since this Proclamation a large amount of tailings has been deposited in the river by the gold-mining companies at Waihi and Karangahake, and a right to recover this material and re-treat it for the percentage of gold therein has been granted by the Warden to a company established for this object. The title to this privilege is as good as the tenure of the Waihi or any other company to its holding, and could not be cancelled without the payment of heavy compensation. 6. That during the month of January, 1907, owing to an unprecedented downfall of rain in the Provincial District of Auckland, large tracts of land throughout the country were flooded to a greater extent than known since the foundation of the colony, traffic on portions of the Waikato Railway being wholly suspended for weeks, and parts of the country laid under water for the first time since the line was built, over thirty years ago. 7. That the low-lying Thames Valley, through which the Ohinemuri and Waihou Rivers find their way to the sea, were also flooded by the overflow of the upper portions of the Waihou River and Te Awaiti Creek, farms fronting the left bank of the Ohinemuri River being thus placed under water. 8. That it is now sought to be proved that the deposition of tailings in the said rivers was the cause of these farms being flooded; whereas the natural conditions are such that had the handiwork of man never been in the country the land in question would have been under water when such weather-conditions prevailed, as the past history of the district abundantly proves. 9. Should the proclamation of the river as a sludge-channel be revoked it would prove a very serious blow to the mining industry, quantities of low-grade ore now worked at a small profit would be left untouched, and a number of men thrown out of employment, forced to leave the district, and compete for work in other centres of the colony. 10. Your petitioners therefore pray that no steps be taken to prevent the gold-mining companies from exercising their legal rights in depositing mining *débris* in the Ohinemuri River, and that a Commission of inquiry be set up to take sworn evidence on the prevailing conditions. And your petitioners will," &c. [Exhibit No. 28.]

11. That is virtually the petition you sent to Wellington, and it contained over five hundred signatures?—Yes.

12. Do you know on what date that was handed in?—The petition was forwarded on the 18th October, 1909.

13. That petition was got up as a result of a public meeting held at Karangahake on the 16th May, 1909?—Yes.

14. Was this petition considered by the Mines Committee?—I do not think so.

15. Who presented it for you?—Mr. Poland, member for Ohinemuri.

16. Have you had any interviews at all with the Silting Association on this question?—Yes, we had one meeting together.

17. Will you tell the Commission the result of that meeting?—We met in Karangahake, and it was agreed at that meeting between the two parties that we hold back our petition for the time being, and that if we could do anything to force the Government to get over the trouble without injuring either the farmer or the miner we would do so.

18. Was that agreement carried out?—No; the Silting Committee broke the agreement the first week. They agreed with us to make no further trouble in the matter. Some expert had been round, and we were to get hold of his expert opinion if we could, and see what he had to say on the matter, and see what scheme could be devised.

19. Did they agree not to ask for the revocation of the Proclamation?—There was really nothing of that mentioned.

20. *The Chairman.*] What did they break?—They were not going to protest. The miners asked for a public battery, and they objected to this public battery putting any tailings into the river. The people out prospecting wanted a public battery in the district to crush their ore, and the Silting people objected to it, and we considered that by doing so they had broken their agreement with us.

21. *Mr. Hanna.*] When did this take place?—It was after our public meeting. We were almost on the point of presenting our petition when they interviewed us. The petition was presented after the application had been made to the Minister of Mines for a public battery.

22. How did the association know that application had been made to the Minister of Mines for a public battery?—It was mentioned in the local Press, I think.

23. *The Chairman.*] As a result of the objections which you believe were lodged by the Silting Association you think the Government never granted permission for a public battery?—That is what we think.

24. *Mr. Hanna.*] At all events you have had no reply from the Minister in regard to the application for a public battery?—It was not sent from the union. It was sent forward by a Waitekauri party. I am only speaking from hearsay.

25. What experience have you had in mining?—Twenty-five years.

26. Has that all been passed in the Ohinemuri district?—I have been ten years between Waihi and Karangahake.

27. Can you state any other cause besides tailings which has silted up the river?—The mullock from the mines and from the Government works. All the material from the big Government tunnel was put into the river, and all the spoil from the cutting up near Owharoa.

28. Was that a considerable quantity?—Thousands of tons.

29. Would it be taken away as easily as the tailings would be taken away?—I do not suppose it would. The rough material would not go away anything like tailings.

30. The question has been raised about stacking the tailings at Karangahake: is that a practicable scheme?—I should say not.

31. Why?—I do not know where you would put them.

32. The Rotokohu Swamp was mentioned?—It is over a hill, three miles away.

33. What height is it over the mountain?—Six or seven hundred feet high.

34. That means lifting the tailings 500 ft. or 600 ft. and carrying them three miles?—Yes.

35. In the summer-time what quantity of water is there in the Ohinemuri and Waitawheta Streams?—It takes the batteries all their time to carry on in summer. You can walk across them, stepping on an odd stone, in most places.

36. Supposing it were practicable to lift the tailings, what would you do with the mullock and all the other *débris*—where would you put it?—I have no idea. We are right in between mountains, with high cliffs each side. There is one outlet, and that is the river.

37. You know the place thoroughly well?—Yes.

38. There is no place further up where the *débris* could go?—I do not know of any.

39. Supposing it was put into the Rotokohu Swamp, where could the stuff all go?—I do not know.

40. Are there any farms about it?—I think there are one or two.

41. I think the biggest percentage of your members are married men?—Yes.

42. Are you a married man?—Yes, with a family of eight, six of whom are dependent on me.

43. I think a great number of your men have little homes of their own?—Most miners have their little homesteads there—the majority have their own place.

44. Supposing you were thrown out of work to-morrow, what means of livelihood could you take up, supposing you could not go on with mining operations for a year or so?—I should have to take navvying.

45. Miners cannot save a great deal out of their wages?—They cannot. It is just a living.

46. *Mr. Cotter.*] I am speaking to you now as representing your union: Have you considered in any way as to who ought in fairness to pay the cost of the removal of the tailings and the amelioration of the present conditions?—The Government.

47. *The Chairman.*] Is that by resolution of the union?—That is my personal opinion.

48. You were asked as the representative of the union?—That question has never been considered by the union.

49. But, having a knowledge of the individual opinions of the men, your opinion is that if it were put to them it would be unanimously indorsed?—Yes. My reason for that is simply this: The river was proclaimed a sludge-channel in the first place, and all machinery has been put into that level to get the material away as cheaply as possible. Now, if the companies had to alter their plants it would throw both them and us to a big disadvantage.

50. *Mr. Cotter.*] You have given certain reasons: were these the whole of the reasons you wish to give?—I think that is enough.

51. *Mr. McVeagh.*] Can you give the Commission any information as to the number of people engaged in mining interests in Waihi and the number dependent on them?—No; it is a long time since I was there. Mining is the only thing they have to go on, and if the population is between five and six thousand I should say the whole of them are dependent on the mines—storekeepers and all.

52. Are you aware that large numbers of the miners in Waihi have small holdings of their own?—Certainly.

53. *Mr. Mueller.*] In regard to the conference that took place at Karangahake between the Miners' Union and Silting Association, do you not know that the association on the evening before that conference had decided to object to the public battery unless there was a condition put in?—We did not know anything about it until I saw it appear in the Paeroa paper.

54. Was that not just before the conference that you mention?—It was not.

55. Was it not at that conference that the public battery was mentioned?—No, it was never mentioned.

56. And did not the association agree to make no protest against this battery provided you people did not go on with your petition?—No; the petition was to be held over until we got the expert evidence. There was no mention of the battery at all.

57. In that petition you stated there were about six holders of land on the banks of the Ohinemuri?—Yes, but you know I cannot swear to all that is in that petition.

58. You do not support that?—Yes, I do.

59. *The Chairman.*] You signed it yourself?—Yes.

60. And therefore you agreed to everything in it?—Yes, although I cannot say as to how many settlers were there at the time.

61. The petition states that at the time of the issue of the Proclamation there were only six farmers resident on the banks of the Ohinemuri?—That is so.

62. *Mr. Mueller.*] Do you not know of your own knowledge that you could name a dozen or twenty of them easily on the banks of the Ohinemuri?—You may or you may not.

63. If the mines were prevented from putting their stuff into the river you do not think they would shut down to-morrow?—I do not know about shutting down. They would have to stop stamping, and if they stopped stamping we should be out of employment.

64. They said they would have to alter their plants, and you said it would take a year or two?—Yes.

65. And it would cost a good deal of money?—Yes.

66. A large part of that money would go in wages?—Some of it would, no doubt.
67. So you do not expect the Commission to believe there would be no employment at all?—I did not say that.
68. There would be employment?—A small amount, but not to any extent. There would be a great many out of employment.
69. In regard to lifting the tailings from Karangahake, you know the run down from Karangahake to Marsh's?—Yes, it is pretty flat.
70. Now, both the Talisman and Crown batteries are pretty close to the river?—Yes, right on it.
71. So you have all that lay of country to bring your tailings down if necessary?—Yes.
72. There is a good fall in the river from the Talisman battery as far as Marsh's?—Not if there is only 14 ft. between the Thames and Karangahake.
73. You do not know that Paeroa is about 30 ft. above the Thames?—I do not. I do not think it is.
74. Would it not be the most feasible way to flume your tailings down alongside the banks of the river?—Where to?
75. You mentioned about going over a hill 600 ft. or 700 ft. high?—I only answered the question.
76. Can you not walk from Karangahake to Rotokohu Swamp without rising above the level of the railway-line?—Not unless you walk right down to the Maori lands.
77. So you can get from Karangahake to Rotokohu Swamp practically on the level?—Yes, by going a long, roundabout way.
78. And to bring the tailings from Karangahake to Rotokohu Swamp, which do you think would be the better way—to lift them over the hill, which would be a bit shorter, or to bring them practically on the level?—I do not think either would work.
79. You said your petition was signed by about five hundred?—Yes, if not more.
80. You did not limit that to Karangahake people?—Pretty well.
81. Mackaytown?—That is Karangahake.
82. Owharoa?—No.
83. Do you know whether that petition was the same petition as was presented by the Waihi Borough Council?—It was similar.
84. Do you know whether that petition was presented by the Waihi Borough Council in 1907?—I cannot tell you.

MICHAEL MARRINAN examined. (No. 38.)

1. *Mr. Hanna.*] You are Secretary of the Karangahake Miners' Union?—Yes.
2. How long have you occupied that position?—Since 1898.
3. How long have you been mining?—Since 1868 until my health broke down in 1891.
4. And since then you have been connected with mining?—Yes.
5. Have you been all this time in the Hauraki district?—Yes.
6. How long have you been in Karangahake?—I came first in 1869. I have been long enough here to know it thoroughly.
7. What was the difference between the flooding of Karangahake in 1869 and now?—I have seen very large floods prior, I think, to about 1873. I took a paddle-steamer up the paddock at the Belmont Farm.
8. Can you remember any other big flood before that of 1907?—There have been numbers of floods, but I cannot remember the dates.
9. Since your first arrival in Karangahake until the present time the place has been subject to floods frequently?—Certainly.
10. You have heard Mr. McGregor giving evidence as to the condition of things, and as to what would happen if this Proclamation is revoked: do you approve of all he has said?—Yes, and a little more
11. Will you give us the "little more"?—I think he underestimated the position. It would all depend on the time it would take to alter the plants.
12. In your opinion the bulk of the miners would be thrown out of employment?—Except a few expert hands—mechanics and so on.
13. In all respects you confirm the evidence that has already been given?—Yes.
14. *Mr. Mueller.*] You say you were in Waitekauri in 1875, and that from that time up to 1891 you have been actively engaged in mining?—In the peninsula.
15. Whereabouts?—Coromandel and Kuaotunu.
16. So you were at Coromandel and Kuaotunu for a good length of time?—I was in Coromandel from 1878 to 1880.
17. Did you live at Karangahake then?—No; principally Waitekauri.
18. You have not been about Paeroa very much in later years?—Yes.
19. Mining in Paeroa?—No, I came in to enjoy myself occasionally. I was living here for a considerable time, too.
20. You do not know anything about the Netherton lands?—I was only there once, some time ago.
21. Are you a member of the Ohinemuri County Council?—Yes.
22. For how long have you been a member?—For ten years and a half.
23. You are a member of the Ohinemuri River Board?—Yes: it is a Board in name, but not in action.
24. Can you tell us whether the River Board got that £1,000 for clearing the river?—They got no money at all, to my knowledge.

25. *The Chairman.*] Did you apply for the money?—Yes, to the Government.
26. What answer did you get?—I cannot say. I suppose it was a sort of negative one.
27. *Mr. Hanna.*] Did you get any answer at all?—I am not sure.
28. *The Chairman.*] Why during these ten years and a half has not something been done by the Ohinemuri County Council to look after the river?—No financial means. We are in debt about £10,000.

CHARLES EDWARD LLOYD examined. (No. 39.)

1. *Mr. Hanna.*] You are treasurer of the Karangahake Miners' Union?—Yes.
2. You heard the evidence given by the chairman and secretary to the union?—Yes.
3. Do you agree with the evidence that has been given?—Yes. I should just like to explain in regard to the conference that was held: We agreed to hold back our petition provided the association took no action to revoke the Proclamation; and the outcome of the whole conference was to force the Government to find some solution of the trouble. Then we saw by the Auckland *Herald* that Mr. Strange, a member of the Silting Association, had asked the assistance of the Piako County Council in the matter of the revocation of the Proclamation. We took it from that that the Silting Association were not keeping their promise, and we sent in our petition. That is the whole position.
4. *Mr. Mueller.*] Mr. Strange is a member of the County Council living near Te Aroha?—Yes.
5. Do you say he was a member of the Silting Association?—The *Herald* report stated he attended the meeting of the Piako County Council as representing the Silting Association.
6. You do not know that the Silting Association had decided to oppose the public battery just before they conferred with you, and that that conference caused them not to make any bother about the battery?—I do not remember any mention of the battery at the conference.
7. You agree that it was admitted at this conference by all parties interested that something should be done?—That is so.
8. And the only idea was to get that something done which would not injure either the mines or the farms?—Yes.
9. I suppose you know yourself that a considerable amount of damage has been suffered by the farmers?—Yes.
10. And your Miners' Union admitted that?—I think they did at the time. I admit it myself.
11. The only question was whether to go for the revocation or not?—It was a matter of dropping the revocation and getting some other solution.
12. And you think that that something else should be done even at the present time?—I do honestly.
13. Are you a member of the Ohinemuri County Council?—Yes.
14. *The Chairman.*] And you are a member of the River Board?—Yes.
15. Do you know anything about this vote of £1,000?—I think we were asked by the Silting Association to try and obtain the money and get it spent. We got a reply that the matter was under consideration, and that the money would be revoted in 1910.
16. Mention was made that the miners and Silting Association were jointly to get some evidence as to what was to be done?—I do not remember anything about that. The whole wind-up of the meeting was that we would force some solution on the Government. In regard to the River Board, some mention has been made of a couple of sections that the Board had taken on which to clear the willows. We received a letter from a person named, I think, Lytton, who reckoned he had a good mode for getting rid of the willows, and the Engineer was appointed to pick him out a section, and he was to clear the section on the principle of "No cure no pay." We granted him another section afterwards, and he has had no pay. We have recently given one of our members, Mr. Strange, a few gallons of Noxine, with which to experiment on the willows at Mangaiti. We heard that by getting rid of the willows they had lowered the Waipa River 9 ft. to its original level.
17. You must have thought and talked over what can be done: what can be done, in your opinion, as a practical man?—My honest opinion is that it is a matter of getting rid of the willows. My honest opinion also is that the gold-extraction company are going to do a lot of good if they lift the stuff and put it back in another way. They were getting this stuff out of the Waititi Creek, on the top of the Waihi dam, and one day I went up to have a look for myself. I went up in a launch in the winter-time, and for three-quarters of a mile to a mile I took a pole, and I could get 9 ft. of water. Therefore I think, if it is going to do good on the top of the dam, it is going to do good in the river. They were treating the silt practically on the top of the Waihi dam, and discharged it back into the Waititi Creek, and then it was going back into the dam proper.

Mr. Hanna.] That is the case for the Karangahake Miners' Union.

WILLIAM SULLIVAN examined. (No. 40.)

1. *Mr. Tunks.*] You are master of the s.s. "Taniwha"?—Yes.
2. How long have you known this Ohinemuri River?—About twenty-seven years.
3. During that time have you been actively engaged in navigating the river?—Yes.
4. How long have you been on the "Taniwha"?—About thirteen years—ever since she was built.
5. And you have been going up and down every day?—Every day, pretty well.
6. What is the draught of the "Taniwha"?—Taking her light, she is 6 ft. aft and 4 ft. 6 in. forward. When she came up this morning loaded she was drawing 7 ft. 9 in. aft and 7 ft. 2 in. forward. Her tonnage is 191.
7. Did you have any difficulty in getting up this morning?—No difficulty. It is a tidal river.

8. *The Chairman.*] At what time of the tide do you come in?—Getting towards high tide. It still had to rise when I arrived.

9. *Mr. Tunks.*] Prior to your being in the "Taniwha," were you on other steamers trading up the river?—Yes, on the "Waimarie" and on the "Ohinemuri" about fifteen years ago. I was also on the "Paeroa."

10. What was the tonnage of the "Ohinemuri"?—I cannot remember. Her draught was about the same as that of the "Taniwha" when loaded, and when light I think she would draw a little more. She might draw up to 8 ft. loaded, but she would not exceed that.

11. Do you find any greater difficulty in navigating since the river has been declared a sludge-channel than before?—No, not from where I am running to Te Puke. It is just the same as I have always remembered it.

12. Have you had any instances in the way of sticking lately?—No; but that is not owing to the bottom, but to fogs and being late on the tide.

13. Then, if you do stick it is not due to the silting of the river, but to lateness on the tide or to fogs?—Yes.

14. I think you have some twelve stopping-places between Kopu and Te Puke?—Quite that, and we sometimes call at more.

15. Have you had occasion to give up any of your places of call below Te Puke since the river became a sludge-channel?—No.

16. As a matter of fact, has not the number of places increased greatly?—Yes, they are increasing all the time.

17. What sort of a river has it always been—always more or less shallow?—Yes; the effect of a fresh is sometimes to make a shoal, but it always sweeps away again.

18. That is to say, the river is able to manage whatever is brought down?—Yes.

19. Have you any reason to think it will not be so in the future?—I should not like to say that. I think it must be shoaly in the future.

20. Why do you think so?—Because there is such an amount of sand up here that I think it is filling up all these places, and eventually it must come down.

21. What sand are you referring to as coming down which you think will shoal the river?—It is the sand up here, which was not here years ago.

22. Have you found anything in the way of shallows at the entrance to the Gulf?—No, none.

23. Have you found any alteration in the width of the channel?—No.

24. When you are making these calls at these various places, have you ever to turn round or to swing out into the river?—It depends. We always swing.

25. I mean, you have an opportunity of judging whether the channel is closing in?—I have never noticed it. It has never interfered with me in turning. I have plenty of room. I have noticed no difference in that respect.

26. Do you know whether the fishing industry has been affected by the sludge-channel? Do you carry less fish now than you used to carry?—I do not think so. We have carried very little fish of late. I think it is according to the tide or weather. I do not think it is owing to any effects of the sand. I have never heard or noticed that the sand had any effect on the fishing.

27. Have you carried less fish within the last twelve months than during the previous twelve months?—We may have carried less, but it is so rarely we get fish. The "Whakatere" always carries the fish.

28. *Mr. Moresby.*] You used to go up to Paeroa in the old days: what boat were you in then?—The "Ohinemuri." I was in the "Kotuku" before that.

29. So you knew the Ohinemuri well in the early days?—Yes.

30. It was a good deep river then, was it not?—Yes.

31. And before these sands came it was easily navigable up to Paeroa, was it not?—Yes.

32. Can you tell us when you first noticed these sands coming down the river?—I cannot remember the year. It would be more than ten or twelve years ago.

33. It would be a few years after the river was declared a sludge-channel?—Yes.

34. I think you had to go down from one wharf to the other—from Wharf Street Wharf and then to the Railway Wharf?—Yes.

35. I think then to Pereniki's Bend?—Yes.

36. What did the river get affected with first of all?—This sand.

37. Do you know where this sand came from?—I could make a shrewd guess. There is plenty there now.

38. Then you were driven to the Junction, and that is where the "Waimarie" came to first of all?—Yes; but it was not owing to the silt first of all.

39. After you had been at the Junction a year or two it began to get pretty bad there?—Yes.

40. You examined the Junction at one time yourself, and did some engineering works there?—Yes; I put in a groin to confine the water. We did it gradually ourselves.

41. Can you give the Commission any idea whereabouts in the Junction you put it in?—I do not think it is to be seen now. I have not been there for years. The groin was put in on the opposite side to this, to give the water a scour. It has either gone or been silted up.

42. Can you remember what length this groin was?—I should think 200 ft.

43. Did it have the desired effect at the time you put it in?—Yes.

44. I think that groin was afterwards added to?—Yes.

45. But that was not owing to any recommendation by you?—No.

46. Were you using the Junction when it was lengthened?—Yes.

47. Can you recognise the photo which Mr. Kenny put in this morning?—Yes.

48. I think, between 1901 and 1902 the Junction itself began to get very bad?—It was about that. I cannot remember the year.

49. I think you made representations to Mr. Ranson about it, and representations were made to the County Council?—Yes.

50. Was that in consequence of the silt?—Yes.

51. Is this the letter sent in by the manager of your company: "N.S.S. Company, Auckland, 26th November, 1901.—The Chairman, Ohinemuri County Council, Paeroa.—DEAR SIR,—I have to call you attention to the difficulties of navigation in the Thames River with which our captains have had to contend for some time past. The silting-up at different points between the Puke and Junction wharves is obstructing the navigation of our steamers, and if something is not done very soon to remove the obstructions it is a question of only a short time when their passage to the Junction Wharf will be stopped altogether. As this is a very serious matter to the district, and may involve business people in extra charges on their consignments, it is of importance that steps with that object in view should be taken without delay in the interests of all concerned. I shall be glad to hear from you as early as convenient.—Yours faithfully, For the Northern S.S. Company, CHARLES RANSON, Manager"?—Yes.

52. That was written at your instigation?—Yes.

53. Is this also another letter written at your instigation: "N.S.S. Company, Auckland, 18th December, 1902.—Secretary, Ohinemuri County Council, Paeroa.—DEAR SIR,—I have to call your attention to the fact that, owing to the shallowness of the Ohinemuri River, our steamers have for some time discharged and loaded at the Puke Wharf. As this will lead to constant heavy traffic on the road leading from the Puke Wharf to Paeroa, my Board respectfully request that your Council will give special attention to this road and keep it in good order and repair.—Yours faithfully, For the N.S.S. Company, CHARLES RANSON, Manager"?—Yes.

54. So we may take it that between these dates, in consequence of the river shallowing up between the Junction and the Puke, you had to go down to Te Puke?—Yes.

55. Now, a good deal of sand has come down lately between the Junction and Te Puke; this last flood made a bit of a difference?—I suppose it has, but I have not been up. It has been reported to me that it has been shallow for some time.

56. The captains of the small steamers have to report these matters to you?—Yes.

57. And when obstructions occur in the Ohinemuri they are reported to you in the ordinary course of duty?—Yes.

58. It has been reported to you that this portion of the river has been shallowing up?—Yes, by both captains. It was a question of the tide going up. If the tide was low they could not get through.

59. You have a small steamer called the "Rotokohu" which tows the goods you bring to Te Aroha; and I understand that boat cannot go from Te Puke to the Junction at low tide, or half-tide either?—No, I do not think so.

60. From that fact you conclude that this portion of the river is shallowing up rapidly?—Yes.

61. Did you notice if this last flood made any difference at all to the river?—No.

62. Captain Bettis seemed to notice that it had had an effect on the banks of the river?—Always after a fresh there must be more sand on the edge of the banks.

63. *The Chairman.*] So in your opinion it is gradually accumulating?—Yes.

64. *Mr. Moresby.*] I believe your boat has twin screws, and was built specially for this trade?—Yes.

65. Supposing that Te Puke got shoaled up, and you were compelled to go to Kopu, do you think the fact of your steamers not running regularly would have any effect on the channel?—Yes.

66. What effect do you think it would have?—The channel would shallow. The action of the steamers, I think, is keeping it open. They are keeping the river stirred up. That is my opinion.

67. *The Chairman.*] Do you consult from time to time when any changes take place in the river?—Yes. In a fresh the current seems to divert sand from the banks into the channel, and then it gradually goes back to the banks.

68. You do not think there is any decrease in depth in the whole over the bottom of the channel?—There may be a trifle, but not enough to affect the vessel.

69. Do you think that the action of your propellers muddies the water more now than a few years ago?—I do not think so. It was always muddy and slushy.

70. There is no difference in the colour of the trail you leave after you?—Yes, in the upper part of the river. Years ago the water was very clear and bright.

71. How many miles down do you notice that?—The water is really discoloured all the way.

72. *Mr. Mueller.*] Do you remember Mr. Stewart, C.E., making inquiries from you about three years ago as regards the navigation of the river?—Yes, I think I do.

73. Did you not tell him then that you thought there may have been a difference of 6 in. or less?—Yes.

74. Do you think that from 1907, when you told him that, up to the present time the river has been getting, not better, but worse?—It would not improve.

75. As you now leave Te Puke instead of the Junction, you get down to the mouth of the river earlier on the tide than used to be the case?—Yes.

76. I suppose when you were running from the Junction you very often used to scrape across the bar from Kopu out?—Yes.

77. You do not do that so much now?—At times. It all depends on our passage down, because every call means a quarter of an hour.

78. But, having a shorter distance to go, you have a better chance of getting over the mouth earlier on the tide?—Yes.

79. You only go up with the tide and down with the tide, so you never see the river actually at low water?—No.

80. *The Chairman.*] Unless you happen to stick for a whole tide?—Yes.

81. How often do you stick for a whole tide?—It is not often, and it is only caused by the fog.

82. *Mr. Mueller.*] So when you stick over a tide you only see that part of the river where you stick?—Yes.

83. *The Chairman.*] Where you have stuck, have you seen any serious change in the river at low tide—are the banks gradually pinching in?—No. Any changes that have taken place over a period of years are not serious for navigation purposes.

84. *Mr. Mueller.*] The dairy-farmers have a number of oil-launches, and they work the river at all stages of the tide?—Yes.

85. And they would have a very intimate knowledge of the river at low tide?—Yes.

86. And if they stated they consider the sides are pinching in, and that the deep-water channel is narrowing, you would not say they were telling falsehoods?—No.

87. You think they ought to know?—Yes.

88. At what time did you get up to Te Puke Wharf to-day?—10.20 a.m.

89. What was the state of the tide then?—It would be just on the ebb.

90. What was the state of the tide when you were at Netherton this morning?—It was coming in.

91. You know Fisher's landing?—Yes, I was there this morning.

92. Just 5 chains off Fisher's landing did not your boat take the ground this morning?—Yes: but she would not have done so if I had been there. I was at breakfast, and the mate does not know the channel very well.

93. How long was the boat stationary?—About ten minutes.

94. How long has the mate been with you?—About nine months. He had never been on the river before that.

95. *Mr. Mitchelson.*] We were told that the river had shoaled in two places—one above and another below Netherton—and that sometimes the steamer swept over to these banks?—Yes, that would be at low tide.

96. Is that bank increasing, or is the water as it has been in the last twelve years?—It is shallower, but very little. I know the place well. We stuck there years ago—eighteen years ago, in the "Kotuku."

97. We were also told about the bar outside the entrance: has that shoaled perceptibly in the last twelve years?—I have not noticed it.

98. Do you ever take soundings going out?—No.

99. We were also told the steamers sometimes scraped up the mud after getting across the bar?—Yes.

100. Is there any change in the bottom there? Has the water decreased in depth there in the last ten or twelve years?—I have not noticed it. Years ago I have seen the "Paeroa" stuck there at low tide.

101. The "Paeroa's" day was long before the operations had commenced at Waihi?—Oh, no! they had begun then.

102. *The Chairman.*] Do you see any difference in the nature of this bar at Opani Point—is it harder in any way?—No.

103. Is the bottom any harder outside the Thames?—There is no difference due to silting.

104. Do you stir up the mud at all going across at low water?—Yes; it is very thick.

105. Do you find any difference in that mud?—No.

106. It is of the same character as it used to be?—Yes. We take soundings with a pole, and you can press the pole down feet.

107. We were told that there is a crust on the top of the mud now, and they have to press the pole to go through it: that is not your experience?—No. The river is hard on the Thames side and soft on the Piako side.

108. We are told it is possible for the sand or silt from the Thames to get washed up into the river in a north-west gale: what is your experience of that?—It may be washed on to the flats, but I do not think it would be washed into the river.

109. What does the flat consist of?—Mud and sand.

110. Soft mud?—Slushy mud on the surface, but not of great depth.

111. Is there much animal life on it?—I have never noticed any. I suppose there are some pipis.

112. Is there much sea-grass growing on it?—Nothing of that kind.

113. Are there any pipis there now?—I believe so. I think I saw some Maoris below Kopu getting shellfish a little while ago.

114. Have you ever done any poling in the river itself?—No.

115. Do you think you settle more, or less, in the bottom now?—I do not see any difference in the bottom.

116. *Mr. Myers.*] You said that sand accumulates on the banks in the floods?—Yes.

117. And do you find any special conditions on the banks with regard, for instance, to willows where this accumulates?—No. It may be, but I would not notice the sand so plain where there are willows.

118. Do you find these accumulations are generally in the neighbourhood of willows, or is that not your experience?—No. Where I notice it is in the clear spots.

119. You are speaking, of course, of the lower Waihou?—Yes.

120. You have spoken of the shallow at the Junction near Mr. Kenny's place?—Yes.

121. Are you able to say whether twenty years ago there were shoals in that neighbourhood?—Yes, it was always a shoaly place.

122. You remember the flood of 1907?—Yes.
123. You remember bad floods prior to that?—Yes.
124. Many?—Not a great many.
125. Floods as bad as the 1907 flood before 1907?—Yes.
126. *Mr. Moresby.*] Do you remember, in the 1907 flood, water coming over down at Netherton and down by Fisher's for quite a long time?—Yes.
127. Have you ever seen that before 1907?—No.
128. *Mr. Flatman.*] At what date previous to 1907 were the floods as bad as 1907?—It would be years before that. I was in Firth's boat at that time. It was the heaviest flood I had seen.
129. *The Chairman.*] That is, a higher flood in the river, but not over the whole countryside?—That is so.

THAMES, SATURDAY, 28TH MAY, 1910.

Mr. Bruce attended, and said he represented the Thames Borough Council, the Thames Harbour Board, and the Thames County Council, who had joined together to-day for the purposes of this inquiry. Therefore the evidence for the one would be the evidence for the other.

THOMAS COOK BAYLDON examined. (No. 41.)

1. *Mr. Bruce.*] You are Harbourmaster and pilot at the Port of Thames?—Yes.
2. And have been so for twenty-eight years?—Yes.
3. During late years has the bottom of the Thames Harbour and the bottom of the Thames River become harder or altered in any way?—Yes, it is harder than it used to be.
4. That would apply to the whole of the front shore, I presume, back from the Goods Wharf to Shortland?—Yes.
5. That undoubtedly has become very much harder?—Yes.
6. How far up do you mean when you refer to the Thames River?—As far as the Junction—that is what we understand by the "Thames River."
7. Referring to the portion of the river opposite the fairway buoy to the mouth of the river, up till lately what was the nature of the bottom there?—Very soft pug.
8. Vessels at certain portions of the tide would be able to plough through a foot or a couple of feet of that mud?—They could plough through for 2 ft.
9. A boat could have been brought in or out of the river through that mud?—Yes.
10. What would be the case now?—I do not think that would be the case now. I took a deep-draught vessel in a little while ago, and I found I had to back and fill her on the flats, where I knew I could have gone through before at the same state of the tide.
11. So far as the exact depth of the water is concerned, there is no appreciable difference during the last few years?—No.
12. But the bottom has become harder?—Yes.
13. Do you think any alteration in this is on account of the scour?—Yes; and I think in a great measure steamers going up and down assist it.
14. Take a vessel, for instance, like the barque "Selwyn Craig": if she had happened to ground a few years ago, what would have been the result—would she have settled in the mud?—Yes. I have seen a vessel like that settle in the mud to the covering-boards.
15. That is, lie in the mud to a depth of 6 ft. or 7 ft.?—Yes.
16. What would happen now if she stuck in the same place?—She would not sink to anything like that depth.
17. Would she sink to 3 ft.?—Yes, but not more than that.
18. *The Chairman.*] What do you mean by the "channel"?—The centre of the Thames River as buoyed out on our chart.
19. What is the width of the channel?—In places about a cable and a half; at other places it widens out considerably. At Opani Point it is not more than a cable wide now.
20. *Mr. Bruce.*] A couple of months ago you took some samples from the bottom and sides of the river from Turua downwards to the fairway buoy?—Yes.
21. The sample you took would amount in the aggregate to about four kerosene-tins full?—About that.
22. What would be the distance?—Seven miles.
23. Therefore the sample taken was a very, very small quantity of the whole?—It was difficult to get that, on account of the rush of water.
24. *The Chairman.*] How did you obtain the sample?—I made a spoon out of a stiff pitch-ladle, and I took it up on a pole as near low water as possible.
25. *Mr. Bruce.*] You handed these samples to me as Secretary of the Board?—Yes. [Exhibit No. 30.]
26. *The Chairman.*] Do I understand that all the samples were mixed together?—Yes; I could not do anything else.
27. And they settled, and this is the result?—Yes. Of course, I looked at the samples to see what the class of the ground was before I put them into the tin.
28. But there is no separate sample for each place?—No. The object was to see if I could trace any silt.
29. How many samples did you take in the seven miles?—I suppose, about fifty.
30. *Mr. Bruce.*] For some years you have noticed a bank forming on the right-hand side of the Thames Goods Wharf?—Yes.

31. Do you know where that material is coming from?—I have not the remotest idea where it is coming from.

32. Do you think it comes from the tailings of the plants at the Thames?—I do not think so.

33. Do you think it comes from the mullock of the tips?—No.

34. You judge that, I presume, by the colour of the material?—Yes.

35. The bank has not been analysed or separated in any way?—No.

36. *The Chairman.*] How far does this bank run out?—A chain to a chain and a half—gradually tapering. It lies alongshore much more than that. It is underneath the wharf, and crawling round the end.

37. What depth of water have you at the wharf?—About 8 ft., high water ordinary tides. That is where the steamer lies.

38. Has it been dredged at all, or is that natural depth?—That is natural.

39. And outside of that in a straight line does the water deepen quickly?—No; the water recedes from the wharf at spring tides nearly 1,500 ft. That is left bare.

40. Is that hard or soft?—It is hard now for a few chains off the wharf, but outside that it is moderately soft.

41. *Mr. Bruce.*] Previously, used it to be very soft there?—Yes; you could go up to your neck in the mud.

42. Do you consider that the foreshore has raised more rapidly during the last ten or twelve years than formerly?—Yes; I think it has considerably, inshore, from my own observation.

43. What are the prevailing winds at the Thames?—From north-west to south-west.

44. How many fishing-boats are licensed at the Thames?—There are about eighty-two on the register, but they are not all fishing. Some of them have been sold. There are forty-two or forty-three fishing.

45. *Mr. Clendon.*] What is the length of the Thames foreshore from Opani Point to Tararu Point, within harbour limits?—I should think, roughly, four or five miles.

46. How many creeks have you discharging tailings, and *débris*, and sand into that five miles?—There are Tararu Creek, Shellback Creek, Moanataiari Creek, Waiotahi Aqueduct and Creek, Karaka Creek, Nokenoke Creek, and Kauaeranga Creek.

47. All these creeks are discharging mining tailings, more or less?—Yes.

48. *The Chairman.*] Are they discharging anything but tailings—mullock and *débris* from the mines?—Yes.

49. And everything that can be brought down from the hills?—Yes.

50. And drainage from the district?—Yes; all the drainage from the town and creeks goes on the foreshore.

51. *Mr. Clendon.*] These creeks rise very rapidly in rainfall, owing to the situation of the hills at the back?—Yes.

52. And bring the water down very rapidly?—Yes.

53. Now, between Kauaeranga and, we will say, Tararu, what is the average depth of tailings and deposit on the foreshore for a distance of half a mile from the beach?—That is difficult to say.

54. Will it be inches?—Yes.

55. Feet?—Yes, in places.

56. Are the tailings coarse or fine in this district?—From Albert Street to Shortland they are all coarse.

57. The effect of a north-westerly wind is to disturb these banks on the foreshore?—Yes, I should think so.

58. Particularly a heavy blow from the north-west?—Yes.

59. In fact, can you contradict the statement that a north-westerly blow takes a lot of tailings and sand to Turua up the river?—I cannot contradict the statement, but I do not believe it, all the same.

60. For instance, is it possible for you or anybody else to say whether that sample you have placed before the Commission is composed of up-country tailings or local tailings?—I do not think it is possible.

61. But your own impression is that it is local?—No; I think it has come down the river. The natural inference is that it has come down the river.

62. Why do you say that if you cannot identify them with up-country materials in any way?—For the simple reason that a heavy blow puts everything over here, and it is not likely to take it out of the main channel and put it on the foreshore.

63. Do not the Piako and Waitakaruru Rivers bring down a very large amount of refuse from the drains?—I have heard so, but I have never seen it.

64. There is a big drainage scheme going on up these rivers, and has been for years?—Yes, since the dredges have been at work.

65. Can you say what percentage of that is distributed over the foreshore?—I have no idea.

66. What is the distance of your fairway buoy from Opani Point, at the mouth of the river?—Roughly, two miles and a half.

67. Will you say that the depth or width of the channel between Opani Point and the fairway buoy has lessened during the last five years, we will say? Taking the depth first, is it less now than it was?—I do not think it is.

68. Is it narrower now than it was?—I do not think so.

69. *The Chairman.*] Then the only difference is that it is harder?—Yes.

70. *Mr. Clendon.*] What disadvantage is it to have a hard bottom instead of a soft bottom?—It is easier for shipping to get stuck instead of dragging through the mud.

71. *The Chairman.*] Is there any greater danger to shipping in a vessel straining itself?—It would be to a loaded vessel.

72. *Mr. Clendon.*] Is it not easy to shove a pole 5 ft. or 6 ft. in the hard bottom?—At one time you could shove it through easily, but now you have to give it a few jabs to shove it through. It goes as far, once it goes through the crust.

73. Have you at any time taken a systematic sounding of the harbour?—I did three months ago.

74. What did you do?—I tried the ground between Turua and the fairway buoy.

75. The other portions of the harbour you did not sound?—There was no necessity to do so.

76. What is the velocity of the current running from Kopu to the fairway buoy?—Up to the mouth of the river it runs three knots and a half at times.

77. What is the current at the mouth of the river?—At spring tides it is quite a 3½-knot current.

78. Are there the same number of vessels going to Kopu and Turua for timber of recent years as in former years?—There have been more in recent years.

79. These vessels have had no difficulty in getting up to these mills?—No difficulty in getting there.

80. Or in coming away?—Yes, they have had difficulty in getting away.

81. Do they sail up or tow up and down?—They tow up now.

82. The bank you told us about on the north side of the Thames Goods Wharf is visible at low water, is it not?—Yes.

83. Is that composed of reddish-coloured sand?—Yes.

84. Can you say up-country silt has had anything to do with the formation of this bank?—I do not think it has.

85. *The Chairman.*] Where do you know of sand of a similar character?—I do not know of any sand of that description anywhere.

86. *Mr. Clendon.*] This has been established since 1867?—Yes.

87. And between 1867 and now this stuff has been going into the harbour?—Of course, it has.

88. Have any of the local authorities at any time done anything by dredging or otherwise towards keeping the channels of the harbour as they would like them?—Yes; they have walled all the tailings in to the north side of the wharf to the best advantage.

89. But have you done any dredging within the harbour limits at any time?—Yes; about twenty-six years ago there was a dredge here, but she was not a success.

90. What portion of the harbour did you dredge?—We tried alongside the wharf.

91. That is the channel for the boats to come in and out?—Yes.

92. *The Chairman.*] Have these creeks ever been declared sludge-channels?—Not to my knowledge.

Mr. Bruce: They are not proclaimed slude-channels.

93. *The Chairman.*] Has your Board ever taken any exception in any way to this material being deposited from the creeks?—Yes; and made every endeavour to prevent it.

94. What action have they taken?—Built walls to keep it in, and compelled the companies to retain their tailings as much as possible, the Waiotahi Company especially.

95. Is it not illegal under the Harbour Act to throw material into such places where it may be swept into the harbour?—I believe it is.

96. You are cognizant with the Harbour Act?—Yes.

97. You have never taken any action against anybody—you have welcomed this?—No; the Board has made every effort, so far as my knowledge goes, to prevent that sort of thing.

Mr. Bruce: The provisions of the Harbours Act in that connection have been ignored because the Board did not wish to interfere with the mining industry.

98. *Mr. Myers.*] I suppose you are not prepared to deny that large quantities of Thames tailings have escaped on to the foreshore?—Certainly not, because they have.

99. You, I suppose, would not be in a position to give any idea as to the aggregate quantity in any given number of years that has so escaped?—No. The only way to get that is from the battery-returns.

100. Do you say, or do you not say, that these tailings have been damaging the Thames foreshore?—In what way?

101. In any way?—If it is filling it up, most emphatically they have damaged it.

102. And some of these tailings would be washed away?—I reckon they would be washed inshore.

103. And you have told us, I think, that the foreshore has been raised rapidly inshore?—Yes.

104. Then, may we take it that that has been done by the Thames tailings?—I do not know what other tailings would do it.

105. You were here in 1895?—Yes.

106. I am informed that in 1895 the question of this proclamation of the Waihou and Ohinemuri Rivers as sludge-channels was discussed by the Thames Harbour Board and approved by the resolution of that Board: is that correct?—It was not approved. It was strongly fought against, and only carried by a casting-vote.

107. I do not care how it was carried: I am asking you whether it was not approved by a resolution of the Thames Harbour Board?—I suppose it was.

108. You know it was?—Yes.

109. *Mr. Moresby.*] You stated that the depth of the channel was not less, nor is it narrower, but the bottom is harder: now, is there a bank at all on the right-hand side of the channel going out?—Yes, there is a shallow bank of shingle and sand. The bank is from below Opani Point to abreast of Tararu.

110. Where is the shallow bank?—Abreast of Opani Point.

111. Then what does it become?—It goes into shallow shingle and rough sand.

112. How long has that bank been there, to your knowledge?—Since Captain Cook's day. I have seen his chart, and it is on his chart.

113. Has the position altered at all?—Not in my time.

114. Has the bank increased at all?—That I am not prepared to say, because I have not taken the trouble either to survey or sound it, because there was no necessity to do so.

115. Then we may take it that you have taken no observations?—That is so.

116. Have you taken any actual observations yourself as to the velocity of the current, say, at Kopu?—Yes; we tried it some two years ago, and that was about the average—between two and a half and three and a half knots.

117. At what state of the tide?—The biggest run was about two hours after high water.

118. When did you take your observations?—Right through the whole tide. It is marked on the chart.

119. *The Chairman.*] Who made that chart?—It is a copy, I think, of the original chart of the Lands Department in Auckland.

120. What is the history of it?—I think it is a copy of a chart made by Captain Drury before the Thames was a harbour.

121. *Mr. Moresby.*] Can you tell us what the velocity of the tide is, coming in?—It does not run as high coming in as going out. It runs a knot an hour less.

122. *The Chairman.*] And in times of heavy flood or freshes in the river it would be less still?—Yes.

123. What do you consider is the minimum velocity?—About two knots.

124. *Mr. Moresby.*] Can you tell us how long the tide ebbs at Kopu, say?—It ebbs about seven hours and flows about five hours.

125. Have you from any observations you have made yourself observed tailings from the Thames or the banks coming up the river?—No, I have never noticed it.

126. By "tailings" I mean mullock and *débris* of all kinds?—I do not think it is possible for it to do so. There is a tremendous extent of inside channel, and how it could get across the bar I cannot say.

127. I am referring to when a strong north-west wind is blowing?—But that blows right into Shortland Creek, and not up the Thames River.

128. Have you observed any tailings or *débris* going up in the stretch between the fairway buoy and Opani Point?—No.

129. In fact, you have never seen anything of the sort?—No.

130. And you think it is impossible?—Yes.

131. *The Chairman.*] Have you observed any *débris* coming from the Piako end and sweeping round into the mouth of the river?—No; I have never had occasion to be over there.

132. If people say so would you think it credible?—Oh, yes! I have seen *débris* going out of the fishermen's nets.

133. *Mr. Bruce.*] Is not the place where the principal part of the tailings made at the Thames go, the foreshore between the Goods Wharf and the Kuranui Creek?—Yes.

134. Has the Board done everything to retain these tailings on the foreshore so that they would not pass out to the damage of the channels?—Yes: they have always done so for the last twenty years.

135. What amount of tailings would you say there were in that catchment—a million tons—I would not say a million tons, but a good many hundred thousands.

136. As regards the other creeks that enter the Thames, such as the Hape, the Karaka, or Tararu, there is a very small quantity of tailings going into these?—Yes, comparatively.

137. Has the Borough Council at any time removed any *débris* from the foreshore at the mouth of the Karaka Stream?—It is a yearly performance, so far as I remember.

138. They take a large quantity?—Some hundreds of loads every year.

139. These feed the tailings that are on the foreshore; but would that apply to the catchment-area between the Goods Wharf and Hurunui Creek?—No.

140. There are tailings on other parts of the foreshore?—Yes.

141. Which were placed there a good many years ago?—Yes; twenty years ago.

142. Of late years crushing here, unfortunately, has been small?—Yes.

143. The principal mine crushing here during the last few years has been the Waiotahi?—Yes.

144. Did the Board do anything towards compelling that company to prevent tailings going into the harbour?—Yes.

145. Is the method adopted fairly effective?—Yes.

146. Nothing but a quantity of what are termed "very fine slimes" is escaping into the harbour?—Yes.

147. Your instructions are to prevent any persons turning tailings on to the foreshore until they make provision for their storage?—Yes, I believe so.

148. And you carry that duty out to the best of your ability?—Yes.

THOMAS JACKSON examined. (No. 42.)

1. *Mr. Bruce.*] You are Foreman of Works for the Borough of Thames?—Yes.

2. And have been so for the last four years?—Yes.

3. Prior to that, for twenty years you were carpenter for the borough and the right-hand man of the then Foreman of Works?—Yes.

4. So you have been for twenty-four or twenty-five years in the service of the borough?—Yes.

5. During that time has it been your duty especially to look after the drainage of the town?—Yes, the drains and outlets.

6. There is no main sewer through the Thames?—No.

7. The drainage is through shallow channels on the sides of the roads?—Yes, leading into culverts, and then conveyed to the foreshore.

8. Now, in taking your drainage on to the foreshore, the level of the foreshore is the primary starting-point?—Yes.

9. Has that level been altered at all during the last few years?—Yes, considerably.

10. During the last twenty years what has been the extent of the rise in the floor of the foreshore?—About 3 ft.

11. During the last ten or twelve years has the rise been more rapid than during the same period anterior to that?—Yes, rather more rapid.

12. From your knowledge, is the amount of tailings that has been made at the batteries in the last ten years less than in the previous ten years?—On the south end only. The north end is the principal place where crushing is going on. I do not suppose the battery in the Karaka Creek is going six weeks in the year.

13. Previous to ten years ago it was going continually, was it not?—Yes. In the Hape Creek there are no batteries at all.

14. Is there a battery on the Thames side that goes constantly with the exception of the Waiotahi?—No: that is the only battery on the Thames with anything like constant crushing.

15. Is that going one or three shifts?—Up till recently it was going three, but now only one.

16. Do you remember the openings or culverts laid down by the Public Works Department on the railway-line?—Yes.

17. Could you walk through these culverts with ease when they were first laid down?—Yes. One at Shortland I could walk through just by bending the head, and one in Albert Street had about 2 ft. of clearance.

18. And the bottoms of these culverts would then be level with the foreshore?—Yes.

19. Can you walk through these culverts now?—No.

20. Can you crawl through?—Yes.

21. That you consider is very good evidence of the rise in the foreshore?—Yes. That is how I gauge the depth that the foreshore has made up.

22. The borough has been in the habit for some years of removing large quantities of *débris* from the mouth of the Karaka Creek?—Yes. This year we have just completed a contract for 1,000 loads.

23. The usual practice has been to remove between 800 and 1,000 loads?—Yes. We have removed as much as 1,500 loads in one year.

24. This annual removal of tailings from the Karaka has only been practised during the last ten or twelve years?—Principally. There was very little previous to that.

25. *The Chairman.*] You use the term "*débris*": do you mean gravel?—No; it is gravel and everything mixed—mullock, &c. It is used to fill up low-lying places.

26. *Mr. Clendon.*] You omitted to mention the ore that has been crushed in the Tararu Creek?—Yes, they have a battery there.

27. What quantity has been crushed in the Tararu Creek during the last three years?—I think the battery was only running one shift, but lately it has closed down altogether.

28. Can you give any idea of the quantity of ore crushed in the Tararu Creek in the last two or three years?—No.

29. What has been the rise in the foreshore between Tararu Creek and the Kuranui Creek?—That has not filled up such a great deal.

30. Has it filled up at all, and, if so, to what extent?—I do not think it has filled up at all. It depends on the wind, which brings the gravel up and down.

31. What has been the rise from the Kuranui Creek to the Karaka Creek?—About 3 ft.

32. From the Karaka to the Kauranga?—That will be much about the same.

33. Would you say or would you not say that the railway along the sea-shore has been a factor in the raising of this level?—I do not think so. It is outside the railway.

34. But has the railway played no part in the raising of it in the westerly winds?—I do not think so.

35. Have you made any examination of the foreshore at all outside the level you have spoken of?—No.

36. *The Chairman.*] Have you ever walked out on the beach at low water?—Not far out.

37. Is it too soft?—It is soft, but it is considerably harder than it was previously.

38. *Mr. Clendon.*] You told us you have been in the habit of taking away 1,000 to 1,500 loads from the Karaka Creek: what quantity comes down yearly?—That is about the quantity. We usually take away everything that comes down. We have just finished taking away 1,000 loads for the last year.

39. And the previous year?—Fifteen hundred loads, which contain a yard and a quarter.

40. You cannot say whether the up-country tailings and slimes have had anything to do with the raising of the foreshore?—I cannot say at all.

41. *Mr. Vickerman.*] In reference to the raising of these culverts from the railway, is it not simply because they have not been cleared out?—No; they have their level right through.

CHARLES TAYLOR examined. (No. 43.)

1. *Mr. Bruce.*] You are a member of the firm of Taylor Bros., fish-merchants, of the Thames?—Yes.

2. You entered upon this business about two years ago?—Yes.

3. Prior to that you were for a number of years engaged in fishing?—Yes.

4. You were the owner of your own boats and gear?—Yes.

5. How many years ago is it since you started fishing?—About seventeen or eighteen years ago.

6. At that time what was the state of the bottom of the foreshore right round within the Port of the Thames—I mean, above low-water mark?—Of course there were always patches of soft and hard, but there is more hard now than there used to be.

7. At that time was not the foreshore, generally speaking, of a soft, oozy mud?—Yes.

8. But the bottom now is hard?—Yes.

9. Has the bottom become perceptibly harder, say, during the last six or seven years?—Yes.

10. Prior to this, fishing-poles were pushed down into the mud to fasten the nets?—Yes.

11. I presume that was fairly easy work?—Yes.

12. Of late years what has been the position?—Anchors have taken the place of the poles, because it is too difficult to drive the poles through.

13. The poles would be much more preferable?—Oh, yes!

14. You know the Thames River very well?—Fairly well.

15. You used to fish up the river?—Yes, a good deal.

16. How far from the mouth?—As far as what we call Whitehouse's, which is the reach above Turua.

17. Did you fish successfully there?—Yes, very.

18. Up till when?—Till about seven or eight years ago, and it has gradually fallen off since.

19. *The Chairman.*] Is that the quality or the quantity of the fish?—Quantity.

20. The quality is the same?—To a certain extent—not the size so much, but we get a great many dead fish.

21. *Mr. Bruce.*] Do you attribute the falling-off in the quantity of the fish to the bottom becoming harder?—Well, yes. The mud at the bottom has become different. The silt is taking the place of the natural sea-mud.

22. *The Chairman.*] How do you know that the silt is now taking the place of the natural sea-mud? What are your reasons for making that statement?—I am strongly of that opinion.

23. Have you any reasons, or is it only an opinion?—Well, certainly I have my reasons.

24. You have given us one—the larger number of dead fish?—Yes. We could also see the difference in the colour of the mud. It is much whiter than it used to be, and of course we attribute the bottom becoming so much harder to that.

25. May it not be due to the fact that the place has been overfished, and that the natural food of the fish has been eaten out?—If that was the reason I believe it would apply elsewhere, but across the flats it does not. Why should that be an exception?

26. I do not know: I am asking you?—I fail to see why there should be any exception.

27. You do not think it is so?—I do not.

28. Do you think there is as much shellfish and food on the flats as there used to be?—Yes, exactly.

29. So there is no loss of life in the shellfish?—Well, when you get well clear of the rivers there is no difference, but it has affected round the rivers.

30. *Mr. Bruce.*] And also the portions of the flat abutting on the river?—Yes.

31. You contend that wherever the bottom has become hard the fish-food has been destroyed?—Yes, where it is hard through what we think is the silt.

32. That is to say, it is more difficult for the shellfish to get through the crust than if it was soft?—Yes.

33. In your opinion, is it on account of the tailings of the Ohinemuri district being taken into that river and being brought down that the bottom has become harder?—Yes.

34. And the tendency of that hardening is to reduce the fish?—Yes.

35. *The Chairman.*] So far the witness has been merely giving evidence in regard to the foreshores: what about the part outside that is not uncovered at low water? Do you think that has become harder on the bottom, too?—I do not think that it is affected perceptibly.

36. *Mr. Bruce.*] There used to be good fishing opposite the town on the eastern bank of the river?—Very good.

37. Is it so now?—It is very exceptional to be anything of consequence now.

38. The waters inside the river from the mouth up to Turua have always been of a dirty nature?—Yes, owing to the scour of the tide.

39. Have you noticed any difference in the colour of this water of recent years?—Yes.

40. At what state of the tide?—On the strong ebb tides of spring tides it is whiter than with the usual current.

41. *The Chairman.*] Captain Bayldon told us that at the slackest time there was always a velocity down the river of two knots: how can you have the harbour-mud up as far as Turua against that current?—A strong current runs up on the flood tides

42. Do you agree that running up with the flood there is a minimum velocity of two knots running out?—Yes.

43. And three and a half on the ebb?—Yes, about that.

44. And that carries the mud up as far as Turua?—Yes.

45. *Mr. Bruce.*] Is the main fishing in the Thames River from the mouth to a point opposite Kopu?—Yes, from Opani Point to abreast of Kopu.

46. How many boats have you seen at one time engaged fishing there?—Twelve to fourteen is the most.

47. The average would be about eight to ten in the season?—Yes.
48. And all fairly successful?—Yes, fairly.
49. What is the position now? Is that a good fishing-ground?—It is not to be compared with what it was.
50. As compared with eight to ten boats formerly, what would be the number now?—You seldom see one.
51. The average would not be more than one?—No.
52. *Mr. Mitchelson.*] What is the distance between the points you refer to?—Scarcely a mile.
53. *Mr. Bruce.*] Of course, all localities of the fishing are liable to good and bad times?—More or less.
54. But in regard to this particular part of the fishery, would you say it was always bad?—It is very exceptional if it is good where some few years back it was the reverse. It was exceptional if it was bad through the summer.
55. During the time you were fishing some years ago, was the river up to where you used to fish fairly full of fry and young fish in the season?—Yes, in the warmer months.
56. Do you consider that the fish spawn in these fresh-water rivers?—Yes.
57. Would one find the same amount of fry that one would find, say, ten years ago?—No.
58. Nothing in proportion?—No.
59. Do you find any at all?—Very small quantities.
60. This applies to the Thames River?—Yes.
61. Does it apply to the Piako River?—No.
62. The fry in the Piako is as ample in the season as ever?—Apparently so.
63. Occasionally, you are aware, there are a good many dead fish—eels and flounders principally—in the Thames River?—Yes.
64. You very often find these fish delivered at your freezing-works?—Occasionally.
65. You know they are stranded and dead fish?—Yes; we know the difference at once.
66. During the time you were fishing there did you ever see anything similar to that?—Yes, as many as four or five dozen fish on one ebb tide.
67. Did you see anything of that kind when you were fishing prior to some years ago?—No; it is only of recent years.
68. How many years?—Something like six or eight years.
69. Would it be possible for a net left down between a tide to account for this?—To a certain extent; but a fisherman would know the difference between a fish merely drowned in a net and one killed.
70. What is the size of the mesh?—Four-inch.
71. Would an eel drown in a 4 in. mesh or a 3 in. mesh?—No. There are very few eels in the river we would catch.
72. Would you occasionally get dead flounders in a net, supposing the net was left down during the length of a tide?—Occasionally you would get one.
73. But, as a rule, do the flounders get killed in the meshes of the net?—They do, more or less. Occasionally they break away when drowned, and we should get them again.
74. Supposing a net were left down in the river, say, on a flood tide, and it was not drawn, I presume that net would be swept above the poles on the reversing of the tide, and would swing in and be practically turned inside out?—Yes.
75. And you consider any fish caught on the flood would be tossed out on the turn of the tide?—Yes. Of course, it is against our interests to allow the fish to go out. We take them out before the tide has finished running.
76. Is it the practice of any persons that you are aware of to leave the nets down?—Over a slack tide during the fishing.
77. Supposing a fisherman were fishing the bank, say, in any portion of the Thames River, and was going into Shortland to sell the fish, and not going back the same day, would be lift his nets?—Yes.
78. Always?—Necessarily he would.
79. If a fisherman was merely going to Shortland with fish and for a supply of food, he would not deem it necessary to lift them?—Of course, he should return before the tide turns.
80. You are satisfied the dead fish are due to something coming down the river?—Yes.
81. The prevailing winds at the Thames are from south-west to north-west?—Yes.
82. And they cause the silt to settle along the foreshore?—Yes.
83. What is the value of the boats and gear engaged in the fishing industry here?—I should say somewhere about £20,000.
84. They are principally oil-launches?—Yes.
85. *The Chairman.*] We have had it in evidence that there are about forty-two or forty-three boats engaged here: what is the value of each one—about £500?—The boats and gear would represent about that.
86. What is the general tonnage of the best boats?—Three or four tons.
87. What horse-power engines? They range from five to twelve. There is a lot of gear. I had at one time 150 pounds' worth of gear myself.
88. How many boats was that for?—One boat.
89. *Mr. Bruce.*] Have you any idea as to the annual value of the fish caught here?—I have never gone into it closely.
90. So forty boats are engaged in the fishing. What would be the average catch per boat per week?—I should say £6 or £7.
91. Taking an average all the year round?—I should say about that.
92. *Mr. Mitchelson.*] How many in each boat?—Usually two; sometimes there are more.

93. *The Chairman.*] We have it there are forty-two boats engaged: how many men are engaged in them, do you think?—I should say about a hundred.

94. These are all in and around the Thames?—Yes.

95. *Mr. Bruce.*] What is the most you ever made in one week?—Thirty-six pounds. Others have made more.

96. You were generally recognized as a hardworking and successful fisherman?—I think so.

97. *Mr. Clendon.*] Were there any oil-launches seventeen years ago?—No.

98. And how many fishing-boats?—Fifteen or twenty boats.

99. How do you compare the number of fish caught now by these forty-two oil-launches with the number caught by these sailing-boats seventeen years ago?—I think there would be three or four times as much caught now.

100. Would the presence of these forty oil-launches fishing daily in the gulf have any effect on the scarcity of fish in the river?—Well, if the fish came into the river they would thin them out quickly.

101. Does not the presence of these forty oil-launches fishing in the gulf show the reason of the scarcity of fish in the river at times?—No, I think not.

102. You only fish in the river during the summer months?—Generally. Of course, we have fished all the year through in the river.

103. Would you be surprised if some fishermen go into the box to-day and state that last summer was one of the most successful summers they have had in the Thames River?—I should not be surprised at anything.

104. To what cause do you attribute the dead fish?—In my opinion it is the difference in the bottom of the river—to the mud changing its nature.

105. Are there not some fishermen who set their nets on Sunday morning, and leave them set until Friday night, working them all the time except when they are delivering their loads to the steamers?—I will not say it has not been done.

106. Is it not very frequently done?—Yes, that has often been done.

107. Would that fact conduce to the death of a number of fish?—Not if they worked the nets regularly.

108. That is, the nets have to be worked once on the ebb and once on the flow?—Yes.

109. And do fishermen sometimes go to sleep and fail to work the nets once on the ebb and once on the flow?—Yes, a few.

110. Are there not a number of Maoris and settlers who leave their nets constantly in the Thames River below Turua?—Not while I have been fishing. I have not been fishing for the last two years.

111. Do you mean to say that none of the residents of Turua were fishing during the time you were fishing in the Thames River?—Occasionally.

112. Did they leave their nets set all the time?—No, they dare not.

113. You said it was not easy to drown an eel: is it not a fact that when the nets are being overhauled a number of eels slip into the dinghy?—Occasionally a few do.

114. Have you taken any samples of this hard bottom in the Thames you have spoken of?—No.

115. For the last two years you have had no personal knowledge of the Thames River?—No.

116. Would the fact of small fish such as whitebait being killed up the Thames River affect the scarcity of fish at the mouth, or conduce to that scarcity?—Not of flounder, I think.

117. You stated there was £20,000 invested in boats and gear: tell us the biggest price paid for a fishing-boat here?—I do not know.

118. What did you pay for yours?—The boat was a little over £300.

119. The gear, as a rule, I suppose, represents £40 or £50?—I have had as much as 150 pounds' worth.

120. I am taking the average fisherman: what is the value of his gear—more than £40?—I should say more than that. I should say nearer £100. I should say about £80 or so.

121. Are the nets used now longer and bigger than the nets used seventeen years ago?—About the same.

122. Is the bottom any harder on the western side of the gulf now than it used to be?—I did not notice any difference.

123. Which particular area, to your knowledge, is harder than it used to be?—All along this side, from Opani Point to Tararu Point.

124. What other area?—That is all I know of.

125. Do you notice any falling-off in the fish in the Piako River?—Not while I was fishing there last—two years ago.

126. Is it not an accepted fact that the fish have gone into deeper water in recent years owing to the number of fishing-boats?—I do not know about going into deeper water, but more boats catch them quicker coming into shallow water.

127. There are other freezing-works besides yours on the Thames?—Yes.

128. And both of these works send large quantities of fish to Auckland?—We do not.

129. Does the other firm?—Yes.

130. Do you not send large quantities of fish daily up-country?—Yes.

131. For how long have you been doing so?—About two years.

132. Is it not a generally accepted fact that the fishing industry on the Thames is in a more flourishing condition now than ever it was?—There is more fishing, and more fish caught and sent away.

133. Have the quantities of *débris* and peat coming down the Piako and Waitakaruru Creeks had any effect on the fishing industry?—It impeded the catching of the fish for a little while.

134. Has it got over it now, or is it still affecting the industry to a certain extent?—I do not know. I have heard no mention of it lately.

135. *Mr. Myers.*] When did you establish your freezing-works?—Nearly two years ago.

136. And when did the other firm establish its freezing-works?—About six or eight years ago.

137. And may we take it that your own business has increased of late years?—Yes.

138. I hope that with your business your profits increase according to your statement?—I expect they do.

139. So that you have nothing to complain of personally?—Of course I have the interest of the fishing industry at heart.

140. I suppose you will act upon the principle of live and let live?—Yes, certainly.

141. Then why should you, who have been increasing your business and profits, and catching more fish and selling more fish, complain, or what do you complain of?—If I can see a way to do it much better still, and I am impeded, why should I not?

142. But you have already said that a larger quantity of fish is caught now than ever before?—Yes.

143. Would you mind telling me what was the best fishing-ground in this neighbourhood, say, ten years ago?—The Thames River for three months in the summer.

144. And at other times?—Different parts of the flats, according to the weather.

145. And I suppose it is fair to assume that a fishing-ground would vary?—More or less.

146. What is your best fishing-ground now?—I do not know, as I am not fishing at present.

147. But you have a pretty good general knowledge: you make inquiries amongst your men?—Yes.

148. Are there any particular fishing-grounds at the present time which are better than the same fishing-grounds were some years ago?—There is none but the Thames River I see any difference in.

149. The number of fishermen and of boats have increased since seventeen years ago: has there been an increase in the last five or six years?—Yes.

150. And there is no reason to believe that they are not all making a living?—No.

151. And some of them doing very much better?—Yes.

152. You have spoken of the number of dead fish?—Yes.

153. Do you suggest that these fish have died of starvation, or of what?—Of course, it is flounder principally. They are fish that live on the bottom, principally in the mud; and put them into silt instead of sea-mud, and they are lost. It may be starvation then.

154. I suppose fish are like everything else—if they cannot get food in one place they will go to another?—Yes, if it is not too late.

155. Then you would suggest these fish have been killed practically by starvation?—Yes.

156. *The Chairman.*] Are the fish found dead very thin, and do they show signs of emaciation?—No.

157. It is not a slow lingering death, but a sudden death?—Of course, we have not analysed them exactly. They may be blown out with wind and water.

158. *Mr. Moresby.*] Of your own knowledge, you do not know what the conditions are in the Waihou at the present time?—No, not since two years ago.

159. Have you yourself noticed any silt in the river, or what you know as to silt?—I have noticed the difference in the mud.

160. Have you taken any steps to see if there was any on the banks?—I have never taken any up and had it analysed.

161. Do I understand from you that, while fishing is bad in the Waihou, it is good in the Piako?—Yes, while I was fishing there.

162. Do you know Mr. Reddish?—Yes.

163. I think he gave evidence before the Warden a few months ago?—Yes.

164. On that occasion it was stated that your evidence would be the same as his?—Yes.

165. With your consent?—I did not hear his evidence, but I assume it would be practically the same thing.

166. Mr. Reddish in the evidence says, "There are more fish caught now than were caught five years ago. Occasionally catch fish in Piako. Not much fishing done there"?—Well, I agree that it is occasional.

167. But he says there is not much fishing done in the Piako?—It depends on the time of the year.

168. You have given the Commission to understand that the fishing has not fallen off in the Piako, and that there is a plentiful supply of fish there; but that it has fallen off in the Waihou?—Yes, in the season.

169. Do they not only occasionally fish in the Piako, and there is not much fishing done there at all?—Only in the season.

170. You admit there is not much fishing done in the Piako?—Not at this time of the year.

171. Do you think the evidence given by Mr. Reddish in respect to the Piako is pretty correct?—Yes.

172. You estimate the value of boat and gear at £500?—About that.

173. Is that an average value?—Hardly the average. It is rather overestimated, taken right through.

174. Do you not think that half would be nearer the mark?—No, nearly £400.

175. Mr. Reddish says, "I should think £300 fair value to put down for each boat, including fishing-tackle": do you agree with that?—Perhaps you will call Mr. Reddish for yourself. I have not gone into the figures exactly—it is merely a rough estimate.

176. I think the class of anchors used are mud anchors?—Yes; we have specially large flukes to hold the mud.

177. Do these anchors hold on hard ground?—Equally as well.

178. *Mr. Flatman.*] Where do you find most dead fish?—In the Thames River only.

179. There has not been the same result in the Piako with the fishing there?—No.

180. To what do you attribute that difference?—I can only attribute it to the bottom changing. If it were the nets doing it, we should get them equally in the Piako as in the Thames River.

181. The bottom has not changed in the Piako in the same manner as in the Thames?—No.

182. *The Chairman.*] Does the Harbour Board charge wharfage on all fish going out of the Thames by sea?—Wharfage on fish has only been charged in the last twelve months.

WILLIAM REDDISH examined. (No. 44.)

1. *The Chairman.*] Did you give this evidence before the Warden's Court on the 30th September, 1909: "William Reddish, on his oath, saith: Fisherman residing at Thames. I have been fishing all my life. There has been a marked difference in the fishing in the river during the last few years. The river used to support six or seven boats, and now a boat or two just go there occasionally. No fish there to catch. I think the fish are deprived of the food they used to get in the river. Something hard has formed on the bottom of the river in place of mud. Used principally to catch flatfish in the river. We get flounder both in deep water and on the flats. Flounders in the river get their food amongst the sea-worms and crabs which they get on the mud. The coating of the mud with this hard substance prevents the fish getting their food. The weather has an effect on the fishing—bad weather prevents us fishing. In summer-time we could formerly fish on the river when we could not fish outside. In summer-time we fish in shallow water. Formerly we used to get a good deal of fishing in the river—it is not so at the present time. We used generally to set our nets with long poles. We cannot do that now because the bottom is hard. This is between Opani Point and Kopu. About five hundred people dependent on fishing. About forty or fifty boats engaged in fishing. The fisherman after his expenses are paid should make £4 per week. His gross returns should be about £6 per week. The average is about three men in a boat—perhaps not quite that. I think it would be fair to say that after paying expenses about £20,000 a year is made at Thames by fishermen. The market price for flounders is 7d. per dozen for small and 1s. 9d. per dozen for large. In summer-time the retail price would be about double that. There are two freezing-works established at Thames in connection with the fishing industry. I should think £300 fair value to put down for each boat—including fishing-tackle. *Cross-examined:* During last five years fishing-boats and men have increased. Have noticed decrease of fish in river for perhaps last five years. Fish as a rule never go out of a river that is a spawning-bed. This river is a spawning-place. Only catch a few there now. There are more fish caught now than were caught five years ago. Occasionally catch fish at Piako. Not much fishing done there. *Re-examined:* A few years ago fishing was done by sailing-boats; it is all done now by oil-launches. That is the sole reason why there are more men employed in fishing and why more fish are caught"?—Yes.

2. Is that evidence correct?—Yes.

3. Do you wish to add anything to it or take anything away from that evidence?—I do not think so. I may say that £300 only included the launch—it did not include the tackle. My boat cost £300 without the tackle.

4. What did your tackle cost?—I could not say exactly. Something under £100.

5. Your tackle wears out very considerably?—Yes.

6. *Mr. McVeagh.*] How long has the fishing industry been established at the Thames?—Something like thirty years.

7. During that time have any steps been taken by the Government to establish protected or breeding areas?—Not that I know of.

CECIL HAYWARD examined. (No. 45.)

1. *Mr. Bruce.*] You are a fishrman?—Yes.

2. *The Chairman.*] You have heard the evidence of the previous witness, and confirm it in every particular?—Yes.

JAMES MONTEITH MCLAREN examined. (No. 46.)

1. *Mr. Bruce.*] Up to two months ago you have been Engineer to the Thames County Council for a number of years?—Yes, for about twenty years.

2. You were also at one time District Engineer for the Auckland Provincial Government?—Yes, in the early days.

3. The area of your district at that time would take in Ohinemuri?—Yes.

4. In September last did you have any samples taken out of the drains at Cryer's Landing, Wharepoa, and Omahu?—Yes, out of the swamp drains.

5. And also from the bed of the river near Turua?—Rather above it.

6. *The Chairman.*] We had evidence that there was a heavy flood in September: was that sample taken before or after that flood?—It was shortly after it.

7. *Mr. Bruce.*] You took these samples for the purpose of discovering whether fine slimes from the tube mills in operation at Waihi and Karangahake were coming down the river?—Yes. Different statements were being made that they were not reaching there, and I took the samples to prove the point.

8. What did you do with the samples?—I brought them to the Thames and handed them to Mr. Baker, Director of the School of Mines, to analyse.

9. Are these the samples returned by Mr. Baker after treatment, together with this report?—Yes. [Exhibit No. 31.]

10. *The Chairman.*] Will you tell us where you took the various samples from?—No. 1 was from Cryer's Swamp Road, near the river.

11. What portion of the river?—Just opposite where the barges get sand.

12. Was the drain you took it from under water?—It was fairly dry.

13. How far from the river-bank?—About half a chain. Sample No. 2 is from the same drain half a mile from the river. No. 3 is from the Wharepoa Road drain on the south side, half a mile back from the river. All are from the bottom of the drain—not the sides. I may mention this is under tidal influence. No. 4 is three samples in one from the bed of the main Thames River near Turua, at low-water mark. We took it out with a baler from a flat-bottomed punt.

14. These drains have no connection with the hills at all?—No; there are no streams running into them.

15. *Mr. Bruce.*] Up to eight years ago there was always a sandbank in the Thames River opposite Turua?—Yes.

16. Is it there yet?—Yes.

17. But at that time it was practically one at low water?—It was one at half-tide.

18. With a fairly deep channel on each side?—Yes.

19. About that time you were looking for a suitable site in the Thames River to fix a ferry?—Yes, in 1902.

20. And you hit upon this as a favourable spot?—I made a survey, and took depths and everything else. This is the plan I made [Exhibit No. 32] in connection with the report I made fixing a ferry at this spot. I have also a little map I made of the locality shortly afterwards. In January, 1903, nine months afterwards, the channel was quite closed, and a bank had grown over the place where I had previously had 1 ft. 6 in. to 2 ft. 6 in. of water. Consequently the scheme for a ferry had to be abandoned.

21. Have you thought out the cause of that eastern channel being filled up?—I took it to be owing to the immense amount of silt coming down the river; for I had known that channel to be open for thirty years before that.

22. Would this be mine-silt or battery-silt or silt from the drainage of the country?—I took these samples to prove what it was. It is very difficult to say unless you analyse it.

23. *The Chairman.*] You practically took these samples only recently, then?—Yes, for a case before the Warden's Court.

24. *Mr. Bruce.*] In 1876, when you were District Engineer for the Provincial Government, did you have the Ohinemuri snagged at any time?—Immediately after the opening of the gold-fields I got instructions, and had the river snagged from the junction with the Waihou at Paeroa to slightly above the present county traffic-bridge.

25. Shortly after that snagging did the Government steamer "Luna" go up the river with Sir Donald McLean?—Yes; I saw her at Paeroa.

26. Have you viewed that locality recently in passing through?—Yes; I was up about twelve months ago.

27. Do you think the "Luna" could get up there now?—No.

28. How far do you consider the bed of the river has been raised at that point?—I had about an hour to spare, and I went over it just for my own satisfaction, and I reckon, after raising these large trees and snagging the river we had about 7 ft. of water under ordinary conditions, and without heavy rains, below the bridge. I consider the bed of the river has risen actually 7 ft. or 8 ft. now compared with what it was.

29. *The Chairman.*] You say the bed of the river has risen, and the water-level has risen with it, 7 ft. to 8 ft. about what is called Snodgrass's Landing?—Yes.

30. In other words, there is some 7 ft. or 8 ft. less bank above water-line now than there used to be?—Yes.

31. Where there is 5 ft. now there used to be 12 ft. and 13 ft.?—Yes.

32. Therefore, at the present time a very much less flood by some 7 ft. or 8 ft. will spread over the land?—Yes. The width appeared to me to be very much the same.

33. *Mr. Clendon.*] I suppose you have read in the papers the evidence given before this Commission at Paeroa?—I read some of Mr. Metcalf's report. I missed some of the evidence.

34. Were you an official of the Thames County Council in 1895?—Yes.

35. Did your Council approve or disapprove of the proclamation of the Ohinemuri River as a sludge-channel?—I do not know that the matter was ever referred to them. I do not remember. It was never referred to me.

36. Were these three samples taken by you from above or below Hikutaia Stream?—Below.

37. Does the Maratoto Stream run into the Hikutaia?—Yes, it is a branch of the Hikutaia.

38. Have mining operations been carried on for a great number of years on Maratoto and Hikutaia Streams?—Yes; pretty extensive at Maratoto, but not at Hikutaia.

39. Have not quartz or tailings from Maratoto come down the Hikutaia Stream into the Thames River?—I cannot say, because it is out of my district.

40. Is not the Hikutaia Stream the boundary of your district?—Yes.

41. Is it not a fact that large quantities of white sand similar to tailings come down the Hikutaia Stream every year?—About thirty years ago a great fresh took away a great deal of land and a lot of whitish-brown sand.

42. You took one sample from this bank opposite Turua?—There were three samples in one taken at different places about a chain apart.

43. Can you tell the Commission of what that bank opposite Turua is composed?—I should call it a sandbank.

44. River-sand?—Yes.

45. I think it is red in colour?—Light chocolate in colour.

46. Is there a good deal of drainage from the Hikutaia district to the eastward of this bank?—Yes.

47. Would that play any part in the raising of this bank?—No; the bank was there before the drains were made.

48. But not to the same extent?—No.

49. Can you say that the drainage from Maratoto has not played a part in filling up this bank?—Everything tends in that direction.

50. Would not the tailings from the Thames foreshore in a north-westerly gale help to increase the height of that bank?—I do not think so. It would not blow tailings up.

51. Well, sand and silt?—No.

52. We have expert evidence that Thames sand and silt have been found in the vicinity of this bank: what do you say to this statement?—The statement cannot be. Not Thames tailings; they cannot travel uphill. There may be tailings, but not Thames tailings.

53. Did you take these samples yourself?—Yes. Mr. Baker had nothing to do with it.

54. *Mr. Tunks.*] You said you have read a copy of Mr. Metcalf's report that was published?—Yes.

55. You see he says there that the presence of willows had a great deal to do with catching the silt: do you agree with him in that?—Yes.

56. *Mr. Moresby.*] Have you seen that portion of the Ohinemuri River just below the bridge behind the present Criterion Hotel lately?—About a year ago.

57. Was it high and dry then, as it is now?—Yes; there was no flood on.

ANGUS McKINNON examined. (No. 47.)

1. *Mr. McVeagh.*] You have been fishing in and about the Thames for the last six years?—Yes.

2. Have you an oil-launch?—I have been fishing in an oil-launch, and in a sailing-boat before that.

3. Do you fish in the Thames River?—Yes.

4. I think you have a season for fishing?—Yes, in the summer months continuously.

5. Not during the winter?—No.

6. Why?—There is too much fresh water in the river, and the fish do not go there.

7. How far up do you fish that river?—As far as Mr. Whitehouse's—that is, above Turua.

8. Have you noticed any decrease in the number of fish to be got in that river?—Not since I have been fishing. In fact, last season was better than the two or three seasons previously.

9. Has there been any falling-off in your earnings?—I was not fishing last summer. I have a brother-in-law fishing, and he told me he had done better last season than for two or three seasons.

10. Is the quality of the fish good, too?—Yes.

11. We have been told that dead fish have been seen floating down the river sometimes: I think you can explain how that arises?—It is very simple. In the first of the season we never get them at all. Later on, when we get them, the fish do not look as though they had been starved or killed, because they are all healthy-looking fish when we get them.

12. I think you know how it happens that you see so many?—I suppose I have killed a good few in the nets one time and another. Fishermen who fish all day and night towards the end of the week may oversleep and miss the turn of the tide, and then all the fish that are in the nets are gone and they are dead.

13. I think you know some people who fish like that?—Yes, I know two or three people at Turua who leave their nets down from one week to another and never go near them except once or twice a week.

14. Why do they leave them so long?—Because they cannot sell all the fish they catch. Another reason is that they have only got a little dinghy, and they cannot always get to the nets.

15. Can you tell us anything about the character of the bottom of the channel?—I have not noticed any difference since I have been fishing. There was always a hard crust underneath, and about from 6 ft. to 8 ft. of soft mud on top.

16. Have you any notion of what the fishermen average per week here?—I cannot give you any idea. I only know what I made myself.

17. What did you make yourself?—While I was at it it was a very poor week in the summer months when I did not make £5, and even very much more.

18. I think you made a big catch in the last summer you were fishing in the Thames River?—Yes, I made two or three. We have had £8 and £9 on several occasions. I believe the last week I had £9.

19. Was that £9 for one or two men?—One, myself.

20. *Mr. Bruce.*] You have no fishing-boat of your own?—No.

21. And never had?—No.

22. You have been about six years at the fishing?—Yes.

23. Constantly?—No. I generally fish in the summer-time and go into the bush in the winter. I have fished one or two years all through.

24. You have never noticed any appreciable difference in the bottom of the foreshore during the last six years you have been fishing?—Not the slightest difference. I pay rent for a boat, but I have my own nets.

25. How many hands besides yourself in that boat?—Only two of us.

26. You distinctly say you see no appreciable difference in the bottom of the harbour?—Not the slightest.

27. If other witnesses say so, would they be saying what was untrue?—I should think so.

28. And they are not to be believed, and you are to be believed?—It is a matter of opinion. I think I have fished more in the river. Three of us fished more in the river than any other fishermen.

29. Would you back your opinion against that of the three witnesses who were in the box this morning?—Yes. I have fished ten times to their one during the last six years.

30. *Mr. Moresby.*] How long is it since you fished at Whitehouse's place?—The summer before last.

31. Is that your general place for fishing?—No; from pretty well the mouth of the river to Whitehouse's. We change about in the river according to the tide.

32. Do you fish outside at all?—Yes, down the coast generally.

33. Have you made any observations on your own account in the river by taking up samples from the bottom?—No. I merely judge because we use poles to fish.

34. You use poles, and not mud-anchors?—No. We might use one or two. We use anchors outside. We do not use poles outside.

35. Do you think there is any difference in the velocity of the tide as it goes out and comes in?—It is according to the wind. In a northerly wind it runs much stronger than the ebb. That is in the summer-time when there is no fresh at all. I know that because we have often to take our nets up on the flood when we can leave them down on the ebb. I am not able to judge the average pace of the tide.

36. *Mr. McVeagh.*] Have you noticed dead fish in the gulf as well as in the river?—I have. We very often get dead fish away down the coast.

37. *The Chairman.*] I suppose these dead fish are not stinking?—Sometimes they are.

38. *Mr. Vickerman.*] Would these dead fish on the coast come from the Thames River?—No, because they are mostly schnapper.

Statement by FREDERICK HAYWARD. (No. 48.)

Mr. Clendon asked for and received permission to hand in the following statement by Frederick Hayward, who could not attend the Commission that day: I am a fisherman. Have been fishing for six or seven years. Have fished a good deal in the Thames River, as far up as Whitehouse's. We fish in the river for four or five months, starting in December. The quantity of fish in all the beds is about the same as when I started fishing. Fish has not decreased in Thames River. I do not consider that silting has in any way affected fishing industry on the Thames. The fish we catch in the river are just as healthy as those caught in the gulf, and just as saleable. There is just as much fishing done in the river as when I started. I have not noticed any difference in the channel of the river or at the mouth. There are more fish in the aggregate now, but they are more widely distributed. I earn about £3 a week fishing. My earnings six or seven years ago were about the same as now. I caught as many fish last summer as in previous years. I have found no difference in regard to the bed of the river in late years. It is just as soft as formerly. There are about eighty-four fishing-launches registered on the Thames, but of that number several have ceased fishing. There are about forty launches fishing now. There was never more than that number actually fishing at one time. The average number of men per boat is two. There are about a hundred men fishing. I have caught dead fish in my nets. This is due to the nets not being worked once on the ebb and once on the flow of the tide. If the nets are not lifted before the tide turns, the fish are drowned. Some of the fishermen leave their nets set all the week in one place. I have often found dead fish in the gulf, due to the cause mentioned. Some of the settlers on the river neglect to work their nets, and this is the cause of many fish being drowned.

PAEROA, MONDAY, 30TH MAY, 1910.

Mr. Mueller: There was a report by Mr. Perham which has been mentioned previously. I have had a few copies of it made, and, as promised, I now formally hand one in. [Exhibit No. 34.] In connection also with the evidence given by Mr. Niccol, the secretary of the Silting Association, as regards the offer made by Mr. Forrest, Mr. Niccol has just handed me a copy of the *Ohinemuri Gazette* of the 2nd April, 1909, in which the matter is mentioned. The statement reads as follows: "Mr. Forrest referred to the statement made by Mr. Barry that it would cost 5s. per ton to take the tailings out of the river, and said that he would be prepared to move the tailings to the Waihi Plains for 1s. per ton, provided no difficulties were raised by the Waihi Company. The highest price ever given for moving stuff that did not require blasting was 1s. 6d., and for that price it was taken two or three miles, while the price was as low as 9d."

Mr. McVeagh: Mr. Chairman and gentlemen,—As you are aware, I am counsel for the Waihi Borough Council, one of the bodies upon which a distinct attack appears to be made by the terms of the Commission which has been addressed to you by the Governor. One of the instructions contained in the Commission is to investigate and report whether a proportion of the cost of carrying out remedial measures should not be a charge against the revenue derived by the local bodies in the vicinity of the rivers from the mines using the watercourses as sludge-channels. Now, there are only two local bodies concerned, the Ohinemuri County Council and the Waihi Borough Council. It is therefore quite clear that a suggestion has come from some source for a diversion of a portion of the revenue which is received by one or both of these local authorities. Therefore the Waihi Borough Council finds itself in the position of appearing before you by its counsel with a view to explaining why this revenue should not be interfered with. Before I proceed to deal

particularly with what I may term the facts of the case—before I proceed to expound the reasons that the Waihi Borough Council puts forward as showing why its revenue should not be diverted—I wish to invite your attention briefly to the law bearing upon the question. It find it necessary to do so, and I am not going to put it before you in any legal or academic manner. I shall endeavour to make myself as clear as possible to laymen in legal education, but most of whom, I am aware, have had during the course of their lives a great deal to do with the concerns of local bodies, and a great deal to do with the administration of Acts regulating these local bodies. We have had during the whole of last week a large body of men, who have come here and who have told you that their properties have been seriously injured by the discharge of tailings and mining *débris* into the Ohinemuri. We will not question that, in a large number of cases, there has been injury, and serious injury, done by the discharge of tailings. It is obvious to any man who visits the ground affected and who uses his ordinary senses of observation. But what we do wish to invite your attention to is to consider what is the legal position of these persons, what legal rights they have, what their claims are, and what legal rights, what vested interests, the people or bodies have against whom these claims are evidently made. As far back as 1875, in consequence of a decision of the Court of Appeal of this country, the Governor in Council was empowered by Act of Parliament to declare rivers to be sludge-channels into which it would be lawful for owners of mining properties to discharge tailings and mining *débris*. That has been the law of this country for a period of thirty-five years. But in order that justice might be done to any one who was injured by the discharge of these tailings, there was provision made that compensation might be claimed within a limited time by any person who is injured by the exercise of the rights conferred by the Proclamation made pursuant to Act of Parliament. There was also a further provision, and that is a very important one—namely, that as regards all lands alienated from the Crown subsequently to the 21st October, 1875, the holders of these lands held them subject to the right of owners of a mining property to discharge tailings into the river. They had no claim for compensation. That has been the general policy of the legislation of New Zealand for a period of thirty-five years; and, therefore, I would put it to you that one of the first considerations which you have to bear in mind in framing your report will be, what was the general policy of the law since 1875. It will be, I submit, an important factor for you to consider whether or not any of these people who claim they have suffered injury acquired their properties from the Crown after the 21st October, 1875. It is important for you to consider that, because if you are prepared to go further than that, if you are prepared to say that persons who have acquired land subsequent to that date are to be awarded compensation, then you are taking upon yourselves to declare that there shall be a complete alteration of the general policy of the law that has prevailed in this country. That is one consideration, and I place it before you as one that will demand the gravest possible consideration on the part of the members of this Commission. The second consideration which I will place before you, still showing that these persons who have made any complaints have absolutely no rights at law, is this: that they had a given time within which to submit claims for compensation, and that not a single claim was ever submitted. There, again, you are invited by the complainants to set on one side what has been the policy of the Legislature of New Zealand for a period of thirty-five years. With regard to that aspect of the case, I am free to admit that the position of the claimants is entirely different from what it is under the other aspect. In the year 1895, when this watercourse was proclaimed as a sludge-channel, I do not suppose that there was any single resident in the community who was not actually engaged in mining pursuits who had formed any conception of the vast quantity of tailings that would be discharged into the river, and it was probably because of ignorance of what the true consequences would be that many of these persons refrained from making claims to compensation. It is possibly with this idea in their minds that the Administration have advised the Governor to set up this Commission. Still, there are these two considerations, therefore, which point to the fact that the persons who complain have not the shadow of a legal right, and, depend upon it, if they had, it is quite certain from the nature of the agitation which has been prevalent in this district for a considerable time past, from the strong feeling that has been manifested by the residents in this locality with regard to the injury that was done, and from the organization which they have set up—I say it is quite clear legal steps would have been taken to assert their rights, if they had any at all. Therefore it may be taken as established beyond any doubt that of legal rights they have not a shadow. But I merely mention that as leading up to another consideration. I say that they have no legal rights, in order that I may contrast their position with the position of those who have legal rights. And that leads me to a consideration of the present position of the local bodies concerned, and also to the present position of the mining companies. By "mining companies" I also include Mr. Hanna's clients, who have just taken up a property. I will first of all deal with the case of the mining companies. What is their position? They are entitled by virtue of the Proclamation to discharge these tailings into the river. In consequence of that Proclamation I have no doubt it will be established they have adapted their machinery to that method of carrying on their work; and that condition of things has been maintained for a period of at least fifteen years. They are therefore in the position of persons who have been granted rights by the Crown. They are in possession of rights and privileges as full and effective and as potent as if they had been a Crown grant under seal authorizing them to discharge tailings into the river. That is their position: they hold that vested right. And what is the position of the local bodies? The position of the local bodies is equally as strong. For a period of thirty-four years, at all events, in this Island the local authorities have had a vested right to the tax which is levied upon gold. The tax upon gold is one that has been in existence for more than fifty years, and from the year 1858 down to the year 1876 it belonged to the General Government. In the year 1876 it was found necessary to hand over that tax to the local bodies in the goldfields districts. Why? This leads to a consideration of what was the policy that dictated the necessity of handing over to the local autho-

rities the revenue arising from the tax upon gold; and a consideration of the special conditions and the peculiar features that pertain to gold-mining communities will show at once why it became necessary to do so. It was not until the year 1886 that provision was made by the Parliament of New Zealand for advancing money to local authorities; and in the case of a gold-mining community, where there was a rapid influx of population, where it became absolutely necessary to provide local bodies who had the regulation of the local affairs in that community with finance in order to enable them to provide all those conveniences which a community of men gathered together require, it became necessary to provide such a community with some means of obtaining finance. It could not be done by the ordinary system of rating. The whole of the lands in this district, at all events, the most of the lands at Thames, and a large portion of the lands at Coromandel, belonged to the Crown, and are held under mining titles. The local bodies could not look to these lands to obtain revenue for the purposes of local government. Where, then, could they look? It might be said they could borrow money. Now, it is a well-known fact that no discreet person will lend money to a local body. The leading financial institutions will not take up the debentures of local bodies, especially in a goldfields district. I am going to call evidence on this very point. My clients a little while ago were pushed for money. Their bankers endeavoured to get them to reduce the overdraft, and the position became a very critical one. They applied to two lending institutions in the City of Auckland to ascertain whether they would take up debentures. They very promptly were informed that nothing of the kind would be done. No trustee who has any regard for the interests of the persons whom he represents would dare lend money upon the security that is afforded by the debentures of a local body in a gold-mining district. How, then, was the local body to raise the necessary money for the purpose of carrying out these municipal improvements and conveniences which are rendered necessary by the rapid aggregation of a large community in a goldfields township in a short space of time? There was only one way that occurred to the representatives of the people of New Zealand, and that was by providing that the goldfields duty should be handed over to them. That was the policy, I submit to you, that directed the Legislature of New Zealand in framing these provisions regarding the application of gold duty to the local bodies in mining communities, and that has remained the law down to the present time. I wish to draw your attention more particularly to the special conditions applicable to the Borough of Waihi, and I wish to point out to you that these special conditions which apply to the Borough of Waihi are strictly within the policy which influenced the Legislature in providing this system of financing local bodies in goldfields townships. The Borough of Waihi was incorporated in March, 1902. At that time the population there was comparatively small—that is to say, compared with the present population. But even at its very inception it met with a difficulty. Prior to its incorporation as a borough it formed part of the Ohinemuri County Council, and at that time the Ohinemuri County Council was largely indebted. It is provided by law that when a portion of a county is formed into a borough there has to be an adjustment of assets and liabilities. That adjustment was made, and the result of it was that Waihi came into municipal existence with a liability of £10,000 around its neck. At the very outset that was what it had to face.

The Chairman: What assets had they?

Mr. McVeagh: Certain public reserves, I am informed, and nothing else worth speaking of.

Mr. Cotter: All the roads were made, and other conveniences of the kind provided.

Mr. McVeagh: Those are not negotiable assets. What happened after that? I am afraid, gentlemen, you have no doubt learnt it in the course of your sittings and in the course of your travels through the district. Very strong feeling arose in the district in regard to this borough, and the next thing done—I cannot complain of it, because it was all done in accordance with law—was this: The Ohinemuri County Council said, "You, the Waihi people, are making use of this main road; you are using it very extensively. Large wagon-teams are constantly passing through from the Paeroa Railway-station and the Paeroa wharves to Waihi, carrying coal, and mining machinery, and other requisites. The wear-and-tear upon the road is great, and you must contribute." Well, they are entitled to do that by law: it was a fair position to take. I mention this in order to show what the contributions of the Waihi Borough Council were. In eight years they had to contribute towards the maintenance of that road in round numbers £23,000: and at the present time the Waihi Borough Council is paying one-half of the cost of maintaining the road between Te Puke Wharf and the Paeroa Railway-station. It is also paying one-third of the cost of maintaining the road between Waihi proper and Waikino. These were matters that it had to face at the very outset. But in addition to that the output of gold from one mine in the borough began to increase, and the population grew very quickly in the borough, so that at the present time there are, roughly speaking, about six thousand people in the borough. The census was taken in 1906, and the population, I think, at that time was 5,584. I think I am understating the position when I mention that there are six thousand people in that place at the present time.

The Chairman: Where is the boundary of the Borough of Waihi? Does it include Waikino?

Mr. McVeagh: No, it does not. The boundary is adjacent to the railway-station at Waihi. The Borough Council came into existence, and it had to provide for this — speaking from a goldfields point of view — large community, and for a rapidly growing community. It had to provide all those municipal requirements that a population of six thousand people had a right to expect: it had to provide waterworks, it had to provide lighting, and it had to provide for roadmaking; and at the present time the condition of affairs in Waihi is such that it is imperatively necessary that a sum of £14,000 be raised somehow or other to provide an extension of the present waterworks system. That cannot be borrowed on loan. No one will lend it. I do not think that any of my learned friends round the table would be prepared to advise any trustee clients to take up the debentures of a mining township—a township that at the present time is practically dependent on the output from two mines. I wish to say a word about the present waterworks system. There is a liability at the

present time of £21,000 due by the borough to the General Government. That represents a loan which they were fortunate enough to raise. Gentlemen, you laugh, but I may mention there were some special features about the matter, and there is certain special legislation which has enabled the Waihi Borough Council to raise that money. But that makes it all the more certain that they will not be able to raise any more. The £14,000 has to come from other sources, and the only available source at the present time is revenue. They cannot raise it from any other quarter. I have mentioned the addition to waterworks: I shall mention now one other very important factor, and one, I confess, which surprised me when I began to investigate the case on behalf of the Borough of Waihi. There is a population of six thousand, and at the present time absolutely no provision is made for the drainage of the borough. And the question of drainage will be an extremely difficult one there on account of the difficulties that arise regarding the outfall. They certainly cannot dispose of their sewage by putting it into the river. An estimate has been prepared by the Engineer of the Waihi Borough Council which shows that in order to complete a system of drainage for the borough a sum approximating £39,000 or thereabouts will be required. That is a liability they have to face—an imperative liability that cannot be delayed much longer, and one that can only be provided for by setting apart a portion of the revenue for the purpose of defraying the cost of establishing a drainage system. I stated a little while ago that a sum of £21,000 had been raised from the General Government for the construction of the existing waterworks scheme: I omitted to mention what was the security provided for the repayment of that loan. The security consisted of a special rate and the hypothecation to the General Government of the gold duty; so that duty is pledged at present for the purpose of securing the repayment of that loan of £21,000. There is another consideration which presses somewhat heavily on the Waihi people, and that is this: they have established a hospital there. In view of the nature of the community it was really necessary that there should be a hospital within the district, and it so happens that the hospital district is coterminous with the borough, so that practically one-half the cost of the maintenance and upkeep of that Hospital has been a charge on the borough revenue. I say "one-half" because the Government contributes pound for pound. That is what the Government does all over the Dominion. There is no special concession in that case. Now, the Hospital has been found to be quite too small to meet the requirements of the district. There was, unfortunately, an outbreak of infectious disease lately. It exists at the present time. No doubt that is due to the circumstance that the drainage of the borough is totally inadequate, and that up to the present time no proper sanitary methods have been adopted. About six weeks ago it was found necessary to send a deputation to one of the Ministers of the Crown who happened to be in Waihi—it was not the Minister of Public Health, but the Minister of Mines—and it was pointed out to him that the medical advisers connected with the Hospital had stated it was imperatively necessary that additions should be made, and that the sum required would be between £2,000 and £3,000. The Minister was not sympathetic. At all events, what he did say was that the Government would contribute pound for pound, and that one-half would have to be found by the hospital district—of course that means by the borough itself. These are some of the pressing works that Waihi has to undertake, and I will now come to the question of revenue. The present annual value, as fixed by a gentleman who undertakes valuations for the purposes of the Government Land Valuation Department, is, roughly speaking, £35,000. On that a rate of 6d. in the pound is levied and, as I understand, always very well collected. The mines contribute their gold duty. For the whole period that has existed since the borough was established the average contribution for gold duty has been about £17,700. There is another source of revenue that is rather too trifling to mention, and that is the revenue which arises from licenses and matters of that description. I merely mention it to show that it has not been ignored. I do not mean publicans' licenses, but dog and music-hall licenses, and so on. Now, in addition to that, there is the cost of the maintenance and upkeep of the existing roads and streets, and generally this absorbs the whole of the revenue which has been received in Waihi for some time past. As a matter of fact, the whole of the revenue has not been sufficient. The present liability to the bank is about £14,000, and the bank has been pressing for its repayment, and there is an understanding at the present time that it is reduced at the rate of £500 per month. These are the conditions existing in Waihi, and it is under these circumstances, with these conditions of a peculiar character, with these difficulties in the way of raising money, that the Waihi Borough Council has to carry on. I may mention that for the purpose of providing lighting for the inhabitants it had to construct its gasworks, and did construct them out of revenue. By setting apart revenue from time to time they were enabled to provide a system of lighting for the borough at a cost of £15,000. That system is paying its way. These are the special conditions affecting the Borough of Waihi—a borough, I will venture to say, that has conditions so extremely peculiar to itself, a borough that has so rapidly grown, that probably there is no parallel for it in New Zealand. Therefore the question of providing a proper and effectual system of finance for that borough is a very pressing and very important one. For these reasons we say that the vested right of every burgess to the revenue derived from gold duty —a right assured to every burgess at present under an Act of Parliament which expresses the public policy of the country for the last thirty-five years—ought not to be interfered with. It ought not to be any more interfered with than the vested right which is given to the mining companies to discharge their tailings into the sludge-channel. I know perfectly well that it is always the fashion to try and extract wealth from what is supposed to be a wealthy body. There is, unfortunately, an insatiable desire in the minds of many people to endeavour to do it. But what I do venture to say is that considerations of that kind ought not to influence us, and that the considerations which ought to be attended to are the circumstance that that is the system of revenue provided by the legislation of the Dominion, and that it ought not to be interfered with at the present time and under present conditions. It would require a special Act of Parliament to enable it to be done, and any special Act of Parliament would be one which would alter the whole policy of the

law relating to the financing of bodies in gold-mining districts in the North Island of New Zealand. I propose now to leave these considerations, and refer to another class of evidence which I intend to submit to the Commission. A good deal of evidence was placed before the Commission regarding floods. Much was said about the nature of the flood of the present year, and a good deal was also said about the flood in 1907. By this time I think it is very evident that the flood of 1907 was one of a special character. It was one that was very general all over the Province of Auckland. It brought destruction not merely in the Ohinemuri district, but also in other parts of the province, extending from the North Cape down to Lake Taupo. It is in the minds of every one here that bridges were washed away in very large numbers, and a great deal of damage done to railway and roads. The Waikato line for a distance extending between Huntly and Pokeno was under water for nearly a month, and railway communication was interrupted. That circumstance shows that the flood was one not special to the Ohinemuri, and not referable to any of the peculiar conditions affecting this river. With regard to the flood of 1910—of a few weeks ago—we had certainly a most extraordinary state of affairs. We had a state of affairs that is certainly without parallel in the records of New Zealand—a state of affairs that is only paralleled in the records of rainfall in two instances. There fell at Waihi during a period of fourteen consecutive hours 14 in. of rain. That accounted for the flood of the year 1910. I would invite your attention to the peculiar topographical features of Waihi. You have been there, and you have seen that it is a huge basin surrounded on all sides by hills. It is, as it were, a very large bottle with an extremely narrow neck through the Karangahake Gorge. I cannot recall what the acreage of the plains is, but I intend to call the evidence of witnesses who will show the quantity of water that fell upon these plains, represented by the 14 in. of rain, and then you will be in a position to imagine for yourself how tremendous a volume of water poured down that rift between the mountains and scattered itself over the surrounding plains. There was nothing extraordinary in its doing so: it is what one would have expected in the circumstances. Now, in regard to a remedy, it is not in the province of the Waihi Borough Council to suggest a remedy. The Waihi Borough Council does not cause the evils, and yet the suggestion made is that it should pay for them. It does not cause the evils, and remedies will be suggested, I take it, from other quarters. What does appear to be a very obvious partial cause of the trouble consists, no doubt, in the accumulation of willows. I have been fortunate enough to have had placed before me a statement by gentlemen who have had some experience as to the effect of willows upon the flood-waters of streams, as to the quantity of land that was placed under water by these willows, as to the steps that were taken to remedy the nuisance, and as to the very satisfactory results obtained in consequence of it. That evidence relates to a district in the Waikato—a portion of the Waipa County. There are two streams there—the Mangapiko and the Mangahoe. In one of these—I cannot recall which it was at the present time—there was a very large growth of willows on both banks of the stream, with the consequence that when the waters rose their course was impeded, and they overflowed their banks, and that left under water a very large area of the surrounding country. This became such a serious trouble that steps were taken to get rid of the nuisance. The willows were ringed and some injection was put into the trees, with the result that all the trees died. Men were employed to take up the rotten branches as they fell from time to time. The consequence of that is that the flood-waters ceased to overflow the surrounding country, and all that area—I think it amounts to 1,500 or 2,000 acres—is now land under cultivation, and forms some of the finest dairying country in the Waikato. There was a somewhat similar experience in the case of the Mangapiko. It was found that the willows retarded the flow of water; and the removal of the willows has had the result of removing to a very large extent the mischiefs that arose through the water overflowing the banks of the stream. I pass on from that, and I wish to refer to the question of the alleged deposit of silt in that portion of the Waihou below the Junction. I propose to call witnesses who will prove that they took samples from the river at various points below the Junction, and for the purpose of comparison they also took samples in the upper Waihou as far back as above Te Aroha. These samples have been examined, and the evidence that will be placed before you will be that there have been samples so fine taken above Te Aroha, where no tailings are discharged, where no tailings ever have been discharged—that they are as fine as the samples that were taken from the lower Waihou.

Mr. Mitchelson: Tailings have been discharged into the upper Waihou above Te Aroha.

Mr. McVeagh: Yes, at Waiorongomai; but these samples were taken above there, at the Gordon Settlement, at a place where, I am informed, no tailings ever were discharged, and they are as fine as the samples that were taken in the lower Waihou. The method by which these tailings were taken will be described by the engineer, who made a special appliance for the purpose. It does not consist of a jam-tin on the end of a pole; he had a tube, of which he has prepared a diagram, which will illustrate the special method that he adopted for the purpose of securing fair samples of the tailings: and a gentleman who is connected with the Mines Department at Waihi—the Director of the School of Mines—will advise what the result of his examination was. That is an outline of the case I intend to put before you on behalf of the Waihi Borough Council. I would therefore ask—as I know it will—that it receive very grave consideration. I would ask that this Commission should not overlook the special demands and the special requirements of a large community of rapid growth in a goldfields township. I would ask the Commission to bear in mind the special conditions that apply to that that do not apply to the case of other townships of a permanent character, where you have all the elements of stability, where the community does not rest for its very existence upon merely one industry, as Waihi does, but where they have other things upon which they may rest. These are considerations which are proper to be borne in mind, and these are considerations which ought to influence the Commission in coming to its conclusions upon the evidence which I propose to place before it.

HENRY DOUGLAS MORPETH examined. (No. 49.)

1. *Mr. McVeagh.*] You are Town Clerk of the Borough of Waihi?—Yes.

2. *The Chairman.*] You gave evidence before the Mines Committee?—Yes, on pages 37 to 41.

3. *Mr. McVeagh.*] The Borough of Waihi was incorporated, when?—1st March, 1902.

4. And you have been Town Clerk and Borough Treasurer during the whole period?—Yes.

5. What is the population at the present time?—I estimate it at about six thousand.

6. During what period has the place grown to that population?—I should say it did not amount to very much until about twelve years ago. The growth is principally within the last twelve years.

7. How long have you known the town?—I have known it intimately for eight years. I was in the town twelve years ago.

8. Generally speaking, what is the character of the buildings in Waihi?—Naturally, in accordance with the requirements of the population, which is almost entirely a working-man population, and the character of the buildings is very small.

9. Are they constructed with a view to permanence?—No; rather the other way.

10. From your knowledge of the population of the borough, what percentage would you say belongs to the working-class of the community?—I should say, 85 per cent.

11. *The Chairman.*] What do you mean by "working-class"?—The men engaged in manual labour in the mines. Mining is the only industry there.

12. Do you consider a clerk a working-man?—I refer to manual labourers in the mines.

13. *Mr. McVeagh.*] What is the class of their dwellings?—Very small, and of not much value. It stands to reason that men receiving such wages as they do—8s. to 10s. at the very outside—cannot afford a very big house, and they cannot borrow money on their property.

14. What is the nature of the titles all over the borough?—All the titles are under the Mining Act—residence licenses.

15. That is a title that endures from year to year on the payment of 5s.?—That is so, but as a matter of fact most of the residence-sites are secured by the payment of a rent of 10s. a year. It is a lease for forty-two years with a right of renewal.

16. I think a large portion of the population of Waihi live in boardinghouses?—There is a considerable element—young unmarried men—who live in boardinghouses.

17. Is there any industry in the place save gold-mining?—Practically none.

18. I think there is no such thing as a farming industry round about Waihi?—Not in the immediate neighbourhood.

19. I may take it, I suppose, that the place has not at present any of those elements that make for permanence and stability?—I am afraid not.

20. You told us what the nature of the titles was: can you say of your own knowledge whether there is any difficulty in obtaining money on the security of such titles?—Yes, I can say most positively that investors will not look at the title.

21. I think you made an estimate of the annual requirements of your borough, based on the average of the last three years?—Yes: it was £20,900.

22. *The Chairman.*] Can you give us the details of what that includes?—I have an abstract of accounts, which I presume will be sufficient for your purposes, as follows: 1908, £22,552 0s. 11d.; 1909, £26,226 7s. 11d.; 1910, £23,688 2s. 5d.: total, £72,466 11s. 3d. I will explain the apparent discrepancy. Last January twelvemonths our overdraft stood at £25,000, and the bank put the screw on and refused further advances. After attempting to negotiate a fresh loan, which was a failure, we came to an arrangement by which we were to reduce the amount of the overdraft by £500 per month. That is going on at the present time. Immediately on that we had to shorten sail very much. A large number of men were discharged, officials were discharged and salaries reduced, and retrenchment became the order of the day; so there is a marked decrease in the expenditure over last year as compared with the two previous years. Roughly speaking, it is about £8,000 less than in the previous year. This is a statement of the accounts for the same years [Exhibit No. 36]:—

Waihi Borough Council.

1910.

Receipts.	£	s.	d.
Gold duty	20,473	5	4
Per Court	1,750	12	6
Rates (£1,085 1 8)			
Other sources (379 2 11)			
	1,464	4	7
	£23,688	2	5

Expenditure.	£	s.	d.
Roads and footpaths	8,346	18	10
Ohinemuri County	1,056	3	2
Administration and other charges	1,704	6	5
Hospital and charitable aid	1,575	0	0
Waterworks	314	13	4
Street-lighting and other public utilities	786	1	11
Expenditure in public institutions	354	1	8
Recreation-ground and reserves	407	16	6
Waihi Technical School	500	0	0
Inquiry Main Road	173	17	5
Bank interest	1,072	0	0
Miscellaneous	381	19	2
	£16,672	18	5

Gold duty paid at Customs prior to 31st March, 1910, but not received by Council until April, 1910, £2,408.—H. D. MORPETH, Town Clerk.

Waihi Borough Council.—continued.

1909.

Receipts.	£	s.	d.
Gold duty	23,147	18	10
Per Court	1,560	7	9
Rates £1,015 0 0			
Other sources 503 1 4			
	1,518	1	4
	£26,226	7	11

Expenditure.	£	s.	d.
Roads and footpaths	12,534	19	0
Ohinemuri County	1,572	6	11
Tauranga County	58	0	0
Administration and general charges	2,028	10	4
Bank interest	1,119	18	7
Hospital and charitable aid	1,675	0	0
Waterworks	1,039	18	2
Swimming-bath	620	15	8
Walmsley quarry and tramway	776	3	4
Property purchased	240	0	0
Recreation-ground and reserves	585	2	9
Street-lighting and other public utilities	823	19	11
Miscellaneous	574	4	0
Stone-crusher	838	6	4
	£24,826	15	3

1908.

Receipts.	£	s.	d.
Gold duty	19,026	16	11
Goldfields revenue, per Court	1,609	4	4
Rates £996 0 0			
Other sources 456 0 0			
	1,452	12	4
Refund	463	7	4
	£22,552	0	11

Expenditure.	£	s.	d.
Roads and footpaths	12,512	12	7
Ohinemuri County	1,856	6	5
Administration and charges	2,067	13	7
Bank interest	938	17	2
Hospital and charitable aid	1,600	0	0
Recreation-ground	367	7	3
Expenditure on public institutions	697	14	4
Compensation, Printing Company	527	10	0
Street-lighting and other public utilities	1,068	5	10
Tauranga County Council	26	6	0
Miscellaneous	244	15	7
	21,907	8	9
Less Printing Company	527	10	0
	£21,377	18	9

23. How was it that the contribution to the Ohinemuri County Council dropped 50 per cent.?—That is under the new award. After the first award was extended for a number of years and the railway went through, we had the award varied, and the contribution became very much less. It followed with the extension of the railway to Waihi, which was provided by the Waihi Company's money, that a large portion of the traffic which proceeded along the Main Road was diverted and taken by rail, and therefore in justice it was only right that our contribution should be reviewed. It was reviewed, and that accounts for the drop.

24. *Mr. McVeagh.*] Your borough is provided with municipal gasworks?—Yes.

25. That was done out of revenue, I think?—Yes.

26. I think your gasworks cost £15,000?—Yes; that is what they stand at now.

27. And your gasworks are self-supporting?—Just about. I think there are a few hundred pounds to the credit of the Profit and Loss Account over the entire period.

28. Is that after allowing for depreciation?—Yes; a small amount of depreciation is charged, and interest.

29. *The Chairman.*] If they were paid for out of revenue, where does the interest come in?—It is only fair to charge the capital invested in trading concerns with interest. We have to pay the bank interest. The works were really constructed out of overdraft, and interest is therefore chargeable to the concern.

30. *Mr. McVeagh.*] Your borough has waterworks?—Yes.

31. These cost, how much?—Twenty-one thousand pounds. That is the amount we borrowed, but they have cost a little more since.

32. I think the money was borrowed at 4½ per cent., which includes interest and sinking fund?—Yes, for a term of twenty-six years.

33. *The Chairman.*] Does this stand in your books as a full sum of £21,000 to the end of twenty-six years?—Yes; that is the amount inscribed in the books of the Treasury.

34. Although a portion of it is repaid?—Yes.

35. So that really it is not fair to state that it stands at the present time at £21,000?—Of course, we do not know what is interest and what sinking fund. It has only been current about four or five years, and the amount of sinking fund accrued in that time will not be very large.

36. *Mr. McVeagh.*] How is the payment of that water loan secured?—There is a rate pledged, and the gold duty is hypothecated.

37. What is the rate?—One penny and a tenth on the capital value. When the loan was raised we worked on the capital value; now we rate on the annual value.

38. *Mr. Cotter.*] Is that included in the return of revenue?—No, because it is not struck.

39. *Mr. Mitchelson.*] Why do you not collect it?—It was never intended to be collected. It was only struck to comply with the provisions of the Loans to Local Bodies Act.

40. *Mr. McVeagh.*] You have no drainage system in your borough?—No.

41. Is that an imperative need?—It is a crying need.

42. *The Chairman.*] Before leaving the question of the water-supply, you make a charge for the water?—Decidedly. It is practically 4 per cent. on the annual value of the property that is supplied.

43. Does that leave a profit?—Yes, a small profit. It pays interest, and there is a small profit accumulating.

44. Do you supply water to the mines?—As an ordinary supplier—not for power.

45. For boiler purposes?—No.

46. So that practically the whole of the water rates are on residential property?—That is so.

47. *Mr. McVeagh.*] In this connection I think you have made a calculation showing the average annual value of each holding in the Borough of Waihi?—Yes. It is 7s. 3d. weekly—eighteen guineas a year.

48. You said that a drainage system was an urgent matter. I think you have had some outbreaks of disease lately?—Yes, scarlet fever, typhoid, and one or two cases of diphtheria.

49. There is a hospital in the borough?—Yes.

50. And I think the boundaries of the hospital district correspond with the boundaries of the borough?—That is so.

51. Therefore you are the only contributor to the maintenance and upkeep of the Hospital?—Yes.

52. *The Chairman.*] I suppose you have a distinct Hospital Board?—Yes.

53. *Mr. McVeagh.*] Is the contribution shown on the accounts?—Yes.

54. What are the present needs of the Hospital?—I gather they are about to call on the borough for £1,750. They have not made a formal demand yet, but I saw that in the Press.

55. What did they get last year?—£1,575.

56. Is the Hospital sufficient in point of accommodation at present?—No. They are about to undertake buildings operations to add to the Hospital.

57. Have you any voice in that at all?—Not as a Borough Council.

58. The Hospital Trust has a right to do that without any reference to you whatever?—They make a demand, and we have to pay it. There is a provision by which we can call in the Colonial Secretary in case of a dispute.

59. What is the estimated cost of this further accommodation?—Sixteen hundred pounds.

60. *The Chairman.*] Is that going to come all in one year?—Yes.

61. Is that the total cost, or your proportion of the cost?—The total cost. I may say I have no official knowledge of this. The secretary to the Hospital Trustees is Mr. Bishop, who resides in Waihi. There are members of the Hospital Board who will be witnesses, and they will possess more definite information than I have.

62. I think you are bound by law to establish municipal abattoirs?—Yes.

63. You have done so, and they have cost you, how much?—Two thousand pounds.

64. You did not borrow for that?—No; it was done out of revenue.

65. Or overdraft?—Yes, but we call it revenue.

66. Is there not a limit to the amount of overdraft you can get by law equal to one year's rates?—One year's revenue.

67. *Mr. McVeagh.*] I want to know what is your experience with regard to local bodies in goldfields townships raising money by issuing debentures?—I never knew of it being done. I do not see how anybody could lend money.

68. You got your £21,000 loan?—Yes. I will explain that. There was special legislation contained in the Goldfields Public Bodies' Loans Act, 1898. It was put there for the purpose of giving Waihi a waterworks.

69. And under that Act you got your loan?—Yes.

70. When you were being pressed by your bankers to reduce your overdraft, I think a delegation from the Borough Council proceeded to Auckland to ascertain whether money could be raised for that purpose?—That is correct; but I may say that before the delegation proceeded application was made by correspondence to two important financial institutions—the A.M.P. Society and the Auckland Savings-bank—and they were not entertained.

71. It is well known that they lend money to local bodies?—Oh, yes! large sums of money.

72. What was the result?—They would not entertain them at all. The deputation then waited also on a large firm in Auckland, and tried to arrange it through them; but after short inquiries it was rejected entirely.

73. And then, I think, you had to make some arrangement with the bank for reduction of the overdraft by instalment?—Yes: we agreed to pay £500 monthly until the whole of the overdraft is paid off. That was not expressed, but that is the inference.

74. *The Chairman.*] Is there any limit to the amount of the overdraft, or can you pay off £500 and borrow it the next day?—No: the account has to be reduced monthly.

75. There is no doubt about it?—No.

76. *Mr. McVeagh.*] You have reduced the account within what period from £24,000 to £14,000?—In fourteen or fifteen months.

77. In addition to all these liabilities, you have the ordinary current borough expenditure, which I do not propose to go into?—Yes.

78. I think you and the Councillors have given some consideration to this attack that has been made upon the revenue of the local bodies in this district?—Naturally.

79. You have come to the conclusion that it would be unfair and unjust to attack the revenue of the local bodies?—Yes; that is what we think.

80. *Mr. Mitchelson.*] When was this attack made?—It has not been made in so many words. It is inferred in the scope of the Commission. This matter has been a subject of controversy in this district for some time. Then there is a statement by Mr. Metcalfe, who says an obvious source

of revenue is the gold duty. Only two local bodies in this district are receiving gold duty, so it is quite obvious he referred to one or both of them—no doubt, both of them.

81. *The Chairman.*] The gold duty is fixed by law, and I suppose the same law that fixed that amount could increase it, or decrease it, or take it away altogether?—Yes.

82. As was done, I believe, in the South Island?—Yes.

Mr. McVeagh: It was done, no doubt, in the South Island, but it was done at the request of the local bodies there. The movement was bitterly opposed by the representatives of the local bodies in this district. It was owing to the bitter and determined fight put up by no less a person than the late Sir Alfred Cadman on behalf of the local bodies in the gold-mining districts in the North Island that the application of the Act of 1890 was limited, and since 1890 there has been no return to the attack. A new system of rating was devised for the South Island.

The Chairman: Which was satisfactory to the mining districts in the South Island.

Mr. McVeagh: Yes: and the condition of mining in the South Island is altogether different. The companies engaged in mining in the North Island have to spend large sums of money to get gold.

83. *Mr. McVeagh.*] You have certain reasons to advocate why the revenue of the local bodies should not be assailed by this Commission. I want you to state them to the Commissioners?—I would say that the gold duty was devised to provide a means of finance to meet the peculiar conditions attaching to the rapid growth of mining townships, so that the ordinary requirements provided by a municipality or other corporation might be promptly afforded to the population, for the reason that the value and stability of a mining township is usually of a very fluctuating nature.

84. Mining townships have their vicissitudes?—Yes. This duty has been current now for upwards of forty years in the North Island, and has the sanction of that time, and has come to be looked upon as a certain revenue for the local body concerned. The Waihi Borough was formed with the knowledge and on the assurance that there would be a large revenue from gold duty.

85. *The Chairman.*] What assurance?—The assurance of the existing law and custom.

86. *Mr. Mitchelson.*] Not a specific assurance from anybody?—No. I do not suggest anybody could get such an assurance.

87. You had to put up a fight for it?—The fight was opposition to the application to constitute the borough. It was seen at once by every person and body receiving the revenue what the result of the formation of the borough would be. The residents of Waihi pursued the course laid down by law—they formulated their memorial and presented it to the Governor praying that the borough be constituted. There was some opposition, and ultimately the borough was constituted, by which means the county lost largely.

88. *Mr. McVeagh.*] That is the assurance, at all events, you formed the borough on?—Yes: on that assurance large commitments were and have been made from time to time.

89. Then, I think you have other reasons: you have your revenue actually hypothecated?—Yes; the gold duty has been pledged as security for the waterworks loan during the currency of the loan.

90. *The Chairman.*] It is pledged as a security, but that is only one security, the other being the rate which the Government no doubt thought sufficient to produce the whole of the interest required?—If that is so, they would hardly have insisted upon the hypothecation of the gold duty.

91. Why did they ask for a rate of $1\frac{1}{16}$d.?—I think I have already said this rate was pledged to comply with the legal machinery of the loan.

92. That machinery being for the safety of the Government?—No doubt, it is an additional safeguard; but I would point out that special legislation was passed to enable the gold duty to be pledged for this purpose. We had not a ghost of a show of getting the loan on the security of a rate. That is well known.

Mr. McVeagh: A little while ago the market value of one mine actually fell £1,000,000 in a few days, and that affords a very striking illustration of the vicissitudes of a mining population.

93. *Mr. McVeagh.*] You have some further reasons why your revenue should not be interfered with?—I would point to the small value of the rating-power—that is, to the smallness of the rateable value of the property in the district. We have to consider the population.

94. But if the borough chooses to give large concessions to its population before they are in a position to pay for them?—Why should it not if the community has revenue from other sources? I ask, why should it extract from its ratepayers more than is necessary for the purpose? I put it as a matter of logic and justice, and I ask why should the Borough Council do so when it has sufficient revenue accruing from other sources?

95. *The Chairman.*] That is scarcely the point. That revenue might cease?—Then they would have to increase their rate.

Mr. McVeagh: In answer to that, I would point out that if that revenue did cease there would be a corresponding flight of the population from that place. There would be less to provide for.

The Chairman: Suppose Parliament in its wisdom decided to treat the North Island as it did the South Island, and abolish the gold duty. Then you would have to find another source of revenue.

Mr. McVeagh: That is a supposition to be fought out on the floor of the House.

Mr. Mitchelson: The same thing may happen to Waihi as has happened to Thames and other mining districts, where the value of gold obtained from the quartz has fallen off.

Mr. McVeagh: Thames is in the fortunate position of having other industries to rely on. First, it has the agricultural industry at its back. Second, there are large iron-foundries in the place, and the fishing industry of which we heard the other day. The Thames has not been dependent on the mining industry for the last twenty years. No doubt, during the last three years there has been a large output of gold from the Waiotahi Mine.

Mr. Mitchelson: And you see the results all over the streets at the present time.

Mr. McVeagh: I say, why not, if this system has been devised for assisting the financial requirements of the local bodies?

The Chairman: I take it the point we want to get at is this: this system has been devised for the purpose of meeting the sudden growth and requirements of mining townships.

Mr. McVeagh: And the vicissitudes attendant thereon.

The Chairman: At Waihi there has been a large growth, no doubt, and they have met that, and expended large sums of money on roads, and channelling, and various luxuries—not necessities if the town is not to be of a permanent character. The point is, how far is it necessary to go on? What are the further essentials not complied with?

Mr. McVeagh: I will develop that in my evidence. I will show there are very serious requirements to provide against.

96. *Mr. McVeagh.*] What other industries have you got besides mining?—No other industries.

97. Nothing else to support the borough?—Nothing. I would point out the fairness of this tax inasmuch as it is levied only on mines that are winning gold. All the other struggling companies are exempt from it.

98. *The Chairman.*] So that a company which sits down and does nothing, and waits for its neighbour to develop, pays nothing?—I said, struggling companies. They have their labour-conditions to comply with, and the Warden has jurisdiction over the whole of the goldfields. I would point out that a change in mining legislation will be a factor in confirming the view now held by many that there is no end to change of gold-mining law, and that is a deterrent to the investment of capital.

99. *Mr. McVeagh.*] You get no Government grants, I think, excepting the statutory grant every municipal body gets in respect to rates collected by the 30th June?—We have never had a penny.

100. You have prepared a statement showing the permits issued for new buildings from the year 1903 down almost to the present time in the Borough of Waihi, with a statement of the average cost of each building?—Yes: this is it. [Exhibit No. 37.] We give it since 1906 because we have not a record for the first three years.

Waihi Borough Council.—Building-permits issued from 1903 *to March,* 1910.

Year.	Permits for New Buildings.	Total Cost.	Average Cost.	Permits for Additions or Alterations.	Total Cost.	Average Cost.
		£ s. d.	£ s. d.		£ s. d.	£ s. d.
1903	34	*	*	13	*	*
1904	44	*	*	17	*	*
1905	66	*	*	30	*	*
1906	57	7,089 0 0	124 7 4	39	1,387 0 0	35 8 3
1907	93	11,528 0 0	123 19 0	96	3,968 0 0	41 6 6
1908	102	10,994 10 0	107 13 9	115	4,569 5 0	39 14 0
1909	91	14,848 0 0	163 3 3	105	4,441 0 0	42 5 10
1910—3 months, to 31st March	21	3,839 0 0	182 16 2	30	1,380 0 0	46 0 0

* 1903, 1904, 1905—No record of the cost was kept. The buildings put up at that time were a very inferior class—mostly shanties and two-roomed cottages.

101. *The Chairman.*] Does that distinguish repairs from new buildings?—Yes.

102. *Mr. Cotter.*] Can you give us, as near as possible, the population of the borough in 1902?—The last official figures taken prior to 1902, and the figures we used in connection with the financial adjustment, were 4,813.

103. So that in eight years the borough has only increased its population from 4,800 to 6,000?—I want to qualify that statement. The 4,813 referred to Waihi and its surroundings—because there was no borough in those days.

104. Were you acting then as secretary to the persons who were promoting the incorporation of the borough?—No.

105. Were you one of the committee, or in any way interested?—I was not in Waihi.

106. You know, I think, that the application for incorporation was opposed by the Ohinemuri County Council?—Yes.

107. Will you just look at this? It is a copy of the memorial objecting to the incorporation [Exhibit No. 38]?—Apparently these are the reasons for the objection.

108. It is stated there that the original assessment of rates was about £200 or £300: can you tell us from memory what it was when you became Town Clerk?—The general rate in 1903 was £200 17s. 7d.

109. You have told us you had a population then of 4,800?—Yes.

110. That was about 1s. per head?—Yes; men, women, and children.

111. And last year the rate came to between 2s. and 2s. 6d. per head upon the then population?—It came to a little over £1,000.

112. Then, so far as the money produced by the rating of the people in the Borough of Waihi is concerned, it does not anything like pay the salaries of the officials?—Oh, yes! it does; because there are other rates. The general rate does not.

113. What other rates have you?—The water-consumers' rate.

114. Is it not a fact that that water-consumers' rate gives a profit actually to the borough?—Yes, a small one.

115. What other rates?—There is a sanitary charge which you could not call a rate.

116. *The Chairman.*] Is there any profit made out of that?—No; it is conducted at a loss.

117. *Mr. Cotter.*] Your general rate is 6d. in the pound: what is the sanitary rate?—You cannot compare it to a rate. It is 4s. 3d. per quarter per house. That is the average.

118. Do you not charge more for large premises?—They have more frequent services, and are charged at the same rate.

119. There is no other charge on the ratepayers?—No.

120. Do you know of any other borough in New Zealand that has such a low rating charged on the inhabitants as the Borough of Waihi?—My knowledge of other boroughs is very limited, but I do not know one.

121. Do you not know of your own knowledge that the whole idea of the formation of the Borough of Waihi was to get for spending there the gold duty produced by the returns from the Waihi Mines?—I tell you I was not in Waihi then. I know nothing about it.

122. You went immediately afterwards, and do you not know that was the idea and intention of those engaged in promoting the borough?—I never had any conversation with the promoters, and I have no knowledge of the matter at all. The borough was an accomplished fact when I got there.

123. *The Chairman.*] Had you any municipal experience before you went there?—None whatever.

124. *Mr. Cotter.*] During the whole period that Waihi has been receiving the gold duty, do you know whether they have ever spent a penny-piece outside their own boundaries except under compulsion?—Yes.

125. What?—Various grants to the Waikino people in the way of grants to the domain and library; also to the Katikati people.

126. For what?—To assist them in their domain.

127. How much to Katikati?—It is hard to remember the balance-sheet.

128. Was the amount worth remembering?—Yes; we will say £25 per year for Katikati, and about the same amount for Waikino.

129. Is it not a fact that a very large proportion of the reduction-work that brings you in the gold duty is carried on at Waikino?—Yes.

130. Is it not a fact that the County Council have to provide for all the requirements of the Waikino Township?—They are the local body concerned.

131. That is, they have no power to rate on the practically big establishment in that Waikino Township?—Meaning the battery—that is correct. I may say on that point that overtures have been made from time to time to get Waikino to join the borough; but they do not seem to care about it.

132. *The Chairman.*] Who made the overtures?—The Waihi Borough Council on two different occasions. There is a party at Waikino who would gladly come in; but the majority decided otherwise. I do not know why, but the county object to it also.

133. *Mr. Cotter.*] Why do you say that? Have you any official knowledge of it?—We asked them to use their influence in the matter, and they said they could not.

134. Do you mean to say you have written a letter?—No. I have not.

135. Did you get a written reply?—Yes.

136. What did the reply say?—I do not remember what it said, but the effect was that they were not agreeable.

137. Will you produce to-morrow the annual balance-sheets of the borough from the time of the incorporation of the borough?—I can produce them now.

138. Do I understand, so far as the gold duty is concerned, or from your own revenue, that you have paid nothing except under compulsion for the maintenance, repairs, or introduction of new roads or tracks, or anything of the kind, in the vicinity of Waihi?—Oh, yes!

139. What?—The Waihi Beach Road.

140. I think the Waihi Beach is a sort of sanatorium used by the inhabitants of Waihi principally?—No; it will be principally used by gold-mines when formed, because it leads primarily to several mines.

141. Do you mean to say you do not know as a fact that thousands of people from Waihi go to that beach every summer?—But not by that road.

142. Is that Waihi Beach Road constructed yet?—It is in course of construction.

143. When did you start that?—It has been hanging fire anyway nine months, awaiting negotiations with the county.

144. Then my question is correct up to nine months ago?—Well, I say we do not spend any money because it would be illegal.

145. How do you construct the Waihi Beach Road then?—Because it has become the subject of an award between the three local bodies—the Ohinemuri, and Tauranga, and Waihi Councils. We have power to do this under the Public Works Act, just as we have to contribute to the upkeep of the Main Road between Waihi and Paeroa. My remark that the expenditure would be illegal does not apply to the contributions to the domains at Katikati and Waikino, because we can contribute to certain objects outside the borough.

146. Can you name the objects?—Yes; that provide for the health and recreation of the people outside the borough.

147. Of your people?—Yes.

148. Then, you have done this because it assists or entertains your burgesses?—Yes.

149. *The Chairman.*] So far as the Waihi Beach Road is concerned, you are at present spending the money illegally on faith?—Yes. We have the assurance of the Tauranga County Council and the Ohinemuri County Council that they will join in a request to the Department to make an award and give our arrangement legal effect. I may say we have had a lot of conferences to adjust matters.

150. Supposing the Roads Department do not agree to your arrangement?—I do not think there is the least likelihood of that. Under the Municipal Corporations Act, by straining a point, we contend we have a right to do it, because we are contributing to a road largely used by the borough. The only difficulty in this case is that it is more than a contribution—it is formation.

151. *Mr. Cotter.*] So far as the Waihi Borough Council is concerned, they consider this gold duty is more for the purpose of what might be termed luxuries—instead of necessities, that is?—What do you mean by "luxuries"?

152. Do you not understand what luxuries are?—Do you call roads and footpaths luxuries?

153. You have referred to Waihi as being only a mining township?—Yes.

154. That there is no guarantee of permanence or stability about it?—Yes.

155. Do you not consider that the roads and footpaths in Waihi have been constructed more of a character with regard to an abiding township and permanent township than one of a more fleeting character?—That is so in the main street. This word "luxury" has been used several times, and I would like a definition of it.

156. The definition, you know quite well, is a very difficult one: what may be a luxury to one man is an absolute necessity to another. Is that not exactly the position of Waihi—that what the Ohinemuri County Council would say were absolutely luxuries, you, in consequence of being spoon-fed by the gold duty, now say are absolutely necessities?—I would point out that the spoon-feeding is all on the part of the county. They have special grants from the Government for £8,000; we have not got a penny. Then they get gold duty and revenue amounting to £9,000 as well.

157. Then, if you know all these figures so well, do you not know as an absolute fact that the Ohinemuri County Council could not possibly exist without these Government grants—that they could not dream of keeping necessary roads in order with their revenue?—I have no knowledge of the county requirements.

158. Are you sure? Do you not know the requirements of the county so far as your own place is concerned?—I know about the requirements between here and Paeroa, but a large portion of the county I never saw.

159. And there is a large part of the county that could never be seen unless these Government grants enabled the roads to be made to it?—What did make the roads in the county—the gold duty?

160. In a great measure the duty provided by the mines roaded the agricultural portions of the county, and not the gold-mining portion at all?—Yes, necessarily, because you could not get the machinery to the mines otherwise.

161. Do you not know that roads in a mining district require very great expense in their construction, because the conveyance of mining machinery is a very great tax upon them?—We know that to our cost. They have cost us £25,000.

162. *The Chairman.*] Is there not a heavy traffic-tax made on these vehicles?—No; they all have broad tires.

Mr. Cotter: What I understand is that the feeling in the district in regard to mining is that it should be assisted as much as possible, and no invidious tax has been made in that way against it.

The Chairman: Is there any power to require a certain width of tires?

Mr. Moresby: Yes. I will produce a copy of the by-laws.

163. *Mr. Cotter.*] Then, I understand that the contention of your Council is that, because it happens that the Waihi Gold-mining Company's properties are within the boundaries of the township, the gold duty received from them is spendable in the township on necessities or luxuries as the Council pleases?—The gold duty forms part of the District Fund of the Council, and as such it is within the power of the Council to spend it in any way it chooses, so long as it complies with the provisions of the Municipal Corporations Act.

164. Do I understand it is also the contention of the Waihi Borough Council that it should pay no part of the cost of alleviating this trouble?—Yes, decidedly.

165. Nothing?—Nothing.

166. It is considered by the borough that they have a right to receive all the benefit, and throw the responsibility of the difficulty on to whom?—On to the parties that provided the difficulty—the Government. The Government have allowed the tailings to go into the river for thirty-five years, and now they want the Waihi Borough Council to pay for it. For twenty years the Government have winked at the disposal of silt in the channel, and huge accumulations had been made when the Proclamation was issued.

167. When the borough was instituted, in 1902 or shortly afterwards, was there then any agitation or any feeling on the part of any person that there was likely to be any serious injury through the deposition of the silt?—I never heard any conversation on the point.

168. In 1902 you had gone up and down the road often enough: had the silt come lower down than—what particular place?—In 1898 there were large accumulations of silt at Mackaytown, where you see them now.

169. I am asking about 1902, when the borough was formed?—Of course, they existed there then.

170. But had they come lower down, so far as you know, or had any of them in 1902 got on to the land?—They had got on to the banks.

171. Then there was no such trouble as to cause you, as Town Clerk, or the Engineer, or any one in charge, to investigate the matter?—No; it was not my business.

172. So long as the Waihi Borough only got rid of the stuff and got the duty, then their business did not extend any further?—I have pointed out that the Waihi Borough have nothing to do with the silt. They do not deposit it in the river.

173. Can you tell us how the gold duty could be produced without depositing the tailings and silt?—It could not be produced.

174. You say you have nothing to do with the deposit of the silt?—I say that the Waihi Borough Council as a public body has nothing to do with the disposition of the silt.

175. *The Chairman.*] There is no provision in the Municipal Corporations Act in reference to a Borough Council preventing the deposition of tailings in a river?—No.

176. *Mr. Cotter.*] Do I understand the position taken up by the Waihi Borough Council to be this: Assume for the purpose of my argument that the stream from the point where the tailings were put in to the point where they do damage was actually in the Waihi Borough, that the Waihi Borough would then have nothing whatever to do with it?—The borough does not deposit the tailings or silt, and therefore takes no responsibility in connection with the matter. The aspect you have put before me is an unusual one, and has not yet arisen.

177. *The Chairman.*] There is no flooding in the low-lying land in the town by the action of the mining *débris*?—None whatever that I know of.

178. *Mr. Vickerman.*] The tailings of the Union and Grand Junction travel through the borough?—Yes.

179. Do you mean to say you have no control over them?—I do.

180. *The Chairman.*] We saw where certain tailings had run over the land at the foot of Wellington Street, inside the borough?—Yes, I remember that. That trouble was caused by the raising of the dam.

181. But, although that is a deposit of silt in the borough, you think you have no control over it?—We certainly have no control. I do not know what our duty is, but I know what the power is.

182. *Mr. Cotter.*] When the Chairman put it to you that you have no control, did you include "and no responsibility"?—If there is no control there is no responsibilty.

183. In fact, to complete your previous answer to me, is this the contention of the borough: that because the Government issued this Proclamation, therefore the Government should pay any damage and remedy any evils inside or outside the boundaries of the borough that have been caused by the issue of the Proclamation?—Exactly.

184. Then your borough does not consider that the mining companies who cause the damage should be in any way responsible for that, because a Proclamation has been issued giving them that right?—Yes.

185. And what will your answer be in regard to the farmers who have sustained damage thereby?—If they have a right to compensation, it is from the Government.

186. And the Government only?—Yes.

187. So far as the Waihi Borough is concerned, is it not interested in keeping the Waihou River open as a navigable channel?—Yes.

188. Why do you say the Waihi Borough is interested in keeping the Waihou River open a navigable length?—Because there is a certain amount of goods carried on the river that come to Waihi.

189. Is it not a fact that almost the whole of the goods received from Auckland for Waihi come by river?—I have no knowledge on the subject, but probably the bulk of the goods come by steamer, and then by rail.

190. And with regard to the passenger traffic?—I think it is probable there is a fair division of it.

191. Would it be fair to put it this way: that both with regard to the goods and passenger traffic Waihi is equally interested, at any rate, with the Ohinemuri County in keeping the river open?—I would not say equally with the Ohinemuri County, but I would say equally with Paeroa, if you like.

192. Therefore if you take the county, you are more largely interested. There are parts of the county that are not so interested in keeping the river open as Paeroa, are there not?—Oh, yes!

193. With regard to mining machinery, is it not a fact that almost all of that comes by river?—Yes.

194. Then, that being so, anything done by the Ohinemuri County Council as a River Board that prevented wharfage being charged also benefited Waihi?—I always understood that the River Board had done nothing.

195. Were you not in Court when it was stated that practically the reason for the River Board being formed was to prevent the imposition of a wharfage rate?—Yes, that is right; I heard that.

196. That benefited the Waihi Borough as much as it did the other part of the county?—It benefited Waihi.

197. Waihi subsequently became a borough, and after that it benefited the inhabitants of the borough?—Yes; other local authorities benefited too—the Piako County Council.

198. Is it not a fact that goods also come up the river even to go up to Te Aroha and Hamilton?—Yes, but I do not know to what extent.

199. So far as the Waihi Borough is concerned, is it not a fact that after the result of the last flood the borough itself had to use the county road?—Yes, for a few days.

200. As a means of access to and from your borough?—Yes. Might I add that a very heavy flood—one of the heaviest floods seen in Waihi—was on the date I mentioned—29th March, 1909.

201. Was that also an abnormal, or phenomenal, or unexpected flood?—My description of it was that it was the heaviest flood that we have had in Waihi that I have seen.

202. Do you know about the damage that it did down here?—I never heard of it doing damage down here. It was evidently a cloud-burst on the other side.

203. Then the fall was to the other side?—The water came this way, too, but it did not reach as far as here with any damaging effect.

204. Do you mean that half the fall came this way and half the other way, so that it might have been very severe at Waihi, but only half of it came this side?—There was about the heaviest flood at the Tauranga Bridge that I have seen at Waihi.

205. *The Chairman.*] We had it that the 1910 flood was over a house up there: was this one over a house too?—No; I did not see the 1910 flood. This was the heaviest I have seen.

206. *Mr. Cotter.*] Did you see the effect of it so far as the railway tunnel was concerned?—It had no effect there, so far as I heard.

207. *Mr. Vickerman.*] Was not that caused by the tailings below being banked up?—No; there is practically no deposit of tailings at the Tauranga Bridge.

208. But lower down?—It might have had that effect.

209. *Mr. Cotter.*] How many days was it after that flood—what you call the biggest flood—that you came down to this neighbourhood?—I did not come down; I came up.

210. You speak of it having no effect at Paeroa: do you speak of your own knowledge or from report in the newspapers?—It was common knowledge that it did not come down here. It is remarkable that it has not been mentioned in this inquiry.

211. Can you give the Commission any idea of the first year when what I may call the silt question commenced to be talked about as likely to injure either the river or the settlers on the bank?—No, I do not know that I could give the date.

212. Anwhere near?—I know there was a very heavy flood here in 1898.

213. There was no talk then about silt either doing damage or being likely to do damage?—No.

214. You gave evidence in 1907 before the Committee of the House?—Yes.

215. Can you not cast your memory back, and say how far before that it became acute?—Speaking very roughly, I should think it was four years before that.

216. Do I understand that it was about a year after the formation of the borough before it first began to be talked about?—I should think it was more.

217. Is it not a fact that it was only a couple of years before 1907 that the damaging effects of the silt were appreciated or talked about?—Really I should not like to say to two or three years.

218. Have you any correspondence with the Council or any resolutions passed by the Council with regard to this silt question?—I cannot remember resolutions. I think it is probable there were resolutions, inasmuch as we presented a petition and proceeded to Wellington to attend the Mines Committee.

219. Can you give us any idea of the first year when the matter was brought up in the Council?—I think it was in 1907.

220. Did the then Council take up the attitude that you have told the Commission the present Council takes up with regard to this silting trouble? Has the Council at the present time passed such a resolution?—No.

221. Is there a formal declaration now?—No.

222. You have told the Commission of the attitude that the present Borough Council has taken up. I am asking now with regard to the attitude of the Council in 1907?—Yes, certainly.

223. The attitude they then took up was that they were in no way responsible, but that the Government were wholly responsible for it?—No, I said that my opinion was that the Government was responsible.

224. I am asking you as Town Clerk of Waihi?—I take it the Town Clerk can only express the opinion of the Council when it is expressed by resolution. I have given the opinion of the Council, but it was not expressed by resolution.

225. Does that answer apply to the year 1907?—Yes.

226. Do I understand that when you, and the then Mayor (Mr. Gilmour), and Councillor Donaldson gave evidence before the Mines Committee, you and they knew that was the feeling of the majority of the Council?—I knew, any way. I do not know what evidence they gave. I was not present.

227. Do you mean to say that you were so little interested in this matter as Town Clerk that you have not since that time seen this report?—Yes, I do.

228. Not even up to the present moment?—I saw it the other day. That was the first thing I heard of it. I may say that I had a family trouble at the time. I gave my evidence and left.

229. May I take it that there has never been but one opinion held by the majority of the Waihi Borough Council, and that was that they should hold on to their gold duty, allow no part of it to go to remedy those evils, and that the whole and sole responsibility lay with the Government?—Yes.

230. You have the balance-sheets of the Borough Council. Take the one ending 31st March, 1909. Take the general rate: is that correct, putting it down as 6d.?—Yes.

231. I have here the document "Statistical Tables of Local Government." Under the heading "Rates, including special," there is put down a sum of £829 16s. 9d. Is that correct according to your balance-sheet?—Yes. Under my heading of "Rates" I do not include the Government subsidy. £829 16s. 9d. is the actual amount of rates collected.

232. Take the next item, "Licenses, rents, and other sources, £7,407 16s. 7d.": what are the items included in that?—Auctioneers' licenses, £40 10s.; publicans', £162; wholesale liquor, £20; vehicles, £14; other sources, £545; water-supply, £1,480: sanitary services, £1,064: abattoirs, £783; gas, £3,542. That comes up to £7,400.

233. In the expenditure column there is £1,882 16s. 2d.: can you tell us whether that includes any charges relating to the production of gas, or whether it is practically what is called office-management?—I think those are general charges.

234. You take £1,800 roughly as what we might call office-management?—Yes, and administration generally.

235. Can you tell us what the gold duty was last year?—£20,473.

236. It really fell off last year as compared with the year before?—Yes.

237. *The Chairman.*] What was the gold duty?—£1,680.

238. Please give us the figures for the year ending 31st March, 1910?—General rates and subsidy, £1,085; license fees, £107; other sources, £339; abattoirs, £785; gas, £4,184; water, £1,424; sanitary, £1,249. That makes £9,173.

239. The amount of £1,800—does that include bank interest?—No.

240. We have got to add bank interest—how much?—£1,119.

241. *Mr. Cotter.*] Do you keep any check on the monthly returns of the mining companies as against the money got from the Government?—Yes; I can supply those figures.

242. Is the only loan from the Government the £21,000?—Yes.

243. If we add £21,000 to the £23,000, we get the total liabilities of the borough?—Yes.

244. *Mr. Mueller.*] You said that the houses and buildings that have been recently erected in Waihi have been of a smaller character. Have not the houses that have been put up during the last two or three years been of a much more substantial character than those of previous years?—Yes.

245. Was not that to a very great extent on account of the Government lending the money on the Waihi titles under the Government Advances to Settlers and Workers Act?—I think probably it was.

246. Have you any idea of how much money has come into Waihi in the last two or three years in that way?—It is hardly two years since that started.

247. But has it affected the building operations, and to what extent?—I could not say.

248. You have no idea of the total amount of money that has been advanced by the Department?—Not the faintest.

249. A certain amount of money has been advanced by the Government on those titles?—Yes, but it is not being advanced now. It is very spasmodic.

250. Your borough found some difficulty in raising loans from private individuals?—They got a straight-out refusal. We got the waterworks loan prior to the time the bank put us in a hole.

251. What was the alleged reason?—They simply declined; they gave no reason.

252. So that a mining-township title is not looked upon as such a good security as a farming title?—No.

253. I suppose that is because farming is looked upon as more permanent than mining?—Yes.

254. You know that in the South Island they have rating on mining properties instead of the gold duty?—Yes.

255. If that were the case here, instead of your borough getting the gold duty, you would have the right to levy taxes on mining properties. You would then put a value on the mines, their batteries and works, and tax them accordingly?—Not the batteries or machinery—except for a waterworks loan.

256. You would value the mines, less the machinery?—Yes.

257. Provided you had mines within your boundary, you would be able to get a revenue from them before there was any gold produced, if it were a tax on mining property instead of the gold duty?—It is very hard to say what the value of a mine is that is producing no gold. As a matter of theory, of course, there would be something to be raised; but whether it would be material or not, that is another question.

258. If there were rating on mining properties, you would actually be getting your revenue earlier than if it were merely gold duty?—It all depends on circumstances, I think.

259. You get a large revenue just because your borough was formed at the time everything was in full swing?—Yes.

260. If your borough had been in existence as long as the county, you would have had very little gold duty for a long term of years?—Yes.

261. During that time you would have had some revenue from gold-mine rating?—Yes, if the mines were rated, but I cannot say what the extent of it would have been.

262. *Mr. McVeagh.*] I think you prepared a statement showing the contributions of your borough in respect of roads in the Ohinemuri County from 1904 on?—Yes, £24,227. [Exhibit No. 39.]

Waihi Borough Council.—Payments made to the Ohinemuri County Council under Award gazetted 19th March, 1903.

	Financial Adjustment.			Maintenance of Main Road.		
	£	s.	d.	£	s.	d.
Year ending 31st March, 1904	1,780	18	10	8,119	15	11
,, ,, 1905	23	3	10	4,472	18	5
,, ,, 1906	23	3	10	3,765	8	8
,, ,, 1907	23	3	10	1,636	7	9
,, ,, 1908	23	3	10	1,833	2	7
,, ,, 1909	23	3	10	2,479	17	7
,, ,, 1910	23	3	10	535	8	10
	£1,920	1	10	£22,307	9	11
				1,920	1	10
				£24,227	11	9

263. *Mr. Mitchelson.*] That includes the £10,000?—Yes. It has been paid off.

264. *The Chairman.*] You gave evidence before the Mines Committee: do you confirm that evidence?—Yes.

JAMES NICHOLSON examined. (No. 50.)

1. *Mr. McVeagh.*] You are a member of the Borough Council of Waihi?—Yes.

2. How long have you resided in the borough?—Since January, 1897.

3. I think you have had a very long acquaintance with the Ohinemuri district?—Yes. I was down here in 1869.

4. You have heard Mr. Morpeth's views with regard to the proposal to subtract from your borough's revenue?—Yes.

5. Do those views express your own opinions in the matter?—Yes.

6. In 1869 I think you were engaged in the timber trade in the lower Waihou?—Yes.

7. I think you were rafting timber down the Ohinemuri River?—Yes, we were cutting timber.

8. That required your being constantly on the river?—Yes, every week we used to be on the river. I was there from October, 1869, to March, 1870—roughly speaking, six months.

9. In the portion of the Waihou below the Junction?—We were cutting timber somewhere about Netherton. It was probably below Netherton—from the water's edge back perhaps some 10 chains.

10. In the course of rafting timber down the river, did you make any observations with regard to the river?—Yes, there were two sandbanks between us and Turua. I could not tell you exactly where they were. I believe there were really three banks, and our rafts stranded on those banks. Whenever there was any rain of any consequence the channels used to shift.

11. *Mr. Mitchelson.*] Was one of those banks the bank from which the Auckland scows are now obtaining sand?—There was no sand then at all. There was bush on both sides of the river up to Thorp's. I could not fix the exact place now where we used to have so much trouble with regard to the rafts.

12. Did you make any observations with regard to the depths of the river at low water?—Except where we stranded, the river was fairly deep.

13. You do not know anything with regard to the channels?—No: all I remember is the trouble with regard to the rafts on these banks.

14. *Mr. Cotter.*] How long have you been a Councillor?—A little over twelve months.

15. During that twelve months has this matter of the silting of either the Ohinemuri or the Waihou River come up while you have been present at a meeting of the Council?—Yes.

16. When?—Just when this Commission was set up, or when it was proposed to be set up. When the Minister of Mines was down he promised that a Commission would be set up. That was about three months ago, I think.

17. What question cropped up at the meeting of the Council?—The question that cropped up was to devise the best means of preserving the revenue of the borough.

18. Not a consideration of the best means of alleviating the injury?—No; we did not consider it within our function to do that.

19. Why?—Because we did not contribute in any way to cause the damage.

20. But you were receiving a very large sum from the material that caused the damage?—No; we were receiving the revenue from the gold duty, but not from the material that caused the damage.

21. You were quite willing to receive the revenue and still say you had nothing to do with the material that caused the damage?—Yes, so long as we were receiving it legally.

22. You did not care where the stuff went or what damage it did?—No, that was not our business.

23. While it was an advantage, you were quite willing to receive all the profits from it, but while it was a disadvantage you wanted to disclaim any responsibility?—What is the advantage and disadvantage?

24. Do you really mean to say to the Commission that you do not know what is the advantage?—Do you refer to the gold duty or to the tailings put into the river?

25. The advantage refers to the gold duty?—Yes.

26. And the disadvantage refers to the tailings put into the river?—Yes, we will have it like that.

27. And that is the way you want to continue to have it?—Yes.

28. And you wish to be considered a fair and just man in so considering the matter?—Certainly.

29. And you would be quite willing to still continue to receive this large sum of money, although the article that had been treated, and paid you this money, wrought destruction upon innocent persons?—Yes, but we did not work the article.

30. You would be quite willing to receive it?—Yes.

31. You are quite willing to receive the profits of anything so long as you are not responsible for the way in which it was obtained?—We do not receive the profits; the shareholders do that.

32. No, they do not. They neither receive the whole, nor do you, but they receive part and you receive part?—We receive the part that comes to us as a local body by law.

33. Do you really say that, in your opinion, the Waihi Borough should pay no part of the expense of ameliorating the trouble?—I say we should not. We do not contribute to the trouble, and therefore we ought not to pay for it.

DAWSON DONALDSON examined. (No. 51.)

1. *Mr. McVeagh.*] You are a member of the Borough Council of Waihi?—Yes.

2. You have held that position for, how long?—Since the borough started, with the exception of a few months.

3. You have given some consideration to this question of diverting the gold duty?—Yes, a good deal.

4. Were you present when Mr. Morpeth gave his evidence?—Yes.

5. Are you prepared to indorse Mr. Morpeth's views?—Very largely, yes.

6. Do you wish to add to them or modify them?—I would like to make one correction, and that is with regard to the liability of the borough for hospital construction and maintenance. Mr. Morpeth was asked what the present demands on the borough were from the Hospital Board, and I think he gave it as £1,600. As a matter of fact, it is £4,000. The new wing of the Hospital will cost £2,600. Mr. Morpeth was speaking of the proposed lesser extension. The Health authorities considered it imperative that we should have an infectious ward.

7. *The Chairman.*] What do you do with infectious diseases now?—At the present time they are put in a building adjoining the main building, which violates all the principles of hospital-management. The additional building would cost £1,500 to £1,600.

8. Is that to be built this year?—The medical authorities are pressing it on very urgently, and at the present moment the infectious-diseases ward is filled, and they have to accommodate patients on the verandah, porches, &c. It was built to accommodate thirty-five patients in the first place, and now there are fifty there, with the result I have indicated. Dr. Valintine and other medical men are pressing that adequate accommodation should be provided.

9. How many beds do the present side wards accommodate?—Only five beds each. We have four main wards and two small rooms built off the main corridor.

10. You have an infectious ward, but it is not big enough or is unsuitable?—It is unsuitable, and is a menace to the main Hospital.

11. Do you wish to add anything further?—I may say that our hospital accommodation is taxed very largely by patients outside the borough. We treat patients from Karangahake and Waikino. I think, roughly speaking, that one-fourth of the patients we treat are from outside the hospital district.

12. I think the nearest hospital is at the Thames?—Yes. In regard to the question of abattoirs, we tried to borrow the money from the Government to build an abattoir, but they refused us. I think they thought we had got quite enough as it was. We were given to understand that the Government could not entertain any application for further loans; that we were thrown upon our own resources and must paddle our own canoe. As to the gold duty, my investigation of the conditions in both Islands has caused me to come to this conclusion: that the mining in the South Island is largely on the surface, and not much capital is required to embark in mining there.

13. *Mr. Mitchelson.*] There is a great deal of quartz-crushing in the Inangahua district?—What we thought in Waihi is this: that the nature of the mining is such that an enormous amount of capital is required to reach the reefs. We think the development of the big mine shows us that adjacent mines will have to be sunk even lower than the big mine in order that they may reach the reefs. If that is so, I think it most unjust and unfair to tax or suggest the taxing of investors who have to incur such an outlay before they can hope for any return. And then there is the small rate—if I may call it so—that the law places upon the gold. We look upon the gold duty as a duty in lieu of a rate, and as much fairer than a rate, because it does not unduly oppress anybody. Capital is sought to be made out of the expenditure on our Beach Road, which I think is very unfair.

14. *The Chairman.*] Tell us your opinion about the Beach Road?—I think it is a very fair and correct thing for the borough to undertake, because we are without access to any pleasure or health resorts. I think the health of the town justifies the expenditure of £500 or £1,000.

15. How many miles long is this road?—Five miles.

16. *Mr. McVeagh.*] Before the borough was formed, what was its general condition?—The condition of the place was very bad. It was very bad from a sanitary point of view.

17. What was the method of sanitation adopted by the local governing body then?—It was simply horrible. The bulk of the places were not visited at all, with the result that the nightsoil was buried in the town.

18. There was a population of four thousand: was there any provision made for supplying them with water?—No.

19. Or light?—None whatsoever.

20. Do you recollect anything about the condition of the roads?—The roads were largely impassable. The Main Road was fairly decent, but the request of local residents to the County Council for expenditure within the limits of the town received only a very cool reception. That was really the primary cause of the people feeling that they were unjustly treated.

21. *The Chairman.*] You gave evidence before the House?—Yes.

22. You confirm that evidence?—Yes; I think it is correct.

23. *Mr. Cotter.*] What annual rates do you pay in the borough? We have been told that it is 6d. in the pound?—That is the first general rate. Then there is the sanitary rate, 4s. 3d. per quarter.

24. You say you were in the borough when it was formed into a borough?—Yes.

25. Is it not a fact that the whole reason for applying to have it formed into a borough was to obtain the gold duty?—Absolutely not. That was one of the reasons, but that it was the sole reason I absolutely deny.

26. Up to the period of the formation of the Waihi Borough, is it not a fact that the greater part of the gold duty was spent practically in roading the district, and, so far as it would enable them to do so, improving the various townships of the district?—I do not think so.

27. Where was it principally spent?—I did not go over the whole of the county, but there was a strong conviction that, as far as Waihi was concerned, that expenditure that should have come our way went in other directions.

28. In what other directions?—In cutting drains, and in draining the land of the farmers.

29. Are you serious in saying that?—Yes.

30. Will you state what drains, and give some idea of the amount?—I have told you that I am giving a statement in this respect in the way that information comes to a man generally. What I will say is that Waihi did not get anything like its fair share of expenditure.

31. *Mr. Mitchelson.*] You have been a member of the Borough Council since the borough was formed?—Yes.

32. Do you not consider, in face of the possibility that always exists of the gold giving out, that it is unwise of the borough to undertake works of a permanent character?—No, because we consider it is the cheapest in the end.

33. *The Chairman.*] Supposing the mines were to get five times the quantity of gold, do you still consider that you would still be entitled to the whole of that amount?—Till the law is altered, yes.

34. And you would not be prepared to say that the borough should contribute anything towards the alteration of the silting trouble?—If we had five times the revenue I would say I would give you a big sum towards the silt trouble.

35. What revenue do you consider necessary to carry on the work of the township?—Until we have an efficient drainage system, and until we have an efficient water system, I consider that the essentials of the town are not catered for.

36. You have a drainage system?—It is not adequate. It would require about £14,000 further expenditure before it is complete, and about £40,000 for a drainage scheme to make the town anything like what it should be to accommodate its population.

37. *Mr. Flatman.*] Patients from outside the hospital district—do they pay for the attention they receive?—Yes, a guinea a week.

DUNCAN WILLIAM MCARTHUR examined. (No. 52.)

1. *Mr. McVeagh.*] You are a civil engineer, and you are Engineer of the Waihi Borough Council?—Yes.

2. How long have you held that position?—Six or seven years.

3. You have a very good knowledge of the borough and its requirements?—Yes.

4. You have prepared a statement showing what are the requirements of the borough which come under your concern in regard to maintenance, and also in regard to the capital expenditure?—Yes. [Statement read. Exhibit No. 40.]

Waihi Borough Council.—Engineer's Statement as to the Requirements and Expenditure in Maintenance and Extension of Roads.

Streets and Paths.—In Waihi there are 61 miles of streets, of which 34¼ are in a state of nature, and 26¾ miles have been partly formed and metalled in the centre, with footpath formed; some only natural soil, some gravelled, and a few principal ones asphalted and having concrete kerbing.

The maintenance of our present metalled streets and paths, to keep them simply as they are, and without any widening of metal, will cost upwards of £5,600 per annum, and, assuming that within a few years—say, five years—it will be necessary to construct half of our present unformed streets—viz., 17 miles—then the maintenance will be increased by $\frac{17}{26{\cdot}75}$ of £5,600, thus bringing the amount for maintenance alone to £9,159.

To construct this half, or 17 miles, 1 chain wide, with double footpaths, only centre of roads metalled, and paths gravelled, will cost £30,400, and, adding to this £4,000 for bridges now necessary, the cost will be £34,400.

Water.—This is supplied in most of the metalled streets, and, taking the above 17 miles as requiring extensions, together with an additional water-supply from another valley, which is urgently required now, the outlay will be £14,776.

Drainage.—Waihi has no drainage system for carrying off sewage, all such, except nightsoil, being thrown on the ground and into holes dug for the purpose; the nightsoil being carted away in pans and buried. The result of this is that every season has its quota of fever victims, thus showing how imperative it is that a proper system be adopted to remedy the evil. To this end the Borough Council has long considered that a proper system of drainage is necessary, and instructed me to prepare an estimate for the work. This I have done, only taking the present formed streets—viz., 26¾ miles—and find the cost will be quite £24,000; but when considering the almost certain extensions of street-construction up to half of the unformed portions—namely, 17 miles—then $\frac{17}{26{\cdot}75}$ of £24,000 will have to be added, so that this addition of £15,252 brings the amount up to £39,252.

Works ordered and under Construction.—These consist of formation, metalling, footpaths, concrete, kerbing, flood-damage repairs, Beach Road, and a number of other works, £3,140.

5. Is it not necessary to provide for further water-extension?—Yes.

6. We have your estimate and your statement about drainage: in your judgment, is it necessary to provide a drainage system to cost that sum of money?—Yes, £24,000. I think it ought to be done immediately. It ought to have been done long ago. The Health Department has been pressing us to get it started for some years past.

7. Where will you get the money from?—It will have to be paid for out of revenue, but it will have to be constructed gradually.

8. You have a very fair knowledge of the Ohinemuri and the Waihou Rivers?—Yes, fairly good.

9. Have you Mr. Haszard's plan?—Yes. [Exhibit 41, plan.]

10. That is a plan showing the areas affected by the last flood?—Yes; it shows the land on which sediment has been deposited. It also shows the places where we took the samples from the river-bed.

11. The areas affected by the flood are shaded brown—a neutral tint?—Yes.

12. After the last flood, you went down the Waihou River to Netherton in company with Mr. Haszard?—Yes.

13. To examine for the purpose of this Commission into the question of what damage had been done?—Yes.

14. At Netherton, what did you find there—say, at the Netherton School?—We could not find any sign of this deposit there.

15. Did you notice how far the last flood had been up near to the school?—Yes, it just filled the drains; it did not get over the middle of the road.

16. Then, coming up the river, did you examine the portion of the river lying between Thorp's Bend and the next big bend?—Yes.

17. You found traces of deposit there?—Yes.

18. Where did that water come from: could you determine that?—I am quite sure that the water that affected Thorp's Bend came across from the Waihou River about a mile or so above the Junction, and flooded right over everything.

19. You took some samples?—Yes.

20. I want you to describe the method you adopted to take these samples?—Yes. I have a diagram here showing it. [Exhibit No. 42.] A description is given of the places from which the samples were taken.

21. I think those samples were handed over to Mr. Morgan, Director of the School of Mines, Waihi?—Yes.

22. And you received his report upon those samples as well as upon the others that were taken?—Yes.

23. In the course of your investigations did you find any indications of the solidifying of the bottom of the river?—None whatever; quite the reverse.

24. You know the large bank at the junction of the two rivers?—Yes.

25. How long has that been there, to your knowledge?—I do not remember the beginning of it. It was there when I first came to this district, about fourteen and a half years ago.

26. I think it is a fact that it has increased in size somewhat?—It has.

27. To what do you attribute that increase in size?—To sand and sediment getting into the eddying waters.

28. Is there a willow growing on it?—Yes, a dense mass of willows.

29. Do they play any part in increasing the size of the island?—Yes; that is what causes still water at low tide.

30. *Mr. Mitchelson.*] Were not some willows planted at the upper end of the island?—I put the willows at the upper end. I may explain why I put them there. About fourteen years ago that island was quite separate from the mainland. It appeared to me as if it were a block of bank that had fallen down by the weight of the willows. That was the way the island began. There was a flood in 1896 that got in behind that island, and altered the current of the Waihou River, and caused the beginning of the sandbank that is there to-day. To prevent a recurrence of the water getting in behind the island I put in the row of willows.

31. *Mr. McVeagh.*] You were County Engineer at the time?—Yes.

32. We may take it that the bank and willows impede the flow of waters from the Waihou?—Yes.

33. I think you superintended the construction of the groin?—Yes; we put up that groin for the purpose of training the current a little higher up the stream to scour away part of the mud-bank there. It did do that, and to some extent shifted it over to the other side.

34. How long ago was that?—Either in 1896 or 1901, I think.

35. That bank had been occasioning trouble to you?—That was the first appearance of the bank.

36. Was that bank, as far as you can say, in any way due to the deposit of silt tailings?—There was a lot of silt tailings on it—leaves, willow-branches, roots, and every imaginable kind of *débris*.

37. *Mr. Mitchelson.*] I suppose a good deal of it was ordinary Waihou River sand?—Yes, there was a good deal of it coarse sand.

38. *Mr. McVeagh.*] You are acquainted with the Waihou River above the Junction?—Yes.

39. And with the growth of willows upon the banks of the river?—Yes; I know both rivers fairly well.

40. What effect have those willows upon the Waihou River when it is in flood?—Reducing the cross-sectional area of the natural flow, it backs the water up. Not long ago there were one or two places that were not wider than 30 ft. between the branches.

41. Have you formed an estimate as to the extent the growth of willows retards the flow of the current in flood-time?—It must heap the water up feet higher than would be the case if the willows were not there.

42. Do you think it would retard the flow of the river by one-third?—It would be very difficult to say without measuring it.

43. Do the willows not have another effect when the branches break off?—Yes, the current sometimes breaks the branches off, and they float down the stream and become planted by nature.

44. You know that portion of the Waihou River above Tirohia Railway-station?—Yes.

45. And at a lower point on the left bank of the river?—Yes.

46. Have you seen where the flood-waters overflow the Waihou River at that place?—No, not myself.

47. Have you examined it with a view to determining whether the flood-waters do overflow there?—I do not think they could do anything else but flow over there, owing to the lowness of the banks and the condition of the willows.

48. What direction would those flood-waters take?—Westerly and northerly.

49. Where would they make for then?—Towards Te Awaiti Creek.

50. Where would they ultimately break away?—If the Awaiti Creek was in flood at the time, the extra water would certainly flow both ways; and I think from appearances it is quite clear that they came down into the back of Netherton from somewhere, because the water was falling over into the Waihou River there; but whether it came from the Waihou or the Piako I cannot say.

51. Where would the flood-water that overflows at the Tirohia Railway-station make for?—In a westerly direction, and I believe that water also gets into the Awaiti Creek, across Section 6547. It crosses that road-line. I have seen it running over that road-formation in the olden days.

52. You have observed a number of drains that flow from the swamp on the left bank of the Waihou above the Junction?—Yes.

53. Are they provided with flood-gates?—I do not know.

54. Would the waters of the Waihou in flood-time make up those drains and run across country?—Certainly: if the water got into the drains it would run back until it came to its own level.

55. The left bank of the Waihou is higher immediately adjoining the bank than the country at the back of it?—Yes, in many places.

56. Are there not large swamps there that would retain the flood-waters?—Yes.

57. The Netherton country is low-lying land, is it not?—Yes.

58. A good deal of draining has been done there?—Yes.

59. *Mr. Moresby.*] When were you first Engineer to the Ohinemuri County Council?—December, 1895.

60. How long did you continue to be Engineer?—Fifteen months, the first time.

61. When did you again become Engineer to the County Council?—1901, I think.

62. How long did you continue to be Engineer on that occasion?—Two years.

63. You left the Ohinemuri County Council when the Waihi Borough was formed, and became Engineer to that body?—Yes.

64. What was the state of the island just above the Junction when you first became Engineer?—I do not know exactly. My attention was never called to it until the formation of the small bank. It was in 1895, I think.

65. Do you remember Captain Sullivan doing anything there?—No.

66. Captain Sullivan states that he put in a groin of 200 ft. in order to divert the current at the top part of the island?—If he did that, it was well out of existence after the first flood. I remember seeing a few stakes there that appeared to have been put in.

67. What did you do at that time?—I put in a groin at the top, and then extended it to a certain point. The groin is in existence now.

68. What did that island consist of at that time—river-tailings?—The first time I saw it it was river-sand. I do not remember any mining tailings there then. When I saw it in 1901 there were some mining tailings on it.

69. A fairly large deposit?—No.

70. What object did you have in putting in the groin?—To scour away the bank that had formed in the old steamer-channel, where the new bank is formed.

71. I think, in 1901 the "Waimarie" and other steamers used to come up to the Junction?—Yes.

72. I have a letter here signed by you as County Engineer, dated 4th September, 1902, in reference to that bank?—Yes.

73. That island has not gradually disappeared?—It is closer in to the bank than it was then.

74. Has that island not got larger?—Yes.

75. So that the effect of that groin was not to make the island disappear?—No: there is very heavy water coming down the Ohinemuri—heavy stuff—and at low water in the Waihou there would be still water there.

76. Was not that an old main channel that the steamers came up?—Yes.

77. There would not be still water in the main channel?—There were two currents operating against each other. The water eddies round and round there. I saw a large branch of willow-tree stranded there. I stated to the Council that it should be cut down. However, it was covered up very quickly.

78. Do you consider that the groin you put in is an obstruction to the Waihou?—I do not know that it is.

79. Are you prepared to say that it is?—I am prepared to say that in its position now, and if it were made 6 ft. higher, it would sweep everything out that side of the river, provided you let all the water come down the Waihou that nature intended should come down.

80. That is still your opinion, notwithstanding what you have seen of the present entrance to the Ohinemuri?—Yes.

81. Do you consider the entrance to the two rivers a good entrance?—No,

82. Have you studied the matter to see whether improvements could be made where the two rivers meet one another?—Yes.

83. What opinion have you formed?—I have thought many a time of cutting through at the bend at that place. That is the cutting recommended by Mr. Metcalfe. It comes out above the Puke Wharf, above Thorp's orchard.

84. You have not estimated what the cost would be?—No.

85. Have you never recommended that before?—No. I have not recommended it. We have talked about it.

86. I think the cut would be a fairly expensive one?—Yes. I am speaking of the cut immediately below the Junction. It would only be a cut of some 900 ft. Besides that, you would have to cut or kill all the willows.

87. The samples you took were taken all the same day?—Yes. One sample was taken at the Ngararahi Bend, where Mr. Metcalfe proposes to make a cut. I took the sample on the left-hand bank.

88. Is that the lowest bank?—No, not at that point. The right-hand side there is the lowest.

89. Did you examine the other bank of the river?—No.

90. Did you observe silt there?—Yes, what I believed to be mining silt, just above the Junction, opposite Ngararahi, opposite to where I took the No. 2 sample.

91. Where do you suggest that that mining silt came from?—There was only one place where it could come from, and that was from the Ohinemuri River.

92. You think it came straight over from the Ohinemuri?—The indications showed that. The indications were perfectly plain on the mill-road. There was no mistake as to where the current had been. I do not think tailings had come up as far as that.

93. What is the width of the river where you took No. 3 sample?—Two or three hundred feet.

94. What was the depth of the water where you took the sample?—About a 12 ft. rod. I took the sample from the launch at low water. It was taken from the channel.

95. I suppose you expected to find a lot of tailings in the channel?—I did not find them.

96. Did you take it from the surface?—About 2 in. under. Wherever I took the sample the depth was under 12 ft.

97. Can you say what the depth was at the time you took it?—Anything from 6 ft. to 10 ft., except where I took the sample opposite Hape Creek.

98. So that we may presume you were looking for the channel, and you took your samples from there?—Yes, from the bottom of the river.

99. You spoke about the water running up some drain on the west bank of the Waihou?—Yes; one was above the Tirohia Railway-station. It was an outfall from the swamp, and in flood-time the water runs the other way. I cannot say where the other drains are.

100. When you were Engineer to the County Council the railway was not open to Waihi at that time?—No.

101. Can you give us some indication of the traffic on the Main Road?—About four hundred horses left Paeroa every morning for about five days in the week, and there were twelve wagons regularly on the road, with eight horses in each wagon—each wagon containing from 6 to 8 tons.

102. I think the heavy machinery all went out that way?—Yes, weighing as much as 50 tons.

103. That road was a great expense to the county for upkeep?—Yes.

104. You know that thousands of pounds was expended on the road for upkeep?—Yes.

105. There was a large sum of money expended on the road from Waitekauri to the Golden Cross?—Yes; it was principally Government grants.

106. The county spent a lot of money on the tracks and roads?—Yes.

107. You had also to look after several gold-mining townships?—Yes.

108. Waitekauri, Golden Cross, Waikino, Mackaytown, Paeroa, and Maratoto?—Yes.

109. So that out of the gold duty the county received it had to provide for eight or nine mining townships, besides the upkeep of the county roads?—Yes, but they got enormous Government grants.

110. Could they have made all that expenditure from their ordinary revenue?—No.

111. The Government was at that time spending money in opening up goldfields by roads and tracks?—Yes.

112. *Mr. Myers.*] You know that there are drains running into the upper Waihou that carry down *débris* other than mining silt?—Yes, many of them run through sandy country.

113. Would you or would you not expect large quantities of material to be brought down those drains?—Yes; you see the sand running into the river at the end of the drains.

114. That is ordinary alluvium—nothing to do with mining silt?—It is what is generally termed pumice sand—quartz.

115. Did you see any other kind of material coming down those drains?—In wet weather the water in the drains is muddy. The sand that has been taken out of the ditches has been put on the top of the roads in many places as metal, and the result is that when a shower of rain comes it is washed off the roads into the drains.

116. You referred to the willows on the Waihou; you have said nothing about the willows on the banks of the Ohinemuri River: do you think that if those willows were cut down the condition of matters would be ameliorated?—Yes, certainly: I would cut every willow in sight.

117. You think that would ameliorate the condition of matters?—Yes. The water will get away quicker, and the river will be nearer its original condition.

118. Do you think that would cause floods lower down the river?—I do not know whether it would or not. The flood would get away quicker than it does at present.

119. Have you considered the question of erecting stop-banks?—Yes: that is quite apparent to any one who looks at the river.

120. Do you think that the judicious erection of stop-banks would improve matters?—Yes, it would save a lot of flooding; but it would have to be done with great care. There are places on the river where if a little attention had been given, with a day or two's labour, hundreds of pounds of loss would have been saved.

121. *Mr. Hanna.*] A reference has been made to the report of Mr. Metcalfe. He also recommends a cut at Pereniki's Bend. Do you object to it, and, if so, what are your objections?—You would be putting all the fall in the present three miles and a half of river into about half a mile, and you would have such a rapid current there it would draw everything out of the river: it would be carried further down the river.

122. To the navigable parts of the river?—Yes; that is what I have always said.

123. *The Chairman.*] Can you give us an idea of what the fall is in the three miles and a half?—I think it is only 3½ ft., but I have never taken the levels.

Mr. Bray: Nine inches and a half from actual water-level.

124. *Mr. Mueller.*] You have heard Mr. Bray's statement as to the fall in that distance: do you still adhere to your previous opinion that this fall would create too much of a scour altogether?—Yes.

125. Supposing the river were first cleared of the tailings that are in it, would not that cut be a great benefit for the future getting-away of the water?—No; I expressed an opinion about that cut before the tailings were ever causing any nuisance at all. My opinion was asked about it twelve or fourteen years ago. My reply was that it would lower the flood by many feet if that cut was made; but in doing good to one part of the place you would be doing harm to the people down below.

126. You say this water comes over the bank at Mackaytown and comes across the country to the Waihou?—Yes.

127. And this cut, you say, would create such a torrent that the lower land would be flooded?—Yes.

128. What land would be flooded still more?—Round about the Junction.

129. Even supposing the present deposit of tailings were cleared out of the river?—Yes.

130. You think the cut would probably save Paeroa from being flooded?—Yes, it would lower the level of the flood-water at Paeroa.

131. You remember the flood in March last?—Yes; there was not a match-box full of silt on the paddocks at Crosbie's.

132. The willows, you say, impede the current considerably?—Yes.

133. And you say the cross-section is considerably affected?—Yes.

134. And that, you say, naturally causes the river to overflow its banks?—It helps it to do so.

135. Supposing the willows are cut down, that would cause a quicker flow of the river: would that not tend to shift the silt in the river further down?—Yes.

136. I suppose you admit that on the banks of the lower Waihou, from the Junction as far down as Netherton, there are deposits of tailings?—Yes.

137. That, I suppose, narrows the river cross-section?—To a certain extent.

138. And if that were still further narrowed by a further deposit, it would make the flooding still more frequent?—It would; but if you cut the willows down in the upper Waihou you would allow all the drainage of the valley to keep within the banks of the river. You would bring it all down past the Junction, and scour out the channel; it would thence go out to the sea, and carry with it three parts of the stuff that is now being deposited.

139. Do you mean to say that the extra flow of water would scour away that bank, and not simply flow over all the countryside?—Yes, provided you trained the current properly with a groin. At present when there is a flood, most of it goes over the top.

140. You reckon it would sweep that bank away?—Yes, if it continues lower down.

141. Supposing even you did that, and mining operations were to take place in the upper Waihou at Waiorongomai, the tailings would come down the upper Waihou?—Yes.

142. And, according to what you state, willows would collect things: would the stuff not be distributed in the upper Waihou?—Yes, it would gradually come down.

143. Talking about the last flood of 1910, you consider that the water which affected Thorp's Bend came from the Waihou about a mile above the Junction?—I think so.

144. Where were you when that flood was at its height in March, 1910?—In Waihi.

145. You did not see the Waihou during that flood?—No; but I went there afterwards, and traced the direction of it from the scour it had made.

146. Do you know whether the Waihou at Te Aroha was in flood at all in March?—I do not know.

147. Did you not hear that the Waihou was not even bank-high at Te Aroha?—I heard there was not much of a flood there in March.

148. So that, from the effect of what you saw of the flood, if the water had gone across at the place you indicated, would you not think it had been caused by the blocking at the Junction, and the Waihou waters being blocked back?—The blocking at the Junction will not lower the water in the Waihou.

149. Will it not tend to raise the height of that water?—Yes, very little.

150. You know that the flood of 1907 did a lot of damage in the Ohinemuri and Waihou Valley?—Yes.

151. As to the sample you took at the island at the mouth of the Hape Creek, are you certain you took it 7½ ft. below the surface?—Yes.

152. Was the surface of the island at that place similar to what you got at 7½ ft.?—No; what I got at 7½ ft. was coarse pumice sand.

153. And the surface was tailings or silt?—Yes.

154. Coming back to the Waihi Borough: we have heard from Mr. Morpeth that the main street was made of a permanent character. You know that numerous other streets were formed of a permanent character?—Yes, the main street is not a very pretty street.

155. Half a mile from the main street, does not the concrete channelling extend right along to the Hospital?—Yes.

156. Miles of concrete channelling?—Not miles.

157. You have spent money on a recreation-ground, including municipal swimming-baths?—Yes, the only place in Waihi where anybody has a chance to wash himself.

158. And a municipal bowling-green?—Yes.

159. Did your borough not lay down grass tennis-courts?—Tennis has been played there.

160. Has not your borough contemplated laying down asphalt tennis-courts?—Most decidedly, and they are very badly wanted, too.

161. Did not your borough spend money in laying down a central cricket-pitch?—No; the cricketers spent that money. It is a pity we had not a recreation-ground three times the size it is now.

162. There is a new practice-room for the band?—The band built that themselves without any assistance whatever.

163. Has not the borough assisted the band financially?—Yes.

164. *Mr. McVeagh.*] What about your own salary?—My salary was reduced during the retrenchment of the borough.

165. *The Chairman.*] What is the consumption of water per head of the population?—There is no meter to measure the consumption, but I managed to do it on one occasion. It was something like fifty or sixty gallons a head. There is a lot of water used by the mines for working their hydraulic lift at the battery.

166. Do they pay for that?—Ten pounds a year.

167. Is that a fair sum to pay for the quantity of water they use?—No, I think it is fairly small; but they held a creek, and did not offer any objection to our taking that creek.

168. Is the water sold by meter?—Partly.

169. What do they pay per thousand gallons?—One shilling. The Grand Junction pays a considerable amount sometimes.

170. Why do you think fifty or sixty gallons of water is an insufficient supply for the township?—That is not available during the summer. The people are then restricted to the smallest possible supply; they are requested to use the water very carefully.

171. Do you know of any city where that does not apply?—Not so much as that. I am afraid we have not enough water for fire purposes. I think it is a very undesirable thing to be drinking water caught off the roofs of the houses. The sanitary arrangements are not what they ought to be.

172. You, as an engineer living in the district, and seeing what a serious matter the silting is, must have studied the matter. Will you give us the benefit of your idea as to what is the remedy: first, as to the present deposits; and, secondly, what is the remedy for further stuff that may come from the mines?—I have thought of it a good deal. The problem is a very difficult one. I am in accord with what Mr. Metcalfe says in connection with embankments. My idea all along has been that it will be necessary sooner or later that all the flooding waters be kept within bounds by embankments a distance out from the river—about 5 or 6 chains from each side of the river. I think that would be quite sufficient. You would require to straighten it here and there. Cut down all the willows. Then there is that deviation at the Junction. I think if these things were attended to thoroughly there would not be any danger of mischief accruing in the future.

173. You would permit future tailings to go into the river?—They would form themselves into heaps on the lee side of the bends.

174. But that must reduce the section?—Yes, but it is a very large section—10 chains wide.

175. They would have to buy 10 chains of land—the best river-flats?—Yes.

176. And the extinguishment of the Native titles and rights on the rivers?—There is nothing else for it.

177. *Mr. Mitchelson.*] Who should pay for it?—The Government should pay for it, because the Government gave permission to the companies to use it. I think that was a very good suggestion of Mr. Breakell's—to take the sand out of the river, and use it for making an embankment right across the Piako Swamp, and also for the roads that are required there immediately. It is the cheapest material that the Government could get for embankments. They require the material, and there it is. Why not take it?

178. *The Chairman.*] That would mean dredging, I suppose?—Yes.

179. Then you think it is a wise thing to discharge the silt material into the river, and lift it out again lower down the river: you think that is a mechanical possibilty?—Yes.

180. And a wise thing to do?—I think so.

181. You know the large drain running into the river at the Netherton creamery?—Yes.

182. Would you put flood-gates on that?—It certainly would do no harm. It is not so much required as higher up.

183. Did you go inland from that place?—Only as far as the school, or a little beyond. I did not go into the swamp beyond that.

184. You cannot tell me anything about the land at the back?—No; I arranged for Mr. Haszard, surveyor, to investigate the whole thing and prepare plans for the Commission, and he will show you them.

185. You said there should be flood-gates on the drains at Bertelsen's land?—That is where the silt came in and deposited itself on the land.

186. Do you not think that practically all the drains are placed, as regards outlets, at the wrong angles to the river?—Yes.

187. And would you recommend them to be placed at one angle?—At an angle down the stream.

188. A material angle?—Yes, of 25° or 30°.

189. You are aware that there was a flood-gate there?—Yes; I am given to understand that it entirely disappeared in one of the floods. The opening of the drain into the river has become very much enlarged. I have no doubt the flood-gate would have been still there if a little attention had been given to it.

190. Was the County Council a River Board when you were its officer?—Yes.

191. And did it do anything as a River Board?—No; there was an annual meeting held at which the financial position of the Board was considered; and the receipts and expenditure were nil.

PAEROA, TUESDAY, 31ST MAY, 1910.

ARTHUR HERBERT VIVIAN MORGAN examined. (No. 53.).

1. *Mr. McVeagh.*] You are Director of the Waihi School of Mines?—Yes.

2. I think you were handed a large number of samples of silt of various descriptions for the purpose of examination and report?—Yes.

3. Samples that were taken at the instance of the Waihi Borough Council?—Yes.

4. You have prepared a report, with a tabulated statement, explanatory of the results of your investigations?—Yes.

5. I think this is the report and explanatory table?—Yes. [Exhibit No. 44.]

6. I observe from the tabulated statement that you have dealt with three classes of silt-deposit?—Yes.

7. And the third class is the last on your tabulated statement?—Yes.

8. That is numbered certain figures over 3?—Yes.

9. You were given to understand that the No. 3 series was taken in the neighbourhood and above Te Aroha?—Yes.

10. Who were they taken by?—By Mr. Morpeth. The No. 2 series was taken by Mr. Haszard and Mr. Morpeth in conjunction, and the No. 1 series was taken by Mr. McArthur and Mr. Haszard.

11. Will you explain the system of classification that you adopted in your investigation?—The object of the investigation was to determine as far as possible what proportion of the samples might consist of mining tailings and what proportion could not possibly consist of mining tailings, or, in other words, consisted of natural river-sediment. The method adopted was to grade the material into coarse and fine material, the coarse material being too coarse to be possibly mining tailings, and the fine material being so fine that it might possibly be mining tailings. Then the coarse material was put on one side as being impossible to be mining tailings, and the fine material was further examined under the microscope and in other ways to see what proportion of it was mining tailings.

12. I think you have a series of columns marked A and B: Please explain these columns?—The samples were separated into four grades, A, B, C, and D. A was the coarse grade, and would remain on a 30-mesh sieve; B was the next coarsest—it passed a 30-mesh and remained on a 60-mesh sieve; C passed a 60-mesh and remained on a 90-mesh; D passed the 90-mesh. I took it that A, which remained on a 30-mesh sieve, could not possibly be tailings. It was coarse material, and it was obvious to the naked eye that it was not tailings. It consisted in most cases of pumice and grains of quartz.

13. *The Chairman.*] Did you deal with these wet or dry?—Dry.

14. *Mr. McVeagh.*] As to grade B?—Grade B was quite unlike tailings in appearance, and I have no doubt the greater proportion of it was not tailings. I have the grades here, and I think it is almost obvious to the naked eye that this grade is not tailings. C and D, however, which are fine enough to be tailings, have the appearance of tailings, and I consider that they are principally tailings.

15. I think your table shows the percentage of material in each sample that might possibly be tailings?—Yes.

16. *The Chairman.*] By bulk, or weight, or how?—By weight.

17. *Mr. McVeagh.*] Some samples were taken above Te Aroha in the neighbourhood of the Gordon Settlement?—I believe so.

18. I think they were taken for the purposes of comparison?—Yes.

19. I think no tailings have been discharged up at that point?—I believe none have been discharged above Waiorongomai.

20. Just refer to the results you have arrived at in regard to these tailings taken above Waiorongomai in respect to their degree of fineness. I think you have in your examination found a much higher degree of fineness than in the samples taken from the Waihou River?—Yes, in some cases. In sample No. 11, for example, there are 52·2 per cent. of fine material and 49·8 per cent. of coarse; and in sample No. 12, 70·8 of fine material and 29·2 of coarse. No. 11 came from the bank of the creek at the Gordon Bridge, and No. 12 came from a wash-out on the road just past the Gordon Bridge.

21. You have set forth the result of your investigation of every sample in that report?—Yes.

22. *The Chairman.*] What was the microscopical appearance of that finer material you mention?—The finer material under the microscope was in all respects similar to that of a sample

of mining tailings which I obtained from the battery. It consisted principally of grains of quartz, some clear and some milky, very fine and very angular.

23. What power did you use—under what objective?—Principally with an inch objective.

24. You said tailings or slimes?—No; similar to the sands from the battery. None of it was fine enough to be classed as slimes.

25. You have examined the slime under the microscope dry: what is its characteristic?—I have not examined slimes.

26. I understand you have examined battery tailings or sands which have gone through a 90-mesh?—Yes, practically the whole of them go through the 90-mesh—those taken from the battery.

27. *Mr. McVeagh.*] So the position is that the artificially produced sand from the battery is identical in character, in your estimation, with that produced by nature in the pumice sand at the Gordon Bridge?—Yes; the portion that is found in the bed of the river is practically identical with mining tailings. The quartz in it is identical.

28. And there are other substances present which distinguish it?—Yes.

29. Have you made any estimation as to the proportion of quartz contained in the sand taken from the Gordon Bridge?—No.

30. What I mean is this: You might in that sand obtain a large quantity of other material, and only a speck here and there of quartz: I want to know, is quartz a predominant or minor factor?—The quartz is predominant.

31. Does that refer only to 11 and 12, or are there a number of other samples?—Yes, I think there are about nine series.

32. And what you are saying now applies to other samples besides 11 and 12?—Yes, I think it applies to most of them.

33. It is a general statement in regard to the whole of the Te Aroha samples?—Yes.

34. That evidence all goes to show that in midstream, where the current is, the fine stuff shifted further and the coarse stuff is left?—Yes.

35. I suppose you cannot give particulars of the total quantity of mining tailings turned into the river?—No, I have not the figures.

36. Nor are you able to give figures as to the area occupied by the bed of the river, and the corresponding thickness which the silt would occupy when spread over the river bed and banks?—No.

37. It is perfectly clear, with such very large deposits visible and traceable, that a very little proportion can be left lying on the bed on the bottom; but you have not prepared any figures to cover that?—No.

The Chairman: Has anybody prepared figures to cover that?

Mr. Hanna: We shall be able to supply a great deal of that information for you.

38. *Mr. Moresby.*] I understand you did not take any of these samples yourself?—No.

39. Nor have you, I presume, for the purpose of giving evidence at this Commission, examined the river yourself?—No.

40. Your tests have been simply laboratory ones for the purpose of determining the amount of quartz material in the sands which have been submitted to you?—For the purpose of determining, if possible, the amount of mining tailings in the samples submitted.

41. I believe that you are aware that in the batteries at Waihi, where you live, the companies at the present time are grinding to slime?—Yes.

42. What do you call grinding to slime: through what mesh would the stuff have to pass, in your opinion, before it became slime?—I think the usually accepted definition of slime is material which will pass a 200-mesh sieve.

43. Did you obtain any standards from the mines in order to get a guide to start with and to compare the other samples with, as to the percentage which would be slimes and the percentage which would pass the various meshes?—No.

44. Do I understand that you did not try to find slimes in the tests you made?—No slimes were present in the material obtained from the Waihou River below the Junction.

45. *The Chairman.*] Why did you say that?—In examining grade D under the microscope the material was all of an even grade which would just pass the 90-mesh sieve and no more. There was no very fine stuff in the samples taken from the bed of the river.

46. *Mr. Moresby.*] What about the samples taken near the banks of the river?—With the exception of three that were taken on the banks there were no slimes. I think Nos. 1, 2, and 7 consisted of very fine stuff.

47. Referring to this sample D, you have not told us the percentage that passed the 90-mesh?—Column D is the percentage.

48. You have not determined what would go through 120- or 200-mesh?—No.

49. Why did you not supply that information?—I did not see what use it would be.

50. *The Chairman.*] You examined these three samples microscopically, and you are satisfied they were slimes?—I stated at the end of the report that I was unable to determine what was mining tailings and what was natural.

51. You cannot give us any estimate of the relative proportion of quartz to other materials in that 100 per cent.?—No. Quartz was the predominant mineral.

52. *Mr. Moresby.*] Above Waiorongomai you get a river which contains nothing but pure river-sands?—Yes.

53. Can you give us the percentage out of that river which passed the 90-mesh?—I think that information is supplied. It varies from 1·9 to 70·8 per cent.

54. So you had some high percentages that did pass the 90-mesh, in the clean river?—Yes.

55. I understand you did not take this any further, and did not see if any would go through the 120- or 200-mesh?—No.

56. So there may be a considerable amount of stuff in the Waihou which will go through the smaller mesh?—Yes.

27. *The Chairman.*] You did not determine the proportion of quartz to other material in the Te Aroha sand, nor did you determine the proportion of quartz to other material in the Waihou River bed samples?—That is so.

58. Therefore it is difficult to trace the analogy?—Yes.

59. *Mr. Moresby.*] Did you make any silica tests?—Not of these samples.

60. So you are unable to tell us from any assays you have made as to what the percentage of silica would be in these pure river-sands up the Waihou River?—No. The percentage is fairly high.

61. You did not make any actual tests?—No. I saw the silica in the sands under the microscope, and from that I am able to say the percentage is high.

62. Do you know what the percentage of silica is in the sands coming from the Waihi Mine?—I think, roughly speaking, about 90 per cent.

63. A very high percentage?—Yes.

64. I think we may therefore assume that the percentage of silica in the pure river-sand above the mining influence is not the percentage of silica in the ore which comes from the Waihi tailings?—No; I think you can fairly assume that.

65. In what you classify as possible mining tailings in the Waihou River below the Junction did you include all the percentage of silica that is found as mining tailings coming from both rivers, or how did you make a distinction?—By the appearance. I did not include all the silica as mining tailings.

66. Although this silica is ground very, very fine in both rivers?—No, it is not.

67. How are you able to determine the difference between the silica which comes down the Waihou and that which comes down the Ohinemuri?—By the coarseness of it.

68. And the same equally fine tailings come down the Waihou as come down the Ohinemuri River?—Certainly.

69. Then how are you able to tell the difference?—That comes under the grade of possible tailings. I say the possible tailings may contain a certain amount of fine quartz which is not mining tailings.

70. You have not decided which is Waihou and which is Ohinemuri, but you have included the whole lot as possible mining tailings?—Yes.

71. *The Chairman.*] So fine that it might be mining tailings; but of course the weakness is that you did not determine how much of that is silica or quartz, except that you have seen it through the microscope, and roughly determined its presence; but you cannot give us the proportion in figures or words?—The quartz from Te Aroha way and from the mining tailings I was unable to distinguish under the microscope. The fine ones were all sharp in each case. The ones fine enough to be held in suspension I suppose would remain angular: only the heavy ones that roll down would get rounded.

72. *Mr. Mueller.*] The classes which you have called C and D I presume you carefully examined under the microscope, as being the finer ones?—Yes.

73. A and B were the coarser ones, and you said in regard to A that it was apparent to the naked eye that it was too coarse to be tailings?—Yes.

74. Was B similarly noticeable?—Yes.

75. You did not require to examine A and B microscopically?—I did examine B microscopically.

76. Every sample of B?—No.

77. So when you state that the greater proportion of class B was not tailings you make that statement principally from naked-eye observations?—Yes.

78. *The Chairman.*] Have you ever done any bacteriological work?—No.

79. You said you submitted the samples to microscopical and other tests: what were the other tests?—I took the specific gravity of some of the samples and also of the mining tailings, and I found the specific gravity of the coarse sand to be lower than that of the mining quartz.

80. You only took some samples?—Yes.

81. The specific gravity of the pumice samples would be less?—Of course, obviously so. I did not bother with them. But I took the specific gravity of class B, which was the doubtful class, and I found that the quartz in it had a lower specific gravity than the quartz in the mining tailings.

82. Did you take class C or class D?—No. I considered they were practically the same as mining tailings. This was the object I had in taking the specific gravity: the specific gravity of fused quartz—that is, quartz set free from igneous rock—is lower than that of quartz from reefs; and I found that to be the case, although the difference is not quite so marked.

83. The specific gravity of igneous quartz is less than the specific gravity of aqueous quartz?—Yes.

84. Is there much difference?—The specific gravity of aqueous quartz is 2·6, and of the other 2·4.

85. You are speaking in each case, of course, of pure quartz?—Yes.

86. Had you gone on with the specific-gravity tests with the fine samples, would you not have got results which would have shown whether the quartz was igneous or aqueous? Why did you stop the test when you did?—I was limited to time.

87. If you got an extension of this Commission for twelve months you could give us very full results?—I could certainly go a good deal further than I did.

88. You took no chemical tests at all for the silica?—No.

89. It is simply a physical test you made, and nothing else?—Yes.

90. I should like to know whether there were any polariscope characteristics in the quartz?—I did not make any polariscopic examinations. That is another thing I had not time to do.

91. If it were done I suppose there is a distinction between aqueous quartz and igneous quartz?—Yes; it would be possible to determine the percentage of the aqueous and igneous quartz in the river.

92. I suppose you cannot tell us why samples were taken only from the upper and lower Waihou and none from the Ohinemuri?—No. I examined some from the Ohinemuri for the borough some three years ago.

93. Can you tell us from memory what the result was?—The Ohinemuri samples were practically all tailings.

WALTER WADDEL examined. (No 54.)

1. *Mr. McVeagh.*] You live in Waihi?—Yes.

2. I think, some eighteen years ago you used to work in the bush at the back of Netherton?—Yes.

3. Whose bush was it?—Fred Smith's. Fisher owns it now.

4. I think you know something about the liability of that land to flooding: you made some observations there?—Yes.

5. Where did the water come from that flooded that land?—It all came through from the back, from the upper Waihou.

6. Do you know where it came through from that way?—You cannot see any flow. For about six or seven months in the winter-time the water is practically waist-deep when you get off the tram-line.

7. Did you ever do any work in the Waihou River below the Junction?—Yes, rafting and fishing.

8. Did you notice sandbanks there?—Yes, there was a shoal just above the Netherton creamery, and there was another one a little over a mile below Netherton, and there were various banks until you got past the mouth of the river.

9. Were these banks permanent or shifting?—Shifting banks mostly; but as you got further down the river they were more inclined to shift than the top banks.

10. I think you worked at the Thames for some time?—Yes, I was reared at the Thames. I did mining and fishing there.

11. You know something about the discharge of tailings into the Thames Harbour?—Yes; all the batteries discharged practically into the Thames Harbour.

12. *The Chairman.*] What was the last year you were there?—About eleven years ago. I was fishing on the Thames at the time.

13. *Mr. McVeagh.*] Do you know what mines the tailings were coming from into the Thames Harbour?—There was the May Queen Extended battery, as it is called now—it was Bull's then. They have discharged into the Karaka Creek since forty years ago. Some years ago there was a battery some 5 chains lower down.

14. Large quantities of battery tailings have been put into the harbour, extending over a number of years?—Yes.

15. *Mr. Moresby.*] You told us you were working in Fisher's bush?—Yes.

16. Do I understand from you that the waters coming over Netherton for this period you mention in the winter-time were practically waist-deep?—It was lying there. Pond's bush was practically a lagoon.

17. How do you know that water came from the Waihou?—From people who had been there all their lives. It was an understood thing that it came from the Waihou.

18. Are you able to say that that water could come from the Awaiti Stream?—I cannot say.

19. Did you ever try to determine where the water came from yourself?—No.

20. Did you ever try to trace its source?—No.

21. *The Chairman.*] Have you been up the Awaiti?—I cannot exactly locate it.

22. Have you been in from the place where you were working in the bush until you met another stream?—No; you could not get in very far in the winter.

23. Well, in the summer?—I never worked in the bush in the summer-time. I was a lot about Netherton and down the river.

24. But that was within half a mile of the river: what about three miles back from the river?—I think it is all kahikatea swamp within two miles of the river.

25. *Mr. Mueller.*] You say you were working in there about eighteen years ago: are you sure of the time?—About eighteen or nineteen years. I am not sure of the time.

26. How long were you working in that bush?—For about four months; but I have lived there. In fact, the owner is a brother-in-law of mine.

27. What other work did you do after that?—Mining at the Thames.

28. For how many years were you mining at the Thames?—Six months

29. So that the four months you mentioned just now was the only time you worked in that bush?—Yes.

30. And you visited it at other times?—Yes.

31. You said you were rafting on the river: was that during the same four months you were working in the bush?—Part of it; but I have been rafting at other times.

32. What has been your experience on the river?—I have had a lot of experience. I have been fishing on the river as far as Bagnall's.

33. What are you doing at the present time?—Working for the Waihi Company.

34. How long have you been in Waihi?—About seven years and a half.

35. Are you a member of the Borough Council or Hospital Trustees?—No.

36. Are you not on some local body there?—No.

MOORE FENWICK HASZARD examined. (No. 55.)

1. *Mr. McVeagh.*] You are a licensed surveyor practising your profession in Waihi?—Yes.

2. You have been practising in this district for fifteen years?—Since January, 1896.

3. I think, during the first two years your headquarters were in Paeroa?—Yes.

4. Have you during that period been professionally engaged in all parts of the Thames, Ohinemuri, and Piako Counties?—Yes, in all parts, and more particularly the Ohinemuri County. My work has carried me right from Tairua, on the other coast of the Thames County, to Morrinsville in the Piako County.

5. You have been recently engaged in examining the areas upon which there has been a deposit of silt and tailings?—Yes.

6. And you have prepared a plan that is now before the Commission?—Yes, that is my plan. [Exhibit No. 41.]

7. It shows the areas affected by the deposit of tailings?—Yes, it shows approximately the areas affected by the deposit of tailings. I may say in regard to that that these are sketched on. Time did not permit of a very accurate survey, but the positions have been taken from the intersection of boundaries and road-lines and known marks on the plan. These were sketched on a copy of the plan in the field. I had a notebook with me as well.

8. *The Chairman.*] And they were transferred at once, I suppose?—Yes.

9. *Mr. McVeagh.*] Your plan, I think, shows the approximate area of the Ohinemuri and Waihou watersheds?—Not on that plan. I have a plan here taken from the Survey Office maps of four miles to the inch, portions of sheets 3 and 4.

10. What are the approximate areas of each watershed?—The watershed of the Ohinemuri above Mackaytown, taken from Marsh's Bend eastward to the source of the stream, approximately 90,000 acres. The area of the whole Waihou watershed, including Ohinemuri and the whole river from its source to its mouth in the Firth of Thames, is about 450,000 acres.

11. *The Chairman.*] Is there not a definite watershed to the Ohinemuri below Mackaytown?—There is a very, very small watershed to the Ohinemuri below Mackaytown. There would be the watershed area of Tarariki Creek, but very little on the other side. As a matter of fact, the watershed on the southern side is away from the Ohinemuri to the Waihou.

12. All above the Te Aroha Railway within a mile and a half of Paeroa must come into the Ohinemuri?—I do not think it does in time of flood. In time of flood that water goes across these swamps out into the Waihou, as far as I can ascertain.

13. Take the watershed of the Piraurahi Blocks, between the railway and the Waihou: how much of that do you think goes to the Waihou and how much to the Ohinemuri?—I say when the Ohinemuri is in flood the flow is across there. I cannot say where the actual watershed would be: it is all practically dead level.

14. Supposing the big drain did not exist on Bertelsen's property, where would the watershed be?—I cannot say. It would be impossible to say without taking actual levels.

15. What line have you taken northwards of Mackaytown as being the watershed?—I have taken the traverse boundary up there. I have referred to the area of the Ohinemuri watershed east of Mackaytown, and that is the area that is taken out.

16. But it is possible there may be more water runs into the Ohinemuri than off these 90,000 acres?—Oh! there is; there must be more. That is dealing with the part east of Mackaytown. I have also taken out the area of the Waihou south of its junction with the Ohinemuri—that is, the upper Waihou—at 280,000 acres.

17. *Mr. McVeagh.*] You commenced your investigations after the flood in March, 1910?—The week following.

18. I think you observed the direction of the flow of the water, and the damage caused by it?—When I started on the investigation I started with the river by Mackaytown. I went over the areas that had been affected there by the deposit of silt, and also, as far as possible, I tried to trace out the direction of the flow and that of the flood-waters which had covered the countryside.

19. You found that there had been an overflow from Mackaytown?—The first place where the river had burst its banks, I think, was just on Moananui's Flat. I have indicated on the 20-chain plan there, as near as I could, by the arrows, the general direction of the overflow, judging by the depth of water on the Te Aroha Road and the evidence left. They show the general course of the overflow waters from the Ohinemuri at that particular place. I think it crossed the country, and swept away the Te Aroha Railway line for a considerable distance. The Waihi line was first affected along Moananui's Flat. There was a long stretch from the crossing on the Te Aroha Road towards Waihi.

20. And the ballast?—The evidence is there still. The ballast has not been collected up. It is spread out in the adjoining paddocks.

21. I think it went across the country, and affected the other line?—Yes. The evidence on the Te Aroha Road where the waters crossed, by the marks left, give one a pretty good idea of the direction of the flow. It crossed there, and crossed the low-lying country, and was evidently held up by the Paeroa – Te Aroha Railway embankment for a time.

22. Then it broke through there?—Yes; it was carried away in places, and these waters would be spread out over Piraurahi No. 10 Block. They ultimately found their way into the Waihou above the Junction.

23. *The Chairman.*] You think they all got across above the metal road?—Yes, practically, as far as I could judge by the indications.

24. *Mr. McVeagh.*] You found indications, I think, that the Ohinemuri had overflowed elsewhere, but the greatest overflow was in this direction?—Yes.

25. I think you were in Waihi at the time that this flood occurred?—No; I was in Rotorua the night of the heavy rain. I was held up in Te Aroha the following day, when coming home, on account of the railway being washed away. I came through on the Friday. The flood was on the Wednesday.

26. You noted the indications of a high flood?—Yes; from the marks on the road and on the banks of the stream all the way along between here and Waihi, I was surprised to see the height the flood-waters had reached.

27. I think you have never known a higher flood in the district?—Not in my experience of the Ohinemuri.

28. You made some inquiries at the meteorological station in Waihi to ascertain what the rainfall was?—Yes. One of the first things I heard of was the tremendous quantity of rain that had fallen, and I got the figures from the meteorological station.

29. *The Chairman.*] Who keeps it?—Mr. Devereux. He is an official of the Waihi Company, and a Fellow of the Royal Meteorological Society.

30. *Mr. McVeagh.*] You found from Mr. Devereux that there was a rainfall of 14 in. in fourteen consecutive hours?—Yes.

31. I think that is a phenomenal downfall?—Yes. I never had any experience of anything like it, nor do I think there is any record of any similar downfall in the Dominion.

32. You did come across in your researches two other phenomenal records?—Yes, in works on the subject of rainfalls. I could only discover two records that equalled this amongst recorded instances of absolutely phenomenal rainfalls.

33. *The Chairman.*] This, of course, is all from one rain-gauge?—Yes.

34. Whereabouts is it situated in Waihi?—Close to the battery.

35. *Mr. McVeagh.*] You have made calculations to show what was the result of this downfall of water?—Yes. I made a calculation to show if possible what the downfall of rain would represent, say, in millions of tons of water.

36. *The Chairman.*] On what assumption?—I will give you the assumption. I am taking an inch of rain as equal to 101·3 tons per acre, and I am taking two-thirds of the volume of fall in twenty-four hours as an approximation of the discharge in that steep watershed for the same time. That is taken from Fanning. That is, that two-thirds of this fall would find its way into the river during the fourteen hours.

37. You said, in the twenty-four hours? The ratio would be the same in the fourteen hours?—I have allowed for a fall of 10 in. That, of course, is an approximation: we cannot say absolutely what the fall was in a particular part of the watershed; the only figures we have are at the station.

38. *Mr. McVeagh.*] You assumed that two-thirds of the water would find its way into the Ohinemuri during these fourteen hours?—Yes. I took 10 in. in the fourteen hours over the watershed I have previously referred to—90,000 acres.

39. The result of that calculation on that basis showed that that quantity of water had to pass through the gorge at Mackaytown—42,550 tons per minute.

40. Under these circumstances do you think the Ohinemuri could have carried these waters without flooding?—I do not think it could. It was a phenomenal downpour, and the river could not be expected to carry it.

41. You told us you examined the country for traces of silt, and that you have shown the areas affected as nearly as possible on the plan before the Commission?—Yes; I have indicated with a light wash the areas, as nearly as I could determine, actually covered by the deposits of silt. I may say, of course, in regard to that that there may be other parts with traces of silt. I do not mean to say that one can be mathematically correct for a work of that kind during the time I had for investigation.

42. *The Chairman.*] Do you mean that the whole of this silt was deposited by the flood of 1910?—That I cannot say.

43. Some of this silt may have been from the floods of 1907 and 1909?—Yes, probably that closest to the banks would be.

44. You examined the district coloured grey, and the whole of it shows signs of silt to a more or less extent?—That is so.

45. *Mr. McVeagh.*] And you found the whole of that district was affected with deposit of varying depth?—Yes.

46. I think it is admitted on all hands that the lands most seriously affected were those by Mackaytown?—Yes; the heaviest deposits are on this side of Mackaytown.

47. You saw Bertelsen's farm?—Yes: I found a very heavy deposit over a portion of it.

48. Did you find any silt on the west of the Waihi–Paeroa Railway line?—No. I followed up these waters where they had broken across there into the paddocks and down towards the Te Aroha Railway line. I really wanted to see if I could associate the collection of silt at Bertelsen's paddock with the overflow of the Ohinemuri at Mackaytown. I could find no evidence of the silt having been carried across that way.

49. The silt went up the drain to Bertelsen's farm?—Yes.

50. You observed how that drain was constructed with reference to the angle that the river takes there?—Yes; it comes out just below a very sharp bend in the river. One would naturally look for an overflow at the angle at the bend of the river, but, from what I could gather, the river did not overflow its banks there. It was just awash, as indicated by the rubbish left there.

51. Did you see the remains of a flood-gate there?—Yes, at the mouth of that drain.

52. I think it was in a state of disrepair or collapse?—Yes, absolutely.

53. Did you see another drain close at hand with a flood-gate in it?—Yes, on the Kuaoiti Creek, on the road you take going down to Bertelsen's farm.

54. I think that creek was fitted with a flood-gate?—Yes.

55. Did any silt get up through that channel?—There was a little, whereas at Bertelsen's there was a very heavy deposit.

56. Have you considered the influence that the willows have on the flow of these streams?—Yes. I have seen the effect of willows in other streams and drains, and I have also been up the Waihou during these investigations, and seen the willows there, and also, of course, in the Ohinemuri.

57. What part do they play?—In my opinion the willows are a great source of trouble in regard to the flooding of the country in both streams, and more particularly in the Waihou. The Waihou is really the main drain of a large area of country, and the growth of the willows now has very, very much restricted the sectional area of the stream. In places I do not think there can be more than 35 ft. to 40 ft. between the overhanging branches from the opposite sides. The presence of the willows acts in two different ways on the flow of the water: the actual area taken up by the growth of the fibrous roots and the accumulation of rubbish and banks around these roots diminishes the size of the bed of the stream; there is also the effect of the branches hanging in the water, which retards the flow of the water.

58. That includes the twigs?—Yes.

59. What about the willows between Te Puke and Mackaytown on the Ohinemuri?—The action there has been the same.

60. Would that action be more marked in the case of a river with the remarkably tortuous channel that the Ohinemuri has?—Yes, it would have a greater effect there than on a fast-flowing river.

61. I take it, therefore, you would advocate the removal of all these willows?—Yes, I certainly should, from the whole river.

62. I think you have a fairly intimate acquaintance with the Piako and Awaiti country?—Yes. I have been on the Piako in summer and winter for every season for the last eleven years with the exception of this year.

63. I think you know that the Waihou overflows above the Junction?—Yes. My first experience as regards the overflowing of the Waihou was in 1899. I went up to Morrinsville with a party, and we took a boat with us. It was a flat-bottomed boat. We came down the Piako River from the Morrinsville Railway bridge, up the Awaiti Stream, had the boat dragged by a horse across the dry land lying between the Waihou and Awaiti, launched it into the Waihou, and came back to Paeroa that way. This was at the end of the dry period. It was the 31st March, and the weather had not broken in this district. The Ohinemuri River was low; there had been no rain at all to speak of. The Piako River was unusually low; I have never seen it as low since in all the years I have been on it. We had the greatest difficulty in getting the flat-bottomed punt from Morrinsville to the junction with the Waitoa. If the Piako is in flood at all you can take a launch right up to the railway-bridge. But I may say that on our way up in the train we noticed and remarked that in the Waihou above Te Aroha there had evidently been rain—we did not know to what extent, but we could see evidence of a fair amount of rain, and we were, of course, surprised to see that the Piako Swamp was absolutely dry. When we got to the mouth of the Awaiti, just on the south side of Kerepehi—I may say the mouth of the Awaiti Stream at that time was very much restricted by the growth of willows where it entered the Piako; it was quite a job to get the small punt through the trees—when we got there, and went up the Awaiti Stream proper, we found it was very high, and over its banks. We had to cramp up and tow the boat—we could not row it; and we were wading up to our knees along the banks. When we got up we found the Awaiti Lagoon full. We stayed the night at the Awaiti Native settlement, and one of the first questions we asked them was how it was they had all this water in the Awaiti. We were then told that the Waihou had overflowed and filled up the lagoons there.

64. Was there an overflow from the lagoons?—You will understand that the Awaiti is a very sluggish stream, and runs through very low-lying swamp. When we got into it there was practically no trace of any current or flow in any direction. It was spread over thousands of acres. At that time I took no notice of any direction of flow. The only thing I was puzzled about at that time was the extraordinary amount of water there when the Piako was so low.

65. Can you say whether or not the Ohinemuri was in flood at that time?—I am quite certain it was not, because when I left Waihi we had had no rain at all. As a matter of fact, we were going duck-shooting, and we took particular notice of the weather.

66. You have observed that country since frequently?—Yes.

67. Have you found an overflow from the Waihou in the direction of Awaiti?—Yes. When I say I have found an overflow, I have not been there when the river was overflowing; but there is a clearly indicated point which is known, I think, to all the engineers and those who have had anything to do with the roads round here, a little to the south of what is known as the Waitoa Swamp Road, which is indicated on the plan. I may say the Commissioners were there, and would probably notice as the road left the stream that there was a piece of dry ground and a cutting. That tongue of land runs in a northerly direction, probably averaging about half a mile from the Waihou bank, and between that river-bank and the high land there is a piece of low swamp which extends to Awaiti No. 2 Block.

68. Where did the flood-waters that came across the left bank of the Waihou make for?—Of course the natural flow would be to the Piako down the Awaiti Stream; but if the Piako were in flood at all it is quite probable that these waters would be driven back across and over Netherton. The Awaiti would be backed up, and these waters would find their way out at Netherton.

69. *The Chairman.*] That is, the waters from the Awaiti?—Yes.

70. Not from the Waihou?—Well, the Awaiti really would be fed by the flood-waters of the Waihou.

71. *Mr. Vickerman.*] The Piako does not feed the Awaiti Lagoon at all?—I cannot say certainly. If the Piako were in flood and the Waihou were not in flood, and if there were no heavy rains immediately on the Awaiti itself, it would be only natural to assume that the water would back up from the Piako.

72. *The Chairman.*] Supposing the Waihou were not in flood, it is possible the Piako might be in so great flood as to back all the way up the Awaiti into the lagoon and down to Netherton?—Yes, I think possibly it might, given the Piako in high flood and no overflow from the Waihou.

73. *Mr. McVeagh.*] I think you know there are drains flowing into the Waihou above the Junction, on the left bank of the river?—Yes, there are drains all the way up the Waihou.

74. May I take it that in flood-times the waters from the Waihou would find their way up these drains and spread around the adjoining country?—If the Waihou were flood-high and the drains were not fitted with sluice-gates or anything of the kind, the water would naturally back up. I have not seen any sluice-gates myself.

75. *The Chairman.*] So, assuming the Waihou to be above normal level, still the flood would be sufficient to run the water back up the drains and to flood the head-waters of the Awaiti?—It depends altogether on where the drains might be constructed. I cannot say I have followed it up to see it, but quite probably it would.

76. In fact, there is a large stretch of flattish land there from which the waters flow off in one or other direction depending on the height of the relative rivers and the rainfalls in the two districts?—That is so.

77. *Mr. McVeagh.*] Do you remember coming up the Waihou below the Junction shortly after the 1907 flood?—Yes; I think it was about ten or fourteen days after the big flood in January, 1907. I was coming up the stream.

78. What was the level of the Waihou about that time?—The Waihou would be about high water. The river then would be back to normal level; there was nothing unusual in the way of flood. There was a bank with probably a 3 ft. or 4 ft. drop along by Netherton, and over this bank there was a cascade falling from the Netherton lands.

79. What was the extent of this cascade?—It would vary in depth from a few inches to a foot, and it extended quite a long distance from the creamery down towards Fisher's at different parts.

80. *The Chairman.*] What was the effect on the big drain running out by the creamery?—I could not say.

81. *Mr. McVeagh.*] Have you considered the effect on swamps of draining them?—Yes. Wherever a swamp is drained the tendency, of course, is for the level of the swamp to sink as the land becomes consolidated. The difference in the level, of course, would be governed by the particular kind of swamp you are draining.

82. I take it that means you have to pay regard to the quantity of vegetable matter that might be contained in the bed of the swamp?—Yes. What we call a peaty swamp would sink very much more than one with a lesser quantity of peat or vegetable matter.

83. We may take it that swamps in their natural condition would absorb this water and hold it for some time?—In the natural state a swamp acts as a large sponge. The water falling on it or flowing through it takes a considerable time to get away to the adjoining rivers. Vegetation also prevents evaporation. When the swamp is drained the waters falling on the swamp and lands find their way to the drains much more quickly, and the result is that floods are likely to be more frequent and more sudden, and of a shorter duration.

84. You know something of the character of the Piako Swamp lands and of the material to be found there?—Yes. The upper portion of the Waihou watershed is practically all volcanic country, containing a great amount of pumice. These swamps and the low-lying land here have been in a large measure formed by the deposit of material brought down by the rivers in ages gone by. This pumice formation is very susceptible to erosion by the entrance of water.

85. I think you have observed that in the case of many outfall drains?—Yes; it can be seen in the drains in the upper Thames watershed, where drains cut perhaps 4 ft. or 6 ft. or 8 ft. wide have been scoured in places to a chain or more in width.

86. Can you say whether or not the Netherton lands consist of country of that character?—No; Netherton would not be in the same position as that I have spoken of. The subsoil is of a stiffer nature.

87. You took certain samples, with Mr. McArthur?—Yes. I have indicated by the numbers on that plan where the samples were taken from.

88. And the samples themselves indicate the precise spots?—Yes.

89. You also took some—the second series—with Mr. Morpeth?—Yes. They were taken from the same place, or as near as we could possibly get.

90. Does this second series of samples indicate the precise spots from which they were taken?—Yes.

91. You were not concerned in the taking of the third series of samples?—No.

92. After the 1910 flood I think you made an examination of the country at Netherton?—Yes: I went over the Netherton district the following week, really to see what effect the floods had had down that way, and also to try and determine where the flood-waters had come from.

93. Will you just state the result of your investigations there?—I heard about the overflow of the Waihou near the Ngararahi Block. I had heard that there was an overflow there, and I wished to see if I could pick up further down where these waters would come out. I went up the drain from which sample No. 7 was taken a distance, I estimate, of 15 chains. At the mouth of that drain there was a considerable deposit of silt on the bank. My object in going up the drain was to try and see if I could locate where the silt had come from—if it had come across from the Ngararahi side, as alleged. As we went up the drain the deposit became less and less. At the end of the drain there was practically no deposit at all. There was a slight deposit of scum left

where the flood-waters had gone down, but we had difficulty in getting a sample there. I think we got some off some leaves. That was sample No. 7. So far as I could see, there were no indications of any of that having been brought across from the Ngararahi side, from where we took sample No. 2. In fact, as we went up the drain we could see by the settlement of the silt that the greater part of it had come up the drain and was deposited on the lower side—that the waters which had been covering that ground could not have contained any great quantity of suspended matter.

94. *Mr. Vickerman.*] These are the Waihou waters?—No: I take it they would be the joint waters. Then, just at the Netherton ferry I followed in an old tramway that runs just alongside the road. I went back on that, I suppose, about half a mile, and there was no trace of silt in there at all, except for the first few chains along by the road. Then I went further down opposite Mr. Lachlan's property, and followed in a drain towards his back boundary for some distance. There had been flood-waters on the paddocks there, but, judging by the position in which the *débris* and stuff was left in the paddocks, the flow of waters there was across from somewhere about the Netherton – Te Puke ferry. There was no indication of the water having come from any back country. My mark of the light deposit stops there.

95. *The Chairman.*] You are of opinion that it came in on the upper side of Te Kouto No. 1, and flowed down across the Netherton Road and across Ngahuiapouri B?—Yes.

96. Are you aware that we found silt all down the sides of that Netherton Road—on the Netherton Road itself and ditches?—As I explained before, I have shown where there is an appreciable deposit of silt, but still there are many other places probably where you could get traces of silt.

97. *Mr. McVeagh.*] You found no water came from the country at the back of Netherton?—So far as I could see from the investigations I made since the flood.

98. I take it you conclude the upper Waihou did not overflow its banks?—That may be so. Another factor may have entered into it: I am not sure whether the drainage operations on the Piako have relieved or increased the channel at Kerepehi. Of course any drainage-work there, or any increase in the outlet of the Piako, and the Awaiti where it runs into the Piako, would relieve that country very considerably. I understand this was to be done, but I have not been to Kerepehi, in the Piako district, for several years. I believe the mouth of the Awaiti has been opened.

99. I think you have considered the amount of the river-*débris* and alluvium that is carried down by the river in the course of the year?—I have made some investigations. I have looked up some standard authorities on the subject. As regards the Waihou, time did not permit of making any investigation of that kind at all. I mean, it would be quite useless unless a series of experiments was taken over at least a year, and, better still, a longer period, to get anything approaching accuracy. I have taken an approximation of material brought down by rivers in suspension—that is, apart from what may be carried along on the bed of the stream. The authority I took this from is "Geological Processes and their Results," by Chamberlain and Salisbury. It is published in London by John Murray, and is dated 1906. They give there the result of experiments carried over ten particular rivers.

100. *The Chairman.*] Have you any idea as to the size of the rivers?—It is given on page 195.

101. The authors are Americans, I think?—Yes.

102. And they have dealt with large rivers like the Mississippi, which is noted for the amount of material it carries in suspension?—Yes; but according to this list the Mississippi does not carry anything like as much as some of the other rivers named.

103. *Mr. McVeagh.*] A great deal depends on the character of the country the river flows through, and on the nature of the watershed?—Yes.

104. From the data you have been able to secure, have you arrived at any conclusion as to the quantity of material carried down in suspension in the Ohinemuri and Waihou Rivers?—Well, taking the average of the material carried in suspension in these ten rivers mentioned, and applying it to the Waihou here, it would give 433,000 tons per annum.

105. *The Chairman.*] That is, the whole watershed to the mouth?—Yes; but calculating it by the rainfall, and taking it that the average rainfall for the district is 40 in.—I cannot speak with certainty of what it would be over the whole district, but I think that is a conservative estimate—and taking 1 in 1,500 as the matter in suspension, would give 1,200,000 tons.

106. Or, in other words, this authority gives 1 in about 4,500, which is a third of that quantity?—One is taken from the average of the ten rivers, and I have taken 1 in 1,500, which is the estimate of the material carried in suspension by the Mississippi. I may say, in adopting this estimate I have taken into account the following facts: The steepness of the sources of supply; the deforestation that has taken place in the watersheds; the artificial works in the neighbourhood of the streams, such as roads, railways, and so forth; the amount of drainage; the character of the surface soil; and also the sudden and very heavy rains we are subjected to. I think, taking all these facts into consideration, 1 in 1,500 would be a very fair estimate to make.

107. *Mr. McVeagh.*] The fall of the Ohinemuri from its source to Mackaytown is very steep?—Yes; practically the whole of these 90,000 acres is very steep country.

108. I think the Waihou is of a somewhat different character?—Yes; the Waihou is not as steep, but the character of the country is lighter, and more susceptible to erosion.

109. *The Chairman.*] Your plan is a little misleading, because you have coloured the portion below Mackaytown the same as the watershed?—My explanation shows that the watershed refers to the portion of the Ohinemuri east of Mackaytown. I made a distinction in the calculation as to the actual area of the watershed of Waihi.

110. If you had added the words "east of Mackaytown" there would have been no doubt about it?—It would have been clearer if I had put that on the plan.

111. *Mr. Moresby.*] Have you calculated that area east of Mackaytown in the watershed of Waihi?—Yes; the 450,000 acres includes the Ohinemuri basin. The 450,000 acres is the whole

of the watershed of the Waihou and its tributaries from the source to the mouth. The 280,000 acres is that portion—what we call the upper Waihou—that is, from the junction with the Ohinemuri southwards.

112. What area of the 400,000 acres comes from the west of the Waihou?—I could not say exactly.

113. Have you included any of the area on that side as being in the watershed?—Yes, as indicated on the plan. I have taken it pretty close to the western bank.

114. I see in some places you have taken it right into the river?—Yes, very close in.

115. Have you included the Rotokohu Stream?—Yes, right up to the saddle.

116. Starting from Moananui's Flat, and coming right to Piraurahi Block, the water that goes there is from the Ohinemuri?—Yes.

117. And in flood-time that is heavily charged with slimes and tailings?—Of course, carrying a lot of suspended matter, but continuing on further I found no deposits of tailings, and the inference was that it was not heavily charged.

118. Is it lightly charged?—That I cannot say. I did not see the water there.

119. Did you see evidence of slimes along there?—Yes, more or less; wherever flood-water recedes you will find a deposit. All flood-water, no matter where it comes from, leaves behind a certain amount of residue.

120. I am talking about mining slimes?—That I could not say, because I could not tell the difference between the mining slimes and the other.

121. You know that a very large quantity of material treated at the mills comes down in the form of slimes, and you are aware that the Grand Junction has adopted the slimes treatment?—Yes; I have been told that about 75 per cent. of what is put into the river now is slimes.

122. Ninety-eight per cent. of it is from the Grand Junction, I understand?—I did not know there was as great a percentage as that.

123. And 75 per cent. of the Waihi material is also slimes?—I understand that is so.

124. Do you not think that you could naturally assume that these slimes are mining slimes?—I did not say I had seen slimes. I said there were slimes or deposits, but I could not say whether it was slimes or not.

125. You did not test them?—No.

126. Have you tested the other material which you have indicated on this plan?—As far as I could judge, it was mining tailings.

127. So that we may take it that whenever you had a doubt you gave it in one way?—No; I think I have given the position as accurately as possible—I have given the actual areas that have been affected—that is, to any appreciable extent.

128. *The Chairman.*] Have you indicated all the land where the grass was affected in any way?—No, certainly not, because that would include the whole area.

129. *Mr. Moresby.*] You used your own discrimination in the matter?—Yes.

130. *The Chairman.*] What is your definition of a material deposit?—I should say there was anything from an eighth of an inch upwards.

131. *Mr. Moresby.*] I suppose you were here when some of the farmers were giving their evidence. You know they complained that where the grass was affected with slimes it affected their cattle?—Yes.

132. Where only the grass has been affected, or there was a small coating on it in that manner, have you shown the area on this plan?—No.

133. Why have you left out the Township of Paeroa?—It was so apparent for anybody in the township to see for themselves. I understood that the Commission was to sit here, and would see the places in the township for themselves, and on the scale of this plan it would have been impossible to show all the particular places where the slimes came in.

134. Therefore you left it out altogether?—Yes.

135. Do you think this plan fairly represents what it is supposed to do, although you have left Paeroa out altogether?—Yes.

136. Although you have offered no explanation to the Commission of that up to the present time?—Yes, that is so.

137. Did you go below Te Puke ferry on the right bank past Arthur Wight's farm?—No; I was not ashore there.

138. Do you know Robinson's land at the Waimarie Bend?—No.

139. Have you shown that that land is affected at all?—No.

140. *The Chairman.*] Have you been ashore on the right bank at all?—No.

141. *Mr. Moresby.*] And you went for the express purpose of showing what lands were affected by the silt?—The reason I did not go down on that side was that I had heard no complaints of the land being affected on that side.

142. You surely knew that Robinson gave evidence in the Warden's Court that his land was affected?—Yes, but this plan was prepared before that.

143. Several farmers have alleged that their land was affected, and your plan does not show any of that area?—That is so.

144. *The Chairman.*] Then we have to modify the description of this plan as being one that only shows the position of the land on the left-hand bank of the river below Te Puke. It shows the right-hand bank also as far as Te Puke and the left-hand bank below Te Puke?—Yes. I have already stated that the plan was prepared not with the idea of showing individual places, but in order to give a general idea of the material damage.

145. But in order to report as to what material damage had been done you must visit the country, and apparently you have not been on the right-hand bank below Te Puke?—That is so.

146. Are there any other portions you want to deduct from this plan?—On the Netherton side I was not along the whole of the bank of the river there.

147. *Mr. Moresby.*] So that in that area you may have left out a large amount of land that has been affected?—Yes, I could not say it is not.

148. I understand from you that you have not visited the river or inspected the river at a time of flood or immediately afterwards?—No.

149. So that you cannot say whether tailings or mining *débris* or other silt does go up the Waihou River during flood-time?—No.

150. I think your plan shows that the land up the Waihou River on the left-hand bank is affected as far as the Ngararahi Block?—Yes.

151. Have you formed any opinion as to the amount of tailings on the left-hand bank of the Waihou?—I think that came across probably from the bend below where the dredging company is putting up its plant; it comes across that peninsula. I could not say that it has gone up the Waihou.

152. You would not contradict the observations of those who have made an examination and followed it up?—No, I could not.

153. Captain Adlam refers to this matter in his evidence before the Mines Committee. You would not contradict a man who has observed the position himself, and who has been on the river for over twenty years?—I have shown that it goes there, but I am not sure how it gets there.

154. With regard to the rainfall in Waihi, you said there were only two rain-gauges in Waihi?—Yes.

155. You are taking the amount of water registered by one gauge as falling over the whole district?—No, I am discounting it by a third. I take 10 in. instead of 14 in.

156. Over a watershed of 90,000 acres?—Yes.

157. You are supposing in this case that 10 in. fell over the whole watershed?—Yes.

158. I think you have heard that very little rain fell in Paeroa at that time?—I heard that, comparatively speaking, there was little rain.

159. And not much at Karangahake and Mackaytown?—I did not actually hear that.

160. But the rain at Waihi appears to have been very, very heavy?—Yes, phenomenal.

161. You consider that you are putting the position fairly when you put the fall at 10 in. over this large area?—Yes; it is only an estimate, but I think it is a fair estimate. There is a portion of the watershed towards the coast where I think probably the rainfall would be heavier than in Waihi.

162. Would not half of the rain falling on those hills flow towards the coast?—Yes, but that is not included in my estimate.

163. You have seen the effect of willows in other streams and drains?—Yes.

164. Have you seen willows in other streams and drains—streams that contain mining-silt?—No.

165. Have you noticed the difference between river-silt and mining-silt in the Waihou and the Ohinemuri?—In the upper Waihou there is no mining-silt.

166. Have you noticed how mining-silt acts on the willows, and have you noticed how a combination of the two silts acts?—I have not taken any particular notice of the difference.

167. Have you noticed the willows in the Waihou and the willows in the river after its junction with the Ohinemuri?—Yes.

168. Have you noticed how the silt affects those willows?—Yes.

169. The willows cause the banks to silt up?—Yes.

170. You do not see the banks of silt in the Waihou as you do lower down?—You do not get such large banks.

171. And the deposits do not pinch the river in so much?—No, although in the upper Waihou the river is very much restricted, as you can see.

172. But you can see the water running through the willows in the upper Waihou?—Yes.

173. *The Chairman.*] Do you say that wherever mining-silt is present the effect of the willows is to form a bank, but where there is ordinary river-silt, as in the upper Waihou, the willows do not necessarily form a bank?—I think the willows there would form a bank in any case, but the bank is more marked in the case of mining-silt.

174. *Mr. Moresby.*] Take Thorp's Bend: have you observed the depth of tailings on the bank—the encroachment that has taken place between the original bank and the bank that is there now?—I have never taken any measurements of them. It is only what I can see.

175. Mr. Metcalfe estimates them as 30 ft. on each side: are you prepared to say he is wrong?—No.

176. I take it that you agree with him in that?—I have made no investigation.

177. About this overflow in the Waihou River: I think you told us that it overflows just behind the old Waitoa Swamp Road?—Yes; the Awaiti Stream runs almost up to that road.

178. Have you seen the waters of the Waihou cross over into the water of the big lagoon of the Awaiti Stream?—No, I have never been on the river when it was actually overflowing, but I have been on the lagoon.

179. *Mr. Tunks.*] I think I understood you to say that the first place you noticed the river break across was at Moananui's Flat?—Yes.

180. Did that involve the Rotokohu Swamp?—It would go over the low-lying block of 1,500 acres, the Otamaurunganui Block, but I could not say how that block would be affected.

181. What about the other block, Tapuihurukehi, adjoining?—I could not say for certain whether that would be included in that low-lying land. I am not quite sure where the foothills come in there. My impression is that all that country along the Te Aroha Road until you get to the farms in the Rotokohu Gorge is all very low-lying and is subject to flood-water.

182. Do you happen to know whether any previous floods have gone across in that direction?—I believe so. I think the 1907 flood went across, and I think the 1908 flood also.

183. *Mr. Hanna.*] You have been many years in this district?—Yes, fourteen years.

184. You know the Ohinemuri River well?—Yes, the whole of it.

185. Have you ever taken any soundings in the river?—No.

186. You also know the Waihou River?—Yes.

187. In the lower portions of the Waihou River I think the current is much faster than in the lower portions of the Ohinemuri River, just before you come to the Junction?—Yes, from Mackaytown down to the Junction the Ohinemuri River is very sluggish, but the Waihou River keeps a fair current.

188. Where they meet at the Junction a bank has been formed?—Yes.

189. Is that bank a predisposing cause to the floods that take place?—Anything in the nature of a bank there would in a certain measure increase the liability to flood.

190. I suppose, considering that the tide operates also against the current there, it is a natural thing for banks to form just about there?—Yes; I think you always find where two rivers meet like that it is natural to find a bank formed.

191. Have you considered any scheme by which this flooding could be lessened considerably?—I have not gone into the question, as to actual figures, or anything of that kind, but I have come to some conclusions of my own as regards prevention as far as possible.

192. One scheme has been read to the Commission, and that scheme propounded, amongst other things, the putting of a cut across Pereniki's Bend?—I saw that report.

193. Do you consider that a feasible proposition?—My own opinion is that it would not be effective. It would be effective, I think, as regards clearing the tailings and deposits that are in the upper reaches of the Ohinemuri, but I am afraid that it would simply put them on to that place opposite the Junction Wharf. It would simply shift the tailings out of the bed of the river and put them a little further down.

194. It would put them down in the navigable part of the river?—Yes, and on the lands in that peninsula. I think it would scour out the upper portion here, and deposit them a little further down.

195. Is the putting-in of a cut like that any part of the scheme you have thought of?—Not putting a cut there.

196. Will you tell us what your scheme is?—As regards the Waihou river itself, I think one of the most important things is the removal of the willows. The river is the natural drain of the country, and the willows are, I think, to a great extent blocking the waters, and I think one of the first things to do is the removal of the willows.

197. Principally in the upper Waihou River?—Yes: and then there are the alternative cuts suggested.

198. Supposing the deposits in the river are taken away at the rate of 500 tons a day?—That would make a very considerable change in the river. There is a long stretch of the river which appears to me to be a natural settling-bed for anything coming down the river from Mackaytown and the flats. In the stretch I have referred to it is practically still water. Only the heavier stuff would be deposited in the bed of the river, and if it was found advisable that the tailings should be taken out of the bed of the river—more especially the coarser sands—I think it would be the best place to take them out down here. It could be done much cheaper than in attempting to handle them at the batteries.

199. *The Chairman.*] We understand that very little coarse tailings is going in there now?—I refer to the tailings already there, and that percentage, whatever it may be, of coarser stuff that is going in at the present time.

200. Even though it is only 3 per cent. of the whole?—I think if it is only 3 per cent. there is no necessity to deal with it at all.

201. If it is necessary to deal with the 3 per cent. you think it would be wiser to let the 3 per cent. find its way into the river and try to pick it up here?—Most certainly. If it is to be lifted out for future treatment, those who are lifting it out would be able to deal with it much cheaper here than at the other end, because they have got to handle it in any case: they will be able to deal with it cheaper than the person who is getting nothing out of it.

202. *Mr. Hanna.*] What we have to deal with is what is in the river at the present moment. There is no means of dealing with the sand in the river now. Is there any means of dealing with it except by dredging it or removing it from the bed of the river?—No, I do not think so.

203. In your opinion would the operations of dredging be beneficial or otherwise?—I certainly think they would be beneficial.

204. Even though the company did not commence their operations, something would have to be done by somebody else to clear the river?—Yes, I think this portion of the river would have to be cleared.

205. You know the extraction company has got claims to several miles of river-bed?—Yes.

206. You know the extraction company has got a site on the Pararahi Block. If the suggested cut were put in, what effect would that have upon their operations?—I think it would be very injurious. I think if the cut were made the scour would clear away most of the sands from here, and deposit them lower down. The company would lose that material.

207. Would not the effect of that cut be to take a lot of water out of this bend?—Yes, and there would be a tendency to silt up.

208. The flow of water being taken away, would not that interfere seriously with their operations?—I suppose it would. Under certain circumstances I think the cut at Pereniki's Bend would relieve the Paeroa Township very considerably—that is, provided you clear the stream right out, and there is no other stuff being put in and deposited a little lower down. If there are no more tailings coming down I would suggest that cut, but if the tailings continue to come down I think this place at Pereniki's Bend would be the simplest place to take them out. I am speaking

of sands or anything that is likely to settle there. If the mining companies alter their system and nothing but slimes is sent down, and if it is shown that slimes will be carried beyond that point, there would be no danger of filling up at all, and I would suggest that the cut be made. As far as the slimes are concerned, I do not pretend to be able to give you any opinion.

209. You have not taken samples from that portion of the river, and you know nothing about them?—That is so.

210. *Mr. Mueller.*] In addition to the mining tailings or slimes, is there not a lot of natural *débris* that comes down: would not that settle?—As long as there is material coming down it is liable to settle, and it would tend to raise the bottom of the river.

211. This cut at Pereniki's Bend would cut off some three miles and a half of the river?—Yes.

212. In that three miles and a half is there not a very large deposit of tailings?—Yes.

213. If you put in that cut, will the stuff not go down through the cut?—It would draw the stuff for a considerable distance at the top of the cut.

214. Would not a big portion of the three miles and a half of deposit be left in the old bed of the river?—Yes, about two-thirds of it, I should say.

215. You said that it would be more easy and better to take the tailings out of the river—that is, future tailings—than take them out at the batteries, or just before it is put into the river: how do you explain that it would be cheaper?—Because all the works of the batteries have been so arranged that the discharge from the works goes right down practically on to the river. The whole of those arrangements would have to be altered.

216. You think that the cost of altering the batteries would be greater than the cost of treating the tailings down below?—That is my opinion; but I have not gone into figures.

217. The dredging would have to be continued as long as the coarser stuff was put in?—Yes. There would be a constant charge at the other end, getting rid of the stuff, when the batteries were altered at the other end.

218. Supposing the extraction company were to take the stuff straight from the battery, would not that be cheaper than dredging down here?—I do not think so, but I have not gone into the figures.

219. As to the island at the mouth of the Waihou and Ohinemuri, you said that is a natural island?—I did not say it is a natural island. I said that at the junction of rivers it is natural to find an island.

220. You were in Te Aroha just after the last March flood?—Yes.

221. Did you notice that the Waihou at Te Aroha was not in a high flood?—It was not in a high flood. It was in flood, but not unusually high.

222. You say that the willows in the upper Waihou restricted the sectional area of the river?—Yes.

223. I suppose you will admit that the sectional area of the lower Waihou has been restricted both by the willows and by the silt?—Yes, to a great extent.

224. That restriction you would consider would have the effect of making a greater liability to flood?—Yes.

225. You referred to a trip you made, and that you towed your boat up the Awaiti Stream: how was it that you towed the boat if the stream was in flood?—Because it was more convenient than rowing, owing to the tortuous route, and there was practically no flow at all.

226. You knew that the Ohinemuri River was not in flood at that time?—Yes.

227. But evidently there was a flood in the Waihou?—Yes.

228. Could not the Waitawheta and Mangakino have been in flood then without you knowing it?—No, I do not think so.

229. You stated that when lands were drained you considered that the floods would become more frequent and more sudden and of shorter duration?—That is so.

230. Has not the experience of the last flood been that they have been of longer duration?—I do not think so.

231. Do you not remember the flood of 1907?—Yes, but that was a phenomenal flood over the whole of the province, and there was then an inland sea for miles.

232. Do you remember the flood of September last year, when the Netherton lands were covered for a week? Was that a phenomenal flood?—It was not a phenomenal flood in other places. The water was coming to Netherton from the Awaiti side.

233. Were you in the Netherton district in September, 1909?—No.

234. You do not know where the water came from?—No.

235. You stated that the land at Netherton was of a stiffer nature than the swampy peat land?—I said that the land of the swamps there was of a stiffer nature than the land in the upper country: there is not so much pumice. The Netherton land would not sink so much as peaty swamp.

236. You said you went up a drain 15 chains: which drain was that?—That was just below McKee's—below the Native reserve opposite Thorp's orchard.

237. How did the silt you found there come into that property, in your opinion?—Principally up the drain and from the bank from the Paeroa side. I went up that stream to see if I could find out where the waters were overflowing from Ngararahi.

238. Were they not flowing from the left bank of the Waihou?—Yes, and for that reason I went to try and find out if possible where the waters came from.

239. In that 90,000 acres of watershed, can you give us the area of bush that has been felled?—I should estimate it at 4,000 or 5,000 acres—that is, round Waihi and Waikino.

240. There has been very little bushfelling within that watershed?—There would probably be another thousand acres at Waitekauri.

241. You know that the flood of 1907 did a tremendous amount of damage in this district?—Yes.

242. And you know that subsequent floods have done damage also?—Yes.

243. You heard the evidence given by the farmers at the present Commission?—Yes.

244. You are not prepared to contradict that evidence?—No.

245. And you think something should be done to remedy the evil?—I do.

246. *Mr. McVeagh.*] With regard to the rainfall: you know the Tauranga Road?—Yes.

247. I think there were bridges washed away on that road?—Yes.

248. How far is that from the centre of Waihi?—About 7 miles.

249. That is on the other watershed?—Yes, flowing into the Katikati Harbour.

250. *Mr. Vickerman.*] In regard to the cut at Pereniki's Bend, there would be no difficulty in retaining the whole of the three miles and a half of tailings that has been referred to?—No.

251. *The Chairman.*] Practically the whole of the tailings in that three miles and a half could be retained?—Yes.

252. And the velocity of the river could be improved very considerably?—Yes.

253. And the probable effect of that velocity being increased would be to reduce the risk of flood?—Yes, in the Paeroa district.

254. And the extraction company would not be in any way damaged, because the water would be let in in sufficient quantity to meet their requirements?—The three miles and a half would not be affected.

WILLIAM HENRY MANDENO examined. (No. 56.)

1. *Mr. McVeagh.*] What position do you hold?—I have acted as Engineer of the Waipa County Council for the last thirteen years.

2. You have streams and rivers in that county in which willows are growing?—Yes, several.

3. There are the Waipa, Mangapiko, and Mangaohoe Rivers?—Yes; two of them are badly infested at the present time.

4. With respect to the Waipa: some years ago that was a navigable river?—Yes, it is still a navigable river, but the navigation is very much impeded compared with what was formerly the case.

5. Is it used by steamers now to anything like the extent that it used to be?—No; it is used to a very small extent even by the settlers living on its banks.

6. How do those willows affect the river when it is in flood?—They cause a backing-up of the waters, the effect of which is that the floods rise much higher now than they used to rise.

7. I think you have noted that result from the way the waters have reached the bridges in the county?—Yes, particularly the big flood of 1907.

8. I think that flood was very general in your county?—Yes, it did a great deal of damage. In the case of the Waipa River, the Whatiwhatihoe Bridge was submerged. That bridge was built some twenty years ago. It was built 5 ft. above the highest known flood. The Te Rori Bridge, built some twenty-four years ago, was supposed to be 8 ft. above any known previous flood.

9. How high did the water rise at the Te Rori Bridge?—To the deck of the bridge.

10. With regard to the Mangapiko River, I think that flows for a large part of its course through flat swampy country?—It is a comparatively small stream, and the adjacent land is very low-lying. The willows are growing right across the stream from side to side.

11. That, I take it, is putting back the waters of the stream?—Yes, and the consequence is that much property adjacent to the stream has depreciated in value, and the settlers have felt the effect so keenly that a proposal is at present on foot to create a Drainage Board for the purpose of clearing the stream. The petition in favour of that has been very generally signed, and I believe that a Drainage Board will be formed in the near future. Of course that means that the trouble is so serious that the settlers are prepared to tax themselves to deal with it.

12. The Mangaohoe flows through flat swampy country?—Yes, the position there is very similar to the Mangapiko, but in the case of the Mangaohoe the trouble has already been dealt with.

13. The trouble is that the river was infested with willows?—Completely so.

14. What result had that on the immediately adjacent land?—The result has been that something like 2,000 acres of land which was practically valueless has been turned into some of the best dairying land in the Waikato. That has resulted from the removal of the willows.

15. I think Mr. North undertook their removal?—He was Chairman of the Drainage Board. There was a Drainage Board formed, representing the whole watershed of the Mangaohoe—an area of about 6,000 acres.

16. Do you know what length of stream was cleared?—I should say about four miles.

17. Do you know to what extent that reduced the height of the flood-waters?—Yes; I have a very good means of knowing. I should say that the average level of the river has been reduced by about 7 ft.—that is, properties adjacent to the river have gained that amount of fall.

18. You have observed the effect of draining the country—that is, after a heavy rainfall?—Yes, principally during the flood of 1907, the results were very apparent. A large amount of drainage had been done in various parts of the county, and that caused the flood-waters to come down so rapidly that, in many cases, bridges and culverts which had always proved sufficient previously could not take the waters, and in some cases they were swept away.

19. Mr. North, Chairman of the Drainage Board, will be able to give us the cost of the clearing of the willows?—Yes. The amount borrowed by the Board was £1,000. I think rather more than that has been expended.

20. *Mr. Hanna.*] During your operations did you ever put in any big drain or cut in connection with the river?—No, we have never had to do so.

21. Has anybody in the district done so?—Yes, a cut, or a sort of canal. In order to increase the fall they cut off a number of bends so as to shorten the outlet and increase the fall.

22. What has been the result?—The result was disastrous in that case owing to the composition of the subsoil; damage was done by the scouring that took place. So much so, that expense had to be incurred in undoing the work that had been previously done. The cut was filled in again, and the original outlet was reverted to.

23. *Mr. Mueller.*] What was the depth of the Mangaohoe Stream before the willows were cleared out?—I could not say. In some places it would be of considerable depth—as much as 20 ft.—and in other places the willows crossed right across the stream, and there was practically no channel at all.

24. It was only in a few places, where there were holes, that there was considerable depth?—Yes.

25. In other places the willows choked up the stream completely?—Yes.

26. After you cleared out the willows I suppose you cleared out the bed of the stream a bit?—Yes. With regard to the work on the Mangaohoe Stream, another witness will give you evidence. At the same time I saw the work in progress, and I know the work was largely done by the scour of the river itself.

27. It was land of such a nature that it could be scoured away?—It was the fibrous *débris* accumulated amongst the roots that was carried away. The bed of the river is no deeper than it was originally. It has perhaps not yet gone back to the original banks.

28. If the river had not itself helped to clear its own bed it would have had to be assisted by some shovelling-out?—Yes.

29. *Mr. Vickerman.*] You spoke of cutting a channel and shortening some bends: in what river was that?—It was not a river. It was the best outlet obtainable to drain certain land that the Ohaupo Drainage Board undertook to drain.

30. The silt in that case was Waikato silt?—It was a kind of pumice sand.

31. That is the reason that it did not answer?—Yes.

WILLIAM NORTH examined. (No. 57.)

1. *Mr. McVeagh.*] You are Chairman of the Mangaohoe Drainage Board?—Yes.

2. You have had a great deal of experience in the destruction of willows?—Yes.

3. Mr. Mandeno has stated the effect of willows in connection with the flooding of certain lands in the Waipa County?—Yes.

4. I believe there was a difficulty in draining the land in consequence?—Yes. When I first knew the Mangaohoe Stream it was a good drain for the country; but the growth of willows—joining across the river in places—caused a series of dams, and the consequence was the overflowing of the adjoining land.

5. I understand that before you addressed yourself to the task of destroying the willows a drain was constructed?—That was on my own farm. I bought a farm about the year 1883. At that time the drains ran pretty freely into the Mangaohoe, and on my property there was a mill-dam. I opened the mill-dam, and put drains through it into the Mangaohoe, with a small fall. That was in 1886. By 1890 I had lost all that fall, and the land that I had drained became of no value.

6. To what do you attribute the loss of the fall?—The filling-up of the river by willows.

7. And the consequent silting-up of the bed?—Yes. I had to look around and see what I could do. I drained my land twice. On the second occasion I got about a 5 ft. fall, and for five years I had the use of my land; but it got worse year by year. By the end of five years the willows below the outlet had risen a foot a year—that is, 5 ft.—and the water then set back up the drain I had dug, and destroyed the land again. By that time we had formed this Drainage Board. We formed the Drainage Board for the purpose of dealing with this nuisance.

8. Will you describe how the Drainage Board proceeded to deal with the nuisance?—Yes; after we formed the Board we took a poll for the purpose of raising a loan, but it was not carried owing to the absentee vote.

9. And the law was altered?—Yes, as a result of a visit paid to the district by Mr. Seddon. We then succeeded in what we desired, and we then proceeded to work. Previous to that time I had been experimenting with my own place to see what would kill the willows. It was just previous to that that I discovered the stuff that I have patented, called "Noxine." We got a loan of £1,000, and dealt with the four miles of willows. We struck a rate each year to keep up the maintenance. The only money we spent on the work was the £1,000 and the rate we have since struck. [Exhibit No. 45 read.]

10. You proceeded to destroy the willows, and you succeeded?—Yes. I may tell you that the root of the willow dies the first winter after the application. After Christmas we found to be the best time to do the work. The following spring if you examine the fibre you find that it is all dead—like rotten hay. The river being choked with timber as well as with fibre, we had to cut a channel 10 ft. wide right through the length of the four miles. We removed the fallen trees and pulled the fibre out. It came away just like farmyard manure. It was the third year we started the opening-out business.

11. What was the result upon the level of the water in the stream?—The upper reach was 9 ft., and at the end where my drain entered it was about 5 ft. lower than formerly, and at the bridge it was just 7 ft. lower.

12. What area of country have you been able to drain as a result of this method of treatment?—Approximately 6,000 acres was dealt with, but about 2,000 acres has been really benefited. There are three degrees of benefit—direct benefit, less direct, and indirect. That is the classification under the Drainage Act.

13. The area directly benefited, according to your classification, was what?—I should think about 3,000 acres.

14. Can you convey any notion of the cost of these operations?—Yes; I went through our minute-book, and I found that for killing the trees and taking out all the underscrub, which was mainly a lot of young willows—we had to take out the underscrub and remove it to dry land so as to get rid of it, because if it was left where it was it would start growing again—it cost about £60 a mile to take that out and to ringbark and poison the trees. The greatest cost was cutting the timber out.

15. Sixty pounds a mile for both sides of the stream?—Yes.

16. *Mr. Myers.*] The work you did brought the river back to its bed?—Yes.

17. You also speak of some work done at Otorchanga?—Yes; that was done at the instance of the Government; the Survey Department had it in hand.

18. I think, at Otorohanga there was a bank of *débris*, sand, &c., collected?—There was a fringe along the bank. The willows were on the sides of the stream, and they had thrown out an apron of fibre, and that had collected *débris* of all sorts about 8 ft. or 9 ft. wide, and some of it reached up to very nearly the top of the bank.

19. How was that *débris* collected?—By the floods bringing it down.

20. And it was collected by the willows?—Yes.

21. I think your process was used upon those trees?—Yes.

22. With good effect?—Yes.

23. What was the result?—I reckon that it was done perfectly. This was done after the New Year in 1908. There was nothing done the second year. It had been overlooked the second year—1909. They should have gone over the ground to see that everything was in order, and to take up the young shoots that grow, because every wind that blows brings down small pieces, and they float away and grow, and if you leave them for a couple of years you have to cut them down. The result was that the treatment and operations were a perfect success.

24. Do you know of any willows at Hangatiki that were poisoned with your "Noxine"?—They might have been.

25. I have here a letter bearing on this subject [Exhibit No. 46]?—Yes.

26. Have you had a look at the willows on the banks of the river near Paeroa that were treated according to your method?—Yes. A request was made to me for a gallon of "Noxine" to make an experiment on the willows here. I have seen the trees. The result, I think, has been perfect in its way, because it was only done in August last—that was not the proper time—but as far as it has gone it is a complete success.

27. You say that as far as it has gone it has been successful?—Yes. What has been done is quite sufficient. There are a few shoots coming out, but that is owing to the manner in which the work was done. You ought not to cut into the wood, but into the outer bark only. If you cut into the tree it only absorbs the poison into the wood, and that is not needed. It wants to be on the inner bark. The cut has been made deep in the wood. It would have been more successful if only the bark had been taken off. He has cut up about 4 ft. in some places. It could have been cut down to within 18 in. of the bottom. I was told by the person who did the work that he has not been paid because the shoots are there. I said, "Never mind the shoots." We examined the roots, and they are like a bit of hay. The erosion of the bank since the last flood is apparent. I am referring to the sand that is collected on the bank. The fibre has released its hold on the old formation that was there, because the fibre is dead, and the river has begun its work.

28. From experience, can you say whether the use of "Noxine" upon the willows generally on these streams would be beneficial?—Undoubtedly.

29. Leaving out "Noxine" altogether, and having regard to your experience, do you think the destruction of willows in these rivers would be beneficial?—Yes, decidedly. I think the primary cause of the trouble is the willows, because the obstruction they make would allow the water to get miles down the river when there is a flood on, whereas it cannot get away.

30. Is there not a difference between the weeping willow and the straight willow with regard to the ease or difficulty with which you can destroy them?—Yes.

31. Which is the easier to destroy?—We found that the "weeper" is the quickest to kill, and the other willow is the hardest, but both die all the same.

32. *Mr. Mueller.*] You say that the best time to do this work is after December?—Yes. It is just as good if you start at any other time, only, as a rule, the streams are low then, and you can bark them lower down.

33. How long would it take that application to kill the willow, supposing it were done in January or February?—Some of them will die the next year, and some will linger on till the second year, but they all succumb before the third year is out; that is, if everything has been properly done, as directed in my leaflet of instructions.

34. So to thoroughly eradicate the willows will take three years?—No; it kills the roots the first year. The tree dies upwards. If you examine the trees you will find that the under-part is dead, and then the tree dies upwards. The tree is kept alive for a time by the sap it holds.

35. It will take about three years for that to be completed?—Yes; I say three years because it happened to be three years when we let off the water.

36. During that three years is there any improvement in the running of the water?—Yes, decidedly.

37. At Mangaohoe you cleared the willows first, and cut the channel 10 ft. wide in the third year?—Yes.

38. So that you had to kill the trees first, and then clear the channel to give the water a chance to get away?—Yes.

39. So that it was four years after you started with the willows that you got the full benefit of the improvement?—We have our river now wide enough. I suppose it is about 35 ft. or 40 ft. wide.

40. How long has that taken to clear out the 40 ft. from the start of your killing operations?—I think that would be about five years after.

41. *Mr. Flatman.*] What would be the cost of killing the trees per mile—trees such as those on the Waihou River?—Sixty pounds a mile it cost us for that. Of course, I have never been on the Waihou. I have not seen the underscrub.

42. *The Chairman.*] What would be the cost per mile of killing and clearing the trees in the neighbourhood of Paeroa?—I do not think it would cost that much.

43. Did you make a charge for your material to the Board, or did you give it free?—The Board paid for it. I was not selling any stuff then. The material is put on with a paint-brush, so that a drum goes a long way.

HUMPHREY B. DEVEREUX examined. (No. 58.)

1. *Mr. McVeagh.*] You are a Fellow of the Royal Meteorological Society?—Yes.

2. And you have a meteorological station at Waihi?—Yes.

3. You have been conducting meteorological observations at Waihi for how many years?—Since September, 1898.

4. You have prepared a table showing the monthly rainfall at Waihi extending over the whole of that period?—Yes. [Exhibit No. 47.]

5. What is the mean annual average over that period?—83·5 in.

6. I think that is regarded as a heavy rainfall?—Yes, it is a very heavy rainfall, indeed.

7. You have also prepared another statement showing the days of rain since the commencement of your record?—Yes.

8. On the 29th March, 1910, the rainfall was 12·15 in., and on the 30th March it was 3·31 in.—a total of 15·46 in. for those two days?—That is so.

9. For a portion of those two days you had a phenomenal rainfall?—We had: we had 12·15 in. in twelve and a half hours' continuous rain, or 14 in. in sixteen hours' continuous rain.

10. Have you ever had such a record of rainfall since you have made observations in Waihi?—No.

11. *The Chairman.*] What is the form of your gauge?—The ordinary 5 in. gauge, exposed in the usual way in accordance with the standard rules. There are no trees. It is on a gently sloping bit of grass land.

12. You had to measure every hour?—I was outside all night. On the night of the 29th March, between 6.30 p.m. and 10.15 p.m., there was 1·94 in.; between 10.15 p.m. and midnight, 2·44 in., equivalent to a rate of 1·4 in. per hour. Now we come to the climax: From midnight to 1 a.m., 2·19 in., equivalent to 2·19 in. per hour; from 1 a.m. on the 30th to 4 a.m., 3·83 in., equivalent to 1·27 in. per hour; from 4 a.m. to 7 a.m., 1·75 in., equivalent to a rate of 1·58 in. per hour. It was 0·97 in. per hour, uniform rate, in twelve hours and a half.

13. *Mr. McVeagh.*] Your record for five months is equal to that of Auckland for the whole year?—Yes. On the 3rd July, 1909, we also had an exceptional rate of rainfall—6·43 in. in eight hours and a half; 1·45 in. fell in thirty minutes. There were also floods then.

14. *The Chairman.*] I observe that in January, 1907, you had an exceptionally heavy rainfall?—Yes, 21½ in. in nine days in Waihi—nine consecutive days' rain.

15. *Mr. McVeagh.*] In addition to recording the rainfall I think you make it your duty to observe natural meteorological phenomena?—Yes.

16. And you are familiar with the principles of forecasting the weather as applied to New Zealand, and particularly as applied to your own district?—Yes.

17. I think you have made a prominent feature of the study of the topographical features of your district in so far as they affect its climatology?—That is so.

18. Your records show that you have in Waihi remarkably heavy rainfalls in very short periods of time?—Yes.

19. How do you account for that?—There are two factors—one, the remarkable topographical features of the Waihi district, and the moisture-laden easterly winds meeting a high and very abruptly rising coast-line. In fact, it is the first obstruction they meet in their journey across the Pacific. The range runs very nearly at right angles to their course. The second factor is its position as regards those tropical storms that approach from the Pacific. They are well-known factors in the meteorology of the Dominion. Then it is a well-known fact that the denudation of the hills really has more bearing on the flooding than the rainfall itself.

20. *The Chairman.*] Where there is bush you have the rain generally deposited more gently than where there is bare land?—Yes, I believe that is so.

21. You mentioned that there was a rain-gauge at Katikati: what did it show?—8·7 in.

22. And how many miles is that from you?—Five miles, bee-line.

23. What relation do the observations at that station bear to your own? Have you examined them?—Yes, for many years, and with few exceptions they have been considerably smaller than Waihi.

24. Where is the nearest gauge on this watershed?—At Turua.

25. What are the results there compared with your own?—I made out a statement showing the rainfall at various stations in the north-east district—Waihi, Athenree, Tauranga, Turua, and Auckland. The reason I chose those stations was because they all have a north-east aspect. The first three are on the same aspect—Waihi, Athenree, and Tauranga: At Turua the rainfall is approximately only about 50 per cent. of that of Waihi. It is about the same rainfall as Auck-

land. In March last we had 19·44 in., with a maximum of 12·15 in. on the 29th. Turua had only 4·87 in. for the month, with a maximum of 1·52 in. on the 30th. In January, 1907, the returns were: Waihi, 24·9 in. for the month; and Turua, 11·76 in.

26. If there were an observatory at Paeroa—which there ought to be—probably the observations would be very close to what you got at Turua?—Yes.

27. So that, taking this watershed of 90,000 acres, one ought to cut out of it the area of low-lying land on this side of the hills?—Yes, theoretically, one should, I suppose.

28. In the absence of actual observations, and as a result of analogy, one would say that the 90,000 acres ought to be very much reduced, and the area taken by Mr. Haszard should be reduced by taking from it the area of low-lying country on this side of the gorge?—Yes.

29. It should be reduced to some extent?—Yes, but what I do not know: I am not an engineer.

30. *Mr. Moresby.*] I understand that the floods at Paeroa occurred in the morning?—I have heard that the maximum occurred about 8 a.m.

31. I am told that at Waitekauri, only four or five miles bee-line from Waihi, that the river did not flood until the afternoon?—I do not know anything about that.

32. *Mr. Mueller.*] Can you explain why the rain has been so much heavier at Waihi in the last few years than previously?—Because we have had an abnormal number of tropical cyclones during that time.

33. Does that apply to the January 1907 flood?—That was a double-centre cyclone—all over the Auckland Province.

THOMAS GILMOUR examined. (No. 59.)

1. *Mr. McVeagh.*] Your name is Thomas Gilmour, and you reside in Waihi now?—Yes.

2. You lived at the Thames from 1869 to 1891?—Yes.

3. It was in the last-mentioned year that you came to Waihi?—Yes.

4. I think you are well acquainted with the Waihi, Paeroa, and Thames districts?—Yes.

5. What do you know of Paeroa as regards floods?—I remember the flood in 1881. I was at Te Aroha, and when I came down, Paeroa was partly under water. Before I go any further I may say that I made a statement before the Mines Committee of the House in 1907, and I can only confirm what I stated then.

6. In that evidence you speak of two distinct floods in Paeroa, one in 1881 and one in 1883?—Yes.

7. You know a great deal about mining at the Thames?—Yes.

8. You know where the tailings were deposited from the batteries that were working at the Thames?—For a long time the tailings were delivered on to the beach, and some time after, when the people commenced to see that they were doing harm, a retaining-wall was put up. That retaining-wall did not take in the *débris* from Karaka and Tararu. The batteries there discharged on to the beach.

9. Do you remember the construction of the railway-line from Paeroa to Waihi?—Yes.

10. Do you know that the excavated material was flung into the Ohinemuri River?—Yes, every bit of it.

11. Including the stuff taken from the tunnel?—Yes.

12. What was the height of that material at the Crown Mine?—The pile was up to the traffic-bridge.

13. And how far out into the stream did it extend?—I could not exactly say—about half-way I should think.

14. What has happened to all that material now?—It has all gone down the river. There is a little remnant lying there yet, but the body of it has gone down.

15. What was done with the mullock from the drive in the Talisman and Woodstock Mines?—I cannot say.

16. *Mr. Vickerman.*] The whole of the tunnel ran into about 30,000 yards, and that is not one-twentieth part of what is being put into the river every year now. I do not think any more need be said here about the railway stuff. It has been brought up a good many times at this inquiry, yet the amount of material was very small compared with the amount of stuff that is being put into the river now?—It would not wash down; it consisted mostly of boulders.

The Chairman: The whole amount, allowing for banks and everything, would not equal what is being put in the river now in one month.

ALEXANDER AITKIN examined. (No. 60.)

1. *Mr. McVeagh.*] You were the engineer for the Kumara Water-race for sixteen years?—Yes.

2. And you were also Engineer to the Thames County Council when Ohinemuri formed part of the Thames County?—Yes.

3. You know a great deal, I think, about hydraulics?—I have had a good deal of experience.

4. And you have known the Ohinemuri River for a good many years?—Yes, for thirty years. I used often to go up and down the river.

5. At that time there were very few willows here?—Very few.

6. What effect would the willows have upon the stream?—It would retard the flow.

7. You would recommend, I suppose, the removal of the willows?—The removal of the willows would make the Ohinemuri River carry within its banks a very great deal more water: in fact, my opinion is that it would carry double the quantity of water it carries now.

8. Recently you know something about the flooding of the land round about Paeroa?—I have seen a good deal of land about Paeroa flooded thirty years ago.

9. Was that from an overflow of the Ohinemuri River?—Yes, and it was always worse when the Waihou River was in flood at the same time.

10. You know that large areas of land have been drained in the upper Waihou district?—I do.

11. What would be the effect of those operations upon the rainfall?—The water would get into the river more quickly.

12. You know the general class of country in that portion of the Waihou district that has been drained?—Yes, both the upper and lower Waihou.

13. How would that be affected by the erosion caused by the drains?—A very large quantity of silt is brought into the river from those drains, and especially from the outlets.

14. I think some of those drains become large as time passes?—Thirty years ago I saw one of the first drains cut through some bank at the back of the Waihou, and in a short time it had scoured out a place that would take a "Dreadnought" in nearly. That was above Te Aroha, on the opposite side from the township.

15. You know something about the discharge of tailings on to the Thames foreshore?—Yes.

16. Was there a large quantity discharged there in the early days?—Yes, a large quantity, but not so much as the mines now are putting into the river.

17. The effect of that would be, I suppose, to silt up the Thames foreshore?—It did silt up a large portion of it.

18. *Mr. Hanna.*] I think you were Government Inspector on the West Coast, at Kumara?—I had charge of all the water-races on the West Coast in the neighbourhood of Kumara and Waimea.

19. And you had full facilities for seeing how they operate?—Yes.

20. How long have you been in the Government employ altogether?—Out of about forty years I have been about thirteen or fourteen years with the County Council, and the remainder with the Government. I constructed the Thames Water-race.

21. Did you construct any works in Paeroa?—Yes, a dam for the Waihi County.

22. Have you had anything to do with any of the bridges on the Ohinemuri River?—Yes, I put up most of them between here and the Thames and between here and Waihi.

23. You know all about Paeroa and the Ohinemuri thoroughly?—Fairly well.

24. What is the nature of the land here?—All alluvial about Paeroa and on the banks of the Waihou.

25. Is there much fall in the Ohinemuri from Mackaytown down to the Junction?—From a little below Mackaytown down to the Junction there is very little fall—about 3 in. to the mile, I should think. And the same with the Waihou River: I do not think it has got more than 3 in. to the mile.

26. You know that portion of the river from a little below Mackaytown to a little beyond Pereniki's Bend: it is a great deal silted up, and there are a lot of tailings there?—Yes.

27. You know where Pereniki's Bend is?—Yes.

28. We have had a report put before the Commission in which it is suggested that, in order to carry the flood-water off, a cut should be put in at Pereniki's Bend to meet the Ohinemuri River above the Junction. [Witness was shown the plan attached to Mr. Metcalfe's report, with one of the suggested cuts.] What do you think would be the effect of that?—I do not think it would have the effect that is stated in the report.

29. Why?—I have heard that the report states that there is a difference of 1 ft. 9 in. I should like to know at what state of the tide the levels were taken.

30. *The Chairman.*] Do you think that sometimes the tide is higher at the Junction than it is at Pereniki's Bend?—Yes. I do not see why it should not be. I am not aware how they took these levels.

31. *Mr. Hanna.*] I believe that Mr. Bray, the County Engineer, stated that there was a difference of 1 ft. 9 in. water-level?—Yes, but at what state of the tide?

Mr. Bray (County Engineer): At the time the levels were taken it was dead low water.

Witness: That would give the very largest amount of fall it would be possible to get. At other times there would be no fall at all. I think before anything of that sort is done the levels should be taken at all states of the tide for two tides—one man taking the levels at the Bend, and another at the Junction. I do not see how you can get at it without doing so.

32. *Mr. Hanna.*] That cut is about a quarter of a mile in length?—Yes, 25 chains.

33. We will show that there is a difference of 1 ft. 9 in. in the levels at dead low water?—When the river began to work upon that the fall would be distributed right through up to Mackaytown. It would not continue to have that fall in that part of the river.

34. I understand you to say that the actual fall would taper off from Mackaytown right away down?—Yes, certainly it would.

35. So that the fall would only be a temporary fall until the cut was put in?—Yes, until the river got its proper bed. I think that interference with the natural course of rivers is a dangerous thing.

36. I suppose it is not a wise thing to interfere with nature if you can help it?—As a rule it is not.

37. A large quantity of tailings would be affected by that cut: would it carry the tailings down?—It would carry down a large portion of them.

38. What would happen to them?—They would lodge in the river just below.

39. With what result?—To a certain extent they would block the river down below—very little below where that is coming in now. I think the river is pretty well blocked now at the Junction.

40. And would that extra fall help to scour the river out at the Junction?—Certainly not. I do not think it would.

41. Can I take it that in your opinion the effect of that cut would be to accentuate the trouble at the Junction?—It would accentuate the trouble there.

42. Why do you say that?—Because it would fill up the river-bed. If it cannot clear away the stuff at the Junction, a large addition to that would be no benefit.

43. A large addition of tailings, silt, or what?—It would be tailings this time.

44. What do you mean by "tailings"—coarse sand or finely ground stuff?—A portion of the tailings that are filling up the Ohinemuri now.

45. What do they consist of—coarse particles or fine stuff?—Much coarser than they are putting out of the mines now.

46. Do you regard this long tortuous channel as somewhat of a natural depository for the matter that comes down the river?—It must be, because we have no evidence of the river having flowed anywhere else. When changes have taken place in a river-bed they generally leave some marks. There is no evidence of that here.

47. I think you know that the extraction company is erecting a plant down here?—Yes.

48. Do you know that they have got river claims right up close to Mackaytown?—I understand so.

49. And intend treating all the tailings in the river?—Yes.

50. Taking that company alone, if this proposed cut were put in, what would be the effect upon this portion of the river as far as they are concerned? What would be the effect upon their operations in that part of the river?—There would be no more tailings go down the river round the bend. I know they are going to grind the tailings very much finer than at the present moment. The finer the tailings are ground, the more the water will take away, and the easier it will be to take it away.

51. What will the effect of this cut be upon the tailings between Pereniki's Bend and Mackaytown?—It would take a portion of them away. I believe it would take a considerable portion away.

52. Supposing this cut, instead of being an absolute cut, were only made a sort of storm-water channel to carry off the surplus water, would the erosion deepen and widen it?—Yes, it would tend to deepen and widen.

53. Assuming that that cut is put in in the way Mr. Metcalfe suggests, will it have the effect of diminishing the flow of water round here?—Undoubtedly it will.

54. And will the diminishing of that water have any effect, in your opinion, upon the operations of the extraction company?—They will require plenty of water.

55. Therefore I can take it that in your opinion the effect of that cut would be detrimental to the extraction company in two ways—first, by carrying away a portion of their tailings from Mackaytown down, and, secondly, by diminishing the water round there, which is absolutely necessary for them to work their plant with?—It would; but it would never clear that part of the river of tailings entirely.

56. Assuming that the Railway Wharf is used, would this cut have any effect upon it continuing to be used?—Only for the difference in distance I think it would be just about the same as now.

57. That is, supposing you could navigate the cut?—Yes.

58. If that cut is put in, you say the effect of that, in your opinion, will be to cause the river at the Junction to shallow more than it is now?—Yes.

59. Will not that shallowing affect the navigation of the river from the cut upwards?—Certainly it would.

60. And would it affect the Waihou River?—It would affect the Waihou also.

61. And it would affect the navigation of the Waihou up to Te Aroha?—It would. The bank at the Junction does that now.

62. *Mr. Mueller.*] You stated that the willows, in your opinion, have a great effect in impeding the flow of the water?—Yes.

63. I take it that you also consider that the tailings that are in the Ohinemuri at the present time impede the flow of the water?—The tailings lessen the sectional area of the river to some extent, but the willows are doing as much damage as the tailings, I believe.

64. I gather from you that you are in favour of clearing away the willows?—I am not in favour of anything, but I think it would improve the thing to clear the willows.

65. In your opinion, it would improve matters to clear away the willows?—Undoubtedly. I have tested the matter, and know what it will do.

66. In your opinion, it would improve matters if the tailings were cleared out of the river?—Undoubtedly it would.

67. Anything that will tend to improve the flow of the river will lessen the liability to flooding?—You may improve this part of the river and destroy another part.

68. But if you take the tailings out of the river it will improve matters?—Yes.

69. And if you shorten the flow of the river—that is, give it a quicker run-off—it will improve matters also?—I do not know that it would.

70. It would do no damage?—They made an alteration at the Junction once by putting a groin in, and, instead of improving it, it was the reverse.

71. Did it shorten the run?—It did not lengthen it. I freely admit that shortening the run would improve the river in one place, but the cost might be more than the improvement would be worth.

72. But apart from the cost altogether?—But that must be taken into consideration.

73. You are of opinion that if such a cut were made it would sweep off only a small portion of the tailings—the reason being, I presume, that only a small portion is in the bed of the river?—I should say that most of it would be in the bottom of the river. The portion on the banks is largely due to the willows and vegetation.

74. *Mr. Vickerman.*] You have had experience of forcing tailings through pipes?—I have seen a good deal of it.

75. Will you tell us the result of your experience?—It can be done, but I should want to know exactly what was wanted to be done before I could say whether it would act or not.

76. *The Chairman.*] Have you had experience of where the water has been laden with silt?—I have seen stones up to 8 in. in diameter go right up the pipe simply from the jet of water; but one would want to know the proportion of tailings and water, and the quantity, before one could give any proper opinion on a thing of that sort; but it can be done.

77. It is feasible?—It is done all over the world.

78. Do you advise lifting the stuff perpendicularly, and then letting it run down a flume?—Yes.

79. What is your experience of the life of wooden flumes with tailings running through them?—I could not tell you the life of one with tailings.

80. *Mr. Myers.*] What is the nature of the tailings that you have seen carried through pipes?—Sand, gravel, and boulder.

81. Do you mean natural product or milled product?—Natural product.

82. May I take it that you have never seen milled product carried through pipes in that way?—Yes, I have seen it at Reefton.

83. How crushed?—By stampers.

84. To what degree of fineness?—At least 40-mesh.

85. Carried for what distance?—They were pumped up by a centrifugal pump 100 yards.

86. That is all you have seen?—That is all I remember at the present moment. The stuff I saw pumped up was really concentrates—the very heaviest material they save.

87. What was the fall in that 100 yards?—I suppose 20 ft. or 30 ft.

88. Do you know anything about the cost?—The thing seemed to be working with very little wear-and-tear, so far as I knew.

89. Over what period did you have an opportunity of inspecting that work?—Not over any long period. It was a casual visit. It had been working for months before I went there, and was working for months after I left.

90. But you saw it only casually?—Yes, that is all.

PAEROA, WEDNESDAY, 1ST JUNE, 1910.

Mr. Mueller: I wish at this stage to put in a report that came to hand yesterday from Mr. J. A. Pond. It has been mentioned previously during the inquiry. Several samples from the river were taken up to Mr. Pond for analysis. He has analysed them, and also examined them microscopically, and compared them with a sample of pumice sand obtained from a wash-out carried into the Waihou near Okoroire. I now propose to hand in his report for the information of the Commission [Exhibit No. 48.] The samples which are numbered in his report are the samples which Mr. Hubbard deposed that he took in company with Mr. Buchanan on the 4th April last. The position from which these samples were taken is not fully mentioned in Mr. Pond's report, but I have put in in pencil in his report the corresponding place according to Mr. Hubbard's evidence. I have now also the prints of these photos which have been referred to, and I now hand them in [Exhibit No. 49]. These have been printed by the amateurs who took them previously, and in fairness to them I wish to say these are not a sample of their usual work. They have been hurriedly printed off, and will probably last four or six months, but not for ever. These are prints of the photos that are referred to in the report of the Mines Committee, with one or two additional prints. There are one or two or these to which I would specially draw attention. One is a photo of the Waihou two miles up from the Junction, in flood, showing the water overflowing the left-hand bank. There are also two photos—one taken in 1900 of the Railway Wharf at Paeroa, and the other in 1907 showing the difference in the water-level. I may say the particulars of each photo are written on the back, and signed by the party who took the photo, stating that the negative has not been retouched. The last one of the wharf in 1907 was taken at as low water as possible, because it was taken for the purpose of showing the silt-deposit in the river, which could not have been shown if the tide had risen at all. We do not know at what time of the tide the 1900 photo was taken; but, even presuming that happened to be taken above low water, the 1907 photo shows a higher level according to the bridge and Railway Wharf. The 1900 photo was a photo simply of the steamer lying at the wharf. I have that from Mr. Kenny, who was the person who took most of these. There are forty-three photos altogether.

Mr. Myers: Mr. Chairman and gentlemen,—I understand from my friends at the table that when the Commission originally sat in Auckland it was arranged that if counsel desired they would have an opportunity, after all the evidence had been taken, of addresing the Commission. That being so, I do not consider it necessary at this stage to in any way attempt to analyse—though it may be necessary briefly to refer to it here and there—the evidence which has been given up to the present time. I propose in the address that I have to make this morning to deal with the subject-matter into which the Commission has to inquire in a somewhat general way, leaving matters of detail to be spoken to by the witnesses and to be commented upon, if necessary, at a later stage in Auckland after all the evidence has been taken. Perhaps I ought to say that if, after the evidence has been taken, it appears to the Commission to be desirable that a visit should be made to the batteries of the various companies here that my friend Mr. Tunks and I represent, the managers of the companies and their officers will be only too pleased to show the Commissioners round the batteries and works of the different companies, and to afford the fullest opportunity of inspecting anything that the Commissioners may desire to inspect. I know that in dealing with the matters which this Commission has to inquire into the Commission will endeavour to deal in

an equitable manner. I know that this Commission is in no way bound by strictly legal principles or by the strict legal position, but in order to ascertain what the equitable position is it is also necessary to refer to the legal position and to ascertain what that is, and it is also necessary to refer to the history of the subject-matter of this inquiry. As the Commission knows, the Proclamation which was made proclaiming the Waihou and Ohinemuri Rivers sludge-channels was made on the 25th March, 1895, and it was made under a section of the then existing Mining Act which appears now in section 126 of the Consolidated Mining Act, 1908. I refer the Commission to the provisions of that section—namely, "That on application made to him in that behalf by any person, the Governor, in his discretion, may from time to time by Proclamation constitute and set apart the whole or any part of any watercourse, whether the same is within or outside any district, to be a watercourse into which may be discharged any tailings, *débris*, and waste water produced by or resulting from mining operations carried on under this Act, and in which, or on the banks of which, mining operations may be lawfully carried on." It will be important to know that the words are, "tailings, *débris*, and waste water"—that is to say, that tailings are distinguished from *débris*. That is a point which I shall have to refer to more particularly at a later stage, but at the present moment I am simply drawing attention to it. Now, section 126 and the subsequent sections also make provision for the compensation of "every person who at the date of the gazetting of the Proclamation is the owner of any estate or interest in land on which such watercourse exists, and whose land or riparian or other rights as such may be damaged or injuriously affected by reason of the operation of such Proclamation." That is section 130. Now, in the case of the Proclamation of the Waihou and Ohinemuri Rivers no compensation was claimed by anybody; and the result is that the claims to compensation are barred. That is to say, the persons whose rights may have been affected, or whose land may have been injuriously affected, not having made their claims within the time limited by the Mining Act, lost their right to claim altogether. Now, why was it that no compensation was claimed in 1895? I suggest that there were several reasons. I suggest, first of all, that no compensation was claimed partly because the extent of the probable damage was not then realized. But I suggest further that that was not the determining factor in the minds of the residents in this district at that time; I suggest that at that time the land in this neighbourhood was of comparatively little value, and that the claims which would have been made based upon the value of the land and the interests of those concerned at that time could only have been very small. But there is another reason beyond that, and I suggest that the chief reason why no claims were made at that time was that the farmers saw the value to them of the development of the mining industry, and they saw an exceedingly good market for their produce. Since then the conditions, no doubt, have changed: but what we have to do in looking at the history and the legal position is to ascertain what the position was in 1895, because the position of matters in 1895 has a good deal to do with the equitable position at the present time. There is just one other point in connection with the compensation question that I want to make, and that is this: that if compensation had been claimed and had become payable to the farmers in 1895, every penny of that compensation would have been payable by the Government of the Dominion. And that brings me to this point: that the Legislature of this country has recognized, and still by its legislation recognizes, the importance of the mining industry; and it recognizes that it is necessary, and has been necessary, for the State to foster the mining industry; and it recognizes that it is necessary, and has been necessary, for the State to foster the mining industry at the expense of paying compensation, conceivable in some cases to a very large amount, to persons who may be injured by the issue of such Proclamations as this. As I have said, no compensation was ever claimed, and in due course the Proclamation was issued on the 25th March, 1895. And what happened then? The mining companies proceeded forthwith to work on a very large scale on the faith of what? On the faith of this Proclamation. They proceeded to erect plants suitable for working their mines in accordance with the terms of this Proclamation. They proceeded to spend hundreds of thousands of pounds upon the development of their claims, and in some cases it is well known that the people who put their money into mines have lost every sixpence they put in. In a number of cases, however, the properties have been developed—as I say, hundreds of thousands of pounds have been spent—and the country has received the benefit of that expenditure. And my point now is this: that but for the right to deposit tailings and *débris* in these rivers the major part—I do not say the whole of it—the major part of the work that has been done would have been absolutely impossible of performance. What have been the results of the mining industry in this district? In the first place it has resulted in the employment of—I am not exaggerating when I say some thousands of men directly. I understand that at the present time there are certainly not fewer than 2,500 men—there may be more—who are employed in these mines. That means that, with the miners and their wives and families, a very great number of people are dependent on the mining industry in this district. That is only direct employment. The number of men up here that these mines indirectly give employment to it is absolutely impossible to estimate, but obviously they must be a very large number. The development of these mines has also resulted in the recovering of large quantities of gold, adding to the wealth of the Dominion: it has resulted in the building of the railway in this district; it has resulted in the construction of a network of roads; it has resulted in the inhabitants of this district being given a fine daily steamer service on the river; and it has resulted in the development of the country generally. I do not say that these things would not have happened in the fullness of time, but I do say that they have all been accelerated by many, many years in consequence of the development of the mining industry here. And I say further, and I want to emphasize, that the mining industry in this district could not have been developed as it has been if it had not been for this Proclamation in 1895. My next point is this: that the Proclamation has given the mining industry a vested right to put their tailings, and *débris*, and waste water from the mines into the river; and I respectfully submit that the Government have recognized that in the terms of the commission under which you gentlemen are sitting. I refer to paragraph 3 of the matters into

which the Commission has to inquire—namely, "What, if any, remedial measures can be adopted without injury to any other persons, corporations, or interests." Now, I submit that these words, "without injury to any other persons, corporations, or interests," are the keynote of this whole inquiry. And it is quite conceivable that there are several reasons which would affect the minds of His Excellency's Advisers in so framing that particular clause of the commission. In the first place, the Government must recognize the great importance of the mining industry. Secondly, it no doubt knows and recognizes that a large amount of capital, both English and New Zealand capital, has been devoted to the development of that industry, and in some cases has been lost, or partially lost. Thirdly, it must know and recognize that there is an enormous amount of capital—a good deal of it English capital—invested in the mining industry at the present day.

The Chairman: What is that different from secondly?

Mr. Myers: A good deal of it has been already lost. However, probably they may be put together. The next point is that the Government knows that the mining companies have acted on the faith of this Proclamation; and the next point that I make is that any interference with the existing conditions that would mean crippling or hampering the mining industry would seriously affect the credit of this Dominion. I referred a little while ago to the provisions of section 126 of the Mining Act, and I pointed out the distinction drawn between tailings and *débris*. I want to point out to the Commission one thing that may have escaped notice, and that is this: that if this Proclamation should be revoked one result would be in certain cases—there is no necessity why I should mention the names of companies—the cessation of a large amount of further development-work. I say that for this reason: that there is absolutely no place in which the owners of these properties can place their *débris*, as distinguished from tailings, except the river. That one observation—and it cannot be disputed, because it is indisputable—is sufficient to show how careful it is necessary to be in dealing with any suggestion that this Proclamation should be revoked. But I am going to show other reasons, and more solid reasons even than the one I have just urged. It is known that the ore which is treated in this district is mostly low-grade, and it is known that the margin of profit in working that ore is exceedingly small. As I am instructed, and as it will be shown by the evidence of most competent men, any different method of treating the ore or of dealing with the refuse makes all the difference between a profit and a loss. This ore can only be worked even at that small margin of profit by bringing the cost down to a minimum, and it is at least safe to say, so I am instructed, that if these companies cannot put their refuse into the river, but have to adopt any other means which would add expense to the working of their mines, enormous quantities of low-grade ore, on which at present there is but a very small margin or profit, would have to be abandoned and remain in the mines. That would mean that it would in all probability remain in the mines for all time, and never be worked, because it would not pay under any circumstances to work that low-grade ore by itself. Now, what would that mean? It would mean most likely reducing the life of every one of the mines in this district. It would do more than that. It would make impossible—I am referring to the revocation of the Proclamation—the development of possibly valuable mines in the district which up to the present time have not been touched or discovered, but which might be discovered in the future. In talking of matters of this kind to business and practical men, it is unnecessary, and indeed undesirable from many points of view, to dilate upon that aspect of the matter upon which I have been addressing myself for the last few moments. It is sufficient to add that if this Proclamation were revoked, two or three of the companies at present employing from six to seven hundred men would be extremely seriously affected, and one at least would have to absolutely close down. These are some of the factors which in the interests of the parties whom I represent it is essential to bring before the Commission. That the deposit of tailings during the last fifteen years has resulted in some damage to certain portions of the district I am not going to deny.

The Chairman: You specifically mentioned tailings. Do you mean tailings and *débris*, or *débris* alone?

Mr. Myers: Probably both; it is very difficult to separate one from the other.

The Chairman: It is an important matter to try and separate them, and to bring evidence to try and separate them.

Mr. Myers: It is impossible, I am afraid.

The Chairman: Then I am to take it you mean tailings and *débris?*

Mr. Myers: Yes. That some damage has been caused is not denied. The damage was inevitable from the outset. It seems to me, speaking as a layman, absurd to contend that a mass of stuff could be sent down the river of the class which was sent down, at all events for a number of years after this Proclamation first took effect, without causing some damage to somebody. But what I say is that that damage should have been foreseen by the persons likely to be affected, and should have been compensated for, and would have been compensated for by the Government under the provisions of the then existing Mining Act. I may say at this stage that whatever damage has arisen has not all been done by the operations of the existing companies. There have been, as some of the Commissioners at all events, if not all, will know, a number of other companies, some of them now defunct, from time to time operating in this district, which companies have cast into the river a very large quantity of tailings and *débris*. I come, in dealing with this aspect of the matter, to a consideration of how the damage has been caused, and what the results have been. And I may be permitted perhaps to preface what I have to say at this point by suggesting that a great deal of damage has been attributed to this silt and *débris* for which it has never been responsible. And I propose first of all to clear away these allegations in which I submit there is no validity whatever. One allegation of damage for which an attempt has been made to make this silt responsible is the alleged damage to the fishing industry at the Thames. I venture to say that no tribunal, whether a strictly legal tribunal or a tribunal such as that of which this Commission consists, ever heard such arrant nonsense in support of a contention as that which was

given at the Thames last Saturday; and I am afraid I am not able to treat seriously the allegations made there. A number of men come forward with a view to showing that their fisheries have been damaged; and what is the result of their evidence? The net result is that, notwithstanding this silt which they say has been coming down, the number of boats engaged in the fishing industry has increased several-fold apparently; the number of men has correspondingly increased; the number of fish apparently has also correspondingly increased. Two of the men who are engaged in the fishing industry have during the last few years, notwithstanding this trouble that they saw looming ahead of them (so they say), erected freezing-works.

Mr. Mitchelson: They have jumped from fishermen to capitalists.

Mr. Myers: Yes. One man who was called—Taylor, if I remember rightly, says that his business has increased largely, and I was very glad to hear from him that his profits had proportionately increased. What can be said, in the face of evidence of that kind, of such a contention as that which these people have sought to raise? Some of them said the number of dead fish had also increased, and in examination by the Chairman one gentleman said these dead fish did not appear at all emaciated. Well, for the life of me I cannot understand how even any flounder could be so silly as to remain in a locality where the food had all been destroyed, when it would be so easy to swim a little way down the river and obtain plenty of food at other suitable places. The real reason I suggest for the mortality that has occurred amongst these fish is that some fishermen have not been as well looked after by their employers as they might have been, and in consequence they have gone to sleep when they ought to have been awake, and have neglected their nets. Indeed, one fisherman did not hesitate to give that as the reason. Well, my submission in regard to the evidence on this point is that the whole of the evidence negatives the allegation which these people at the Thames have sought to maintain. The second class of damage to which I desire to refer is the alleged silting of the bed of the lower Waihou, and the reason I give is this: that if such silting exists it has not been caused by the mining tailings at all. I would point out that there is no evidence up to the present time to show that any substantial quantity of tailings has been found in the bed of the lower Waihou. Indeed, I am not sure that any evidence has been called to show the presence of any tailings at all definitely in the bed of that river. There may be some accumulations upon the banks of that river, but apparently none of this silt is to be found or has been found in the bed. And if the bed of that river has silted up at all, we say it has been caused not by these mining tailings at all, but by sand and detritus which have been brought down by the upper Waihou and by the drains leading into it. I understood on Monday from a remark made by one of the Commissioners that you had all had an opportunity on Sunday last of seeing a drain that has been referred to, I think, as Roache's drain, and also the drain which has been referred to as the drain leading from the Hungahunga Swamp. I do not think I am exaggerating when I say that this drain, which was originally a small ordinary class of drain, is now a river about 100 ft. wide and 25 ft. deep, and that these conditions extend for something over a mile. And the same class of thing has been going on, though perhaps not to the same extent, so I am instructed, practically the whole length of the upper Waihou. Now, the raising of the bed of the river is in no way peculiar to this district or to these particular streams. It has happened, as you gentlemen will know, in various parts of New Zealand where there are no mines and no mining-silt at all. May I refer now to a statement from a newspaper which I myself saw some time ago, and which I have been able to get since I have been here. This is a report of a statement taken from the *Hawke's Bay Herald*, and made by Mr. G. P. Donnelly, a well-known settler in the Hawke's Bay District. It is as follows: "According to a statement made by Mr. G. P. Donnelly at the meeting of the Hawke's Bay County Council," says the *Herald*, "the river question is gradually assuming a very serious aspect in this district. At Omahu Mr. Donnelly said the bed of the river had risen over 20 ft. within the last twenty-five years, and in the course of time it would reach the level of the banks. Where the water would then go no one could tell. The same thing, he said, was taking place all over the river districts, and was a grave menace to the rich low-lying country." Again: "The willow nuisance is evidently as flourishing in the Northern Wairoa as it is in the Ohinemuri River down Paeroa way. The tributaries are almost blocked to boats, and in flood-time the surrounding country (like Paeroa) is under water. At Mangakahia some £500 has been spent in felling the willow-tree and improving navigation. The Waikato is in a similar condition; but neither in the Waikato nor Wairoa is there gold duty or silt. Where these two exist the willow evil is forgotten, the gold duty being the objective, and the silt the lever whereby it is hoped to dislodge the golden treasure." And that last paragraph brings me to the damage which we say has been caused by the presence of the willows in these rivers, and to which I propose to refer. The third class of damage to which reference has been made is the flooding at Netherton. I do not propose to enlarge upon that, but what I do submit is this: that the evidence that has been called on all sides up to the present time shows conclusively that the flooding is caused by the upper Waihou flooding, and not by the Ohinemuri, and that consequently it cannot be seriously suggested that the damage by flooding at Netherton is in any way caused or is attributable to this silt difficulty. Now, having disposed as far as I propose to do at this stage of this class of damage, I propose to turn to the damage which we admit has been caused by the silt. The damage which has been caused by the silt has been done, we say, to the Ohinemuri, and we say that that has been affected to some extent by deposits in the bed of the river, and more particularly by accumulations on the banks of the river, which in flood-time are carried over and upon parts of the surrounding country. But, so far as both these results are concerned, I want to add this: First of all, even in the Ohinemuri the difficulty, so far as the bed is concerned, has been largely assisted by natural detritus, and consequently I want to say that whatever damage has been done to the Ohinemuri in the way of these accumulations has been done prior to, say, the last five years.

The Chairman: You say there has been no damage in the last five years.

Mr. Myers: None, or practically none. I do not say that there has not been damage done to the surrounding country; but that has been by the floods.

The Chairman: You mean there has been practically no damage done by the material brought down in the last five years.

Mr. Myers: You understand me to mean "by material discharged from the batteries and mines during the last five years." I want to say this also: that the damage that has happened from 1895 could have been and should have been very much lessened if the settlers had not, by their own negligence, contributed to the damage.

Mr. Moresby: You say it has been contributed to by the settlers?

Mr. Myers: Yes, certainly. I say that the settlers could have done a great deal to mitigate this evil by attending to the willows and preventing their growth and accumulation. There are statutory provisions in regard to this question to which I desire to refer. In the first place, there are the provisions of the River Boards Act (consolidated), 1908, section 77, which provides that "The Board may order the occupier, or in case there is no occupier, then the owner, of any land on the bank of any river or stream within its jurisdiction to remove any tree, shrub, or bush, or any part thereof, hanging in the water and impeding the free flow thereof, or to lower or trim any part of a tree, shrub, or bush overhanging a river or stream and likely to fall therein."

The Chairman: Is that a general power over Native as well as European land?

Mr. Myers: I am not prepared to answer that question at once, but I will look it up and answer you later on. But, at all events, there was power which the Board was entitled to exercise, and my point is, that the settlers were able to help themselves if they had been disposed to do it. I am not blaming the County Council as a River Board for not doing a lot of work which might have been done, because the answer of the County Council, no doubt, is that it had not the funds with which to do the work. But I do say that the County Council might have called on the settlers to do something, and the settlers might and should have been prepared to help themselves to some extent. There are also provisions in the Public Works Act, 1908, sections 177 and 179, which enable a local authority—and that includes a County Council—to remove weeds, refuse, and so on.

The Chairman: So the County Council could have trenched on the functions of the River Board, and thus done it.

Mr. Myers: Yes; there is no question they could have done it.

The Chairman: They could have expended their funds on works which as a River Board they had no funds to do.

Mr. Myers: Yes. And then there is another statute to which I invite the study of the Commissioners, and that is the Drainage Act, 1908; and I desire to make a reference to a few of the sections of that Act. In Part III, section 60 provides that "local authority" shall include County Council. Section 61 provides that "Every local authority not within a drainage district . . . . shall have, and may, in regard to the cleansing, repairing, or otherwise maintaining of watercourses or drains, exercise, the powers exercised by Boards under Part I hereof." It may be that these provisions of the Land Drainage Act are not applicable, because there is a River Board in the district, but I have no knowledge as to when this County Council was constituted a River Board; but in any case it is not material for my present argument. What I want to show is that there was ample power which would have enabled these residents in this district to prevent this evil from becoming what it is now alleged to be. Section 17 of the Land Drainage Act empowers the Board to "Cleanse, repair, or otherwise maintain in a due state of efficiency any existing watercourse or outfall for water, either within or beyond the district." Section 26 provides that "Every person, not being authorized for that purpose by the Board, who, without the consent of the Board, makes any branch drain into any watercourse or drain vested in the Board or under its management, or without such consent stops or obstructs any such last-mentioned watercourse or drain, is liable for every such offence to a fine not exceeding thirty pounds; and the Board may cause such branch drain to be remade as it thinks fit, and all expenses incurred thereby shall be repaid to the Board by the person making such branch drain, and may be recovered before any Justice in a summary way."

The Chairman: That is more honoured in the breach.

Mr. Myers: It certainly looks like it, and that emphasizes the point I am making. These settlers did not help themselves, but, on the contrary, have done everything to make the position worse. They have brought injury on themselves, because some of these drains, I understand, have done a considerable amount of harm. Under section 27 "The Board may at any time give written notice to the occupier or owner of any land to remove any tree or part thereof that in the opinion of the Board is likely by falling or otherwise to obstruct or damage any drain vested in the Board or under its management." Then, section 62 provides that "Where there is any watercourse or drain within or beyond the district of a local authority, and its construction is likely to cause damage to any property in such district, the local authority may order the occupier, or, if there is no occupier, the owner, of any land on the banks of such watercourse or drain within the district, or within one mile beyond the boundary of the district, to remove from such watercourse or drain all weeds or other growths or refuse and obstructions of any kind calculated to impede the free flow of water in the said watercourse or drain."

The Chairman: The effect of that might be that the local authority in whose district a settler lives may order him to do one thing, and the adjoining local authority may order him to do a totally different thing.

Mr. Moresby: Under that Act could we order you to remove the tailings?

Mr. Myers: Certainly not. That is not the point.

Mr. Moresby: It seems to me that is the very point.

Mr. Myers: Perhaps that is a very good thing for us. If the County Council had that power I do not believe they would exercise it, because I honestly believe—and I shall be very surprised if they do not admit it afterwards—that they do not want this river Proclamation to be revoked. I believe that they would be satisfied—and I hope we shall get them to say so at a later stage—with

remedial measures in the river itself. That is a point I will come to later. I believe a remedy will be found which will be a remedy that I hope will satisfy the County Council. Then we have section 63, which is of some importance, and that is the section which enables the settlers to help themselves: "Where any ratepayer within the district of a local authority, by notice in writing, requests the local authority to exercise the powers conferred by the last preceding section by ordering any specified owner or occupier of land to remove from any specified watercourse or drain all weeds and other growth or refuse and obstructions of any kind, and for the space of twenty-eight days after the receipt of the notice the local authority fails to comply therewith, then the following provisions shall apply," and so on. Then there is section 66, which provides "In those parts of a county in which a Drainage Board or River Board does not have jurisdiction . . . . the County Council shall remove from all watercourses all obstructions, weeds, growth, and refuse calculated to impede the free flow of water in any watercourse within the said parts of the county." And section 89 provides that "Where any Native land is required to be taken for the purposes of this Act, it shall be taken by the Governor under Parts II and III of the Public Works Act, 1908. (2.) Native lands rateable under any Act for the time being in force relating to rating shall be rateable for the purposes of this Act. (3.) Subject to the provisions of this section, this Act applies to all Native lands." So that the Commissioners will see that under that Act the Natives can be called upon.

The Chairman: How far is that Act overridden by the mining claims? Is it possible for the County Council to start with a dredge, and remove the material lying in the Ohinemuri, and sell it to the extraction company?

Mr. Myers: I think that is a question Mr. Hanna should answer. If I had anything to do with the county I should probably take a pretty firm stand. The silt is worth a considerable number of shillings per ton, and it may pay the County Council to improve the river by selling the silt.

Mr. Cotter: I am informed that the County Council removed some gravel from the bed of the river for use on the roads, and that immediately one of the settlers started proceedings and recovered damages against the County Council for doing so in this very Court. I may say the whole matter of the ownership of the bed of the river has been a seething matter of discontent, and wherever the County Council puts its foot, then some settler says "You should not."

Mr. Myers: I am obliged to Mr. Cotter, because he has emphasized my point that the settlers are not prepared to help themselves; and the only consolation I have been able to draw from a number of witnesses is that they do not charge the growth of the willows against the mining companies or the Government. The next question I come to, and it is an important one, is this: What is the remedy for the trouble which exists? I preface what I have to say on that point by saying that while we do not think it devolves upon us to evolve a remedy, inasmuch as we have a vested right, we are nevertheless here for the purpose of doing our best, and honestly and genuinely doing our best, to assist this Commission in arriving at a fair and just conclusion. Strictly speaking, it might be said on behalf of the mining companies that, having the right which they undoubtedly possess, it may be considered proper for them to simply sit down and wait, and then consider the suggestions which might be made by others. But that is not the attitude which has been adopted. As I say, we are genuinely desirous of being of assistance in this matter, and we have considered all the suggestions that have been made and everything that we could possibly think of. But there is one point that I do desire to emphasize in connection with the question of remedying any evil that exists, and that is that the cost of the remedy should not be borne by the mining companies. I submit that it would be most unjust and inequitable to impose upon the mining companies the cost of finding a remedy, and I propose to give the reasons. The first reason is this: that if compensation had been claimed and paid in 1895, as it should have been, it would not have been payable by the mining companies.

The Chairman: May I interrupt there. The claims would have been made before the issue of the Proclamation, and the settlement of these claims would have taken place before the issue of the Proclamation.

Mr. Myers: No; hardly that.

The Chairman: Because it is possible that the claims may have been such that the Government would never have issued the Proclamation in its present form, but might have issued the Proclamation having some condition attached that any claims for compensation would be borne in a certain way; so your argument does not appeal to me as that necessarily the claims would have to be paid by the Government.

Mr. Myers: Yes, I think so.

The Chairman: Because many claims might have come forward, and the Proclamation might not have been issued at all if the Government had not been prepared to pay these claims.

Mr. Myers: That is another matter, and I quite agree.

The Chairman: Therefore it does not at all follow that the compensation had to be paid by the Government.

Mr. Myers: No. It is then for the Government to consider whether the Proclamation shall issue. Then, subject to any arrangement that may have been made—and I know of no such arrangement that has ever been made in New Zealand—the compensation would undoubtedly have been paid by the Government; and I think I am right in saying that there is no case in New Zealand where a sludge-channel has been acquired where the compensation has not been paid by the General Government.

The Chairman: I understand that in this case the sludge-channel was not proclaimed until many years after it had been illegally used, and that at the time the Proclamation was asked for the companies were companies of considerable magnitude in their operations, and financially strong, and it is quite possible the Government might have then not considered it to be a case of trying to open up a fresh mining district and trying to assist a struggling industry.

Mr. Myers: But the industry was, I think, struggling in those days. It certainly was nothing like as prosperous as it is in the case of some of the mining companies at the present time; and I do suggest that it is inconceivable that the Government would at that time, especially when the compensation in those days would have been small, have refused to pay the compensation.

The Chairman: It is possible.

Mr. Myers: Yes, I cannot and do not dispute that; but at least I can put it this way: that, while it is difficult after this lapse of time to imagine what the Government in those days would have done, it was in all probability the Government that escaped the payment of compensation at that time. You will see that there is another question, and that is that you suggest to me that possibly the Government may have made some arrangement with the mining companies. But if the compensation had been a large item—although I do not think it possibly could have been in those days—it might not have paid the mining companies in the then state of their development to have proceeded with their application for the Proclamation. The second point is this, why I say the cost should not be borne by the existing companies: that if a charge is made against them now, they would be paying not only for their own acts, but for the acts of a large number of concerns which have carried on mining operations in this district at various times since 1895, and which can now no longer be called upon for any contribution because in many cases they are defunct. And the third reason for my present argument is that if it could ever have been contemplated by the mining industry in 1895, or at any time later, that the revocation of the Proclamation was possible, the money now invested in several of the companies would in all probability never have been expended. As I said before, it was all expended—all the money that has been expended in the development of mining in this district has been expended on the faith and on the basis of the existence of this Proclamation of 1895. There is another very potent reason for my present argument, which I venture to think will appeal to the Commission: If any charge is to be levied upon the mining companies at all this would follow: Not only would the cost of the remedy add to the cost of the production of the ore still to be mined, but it would depreciate the value of all the properties in that it would prevent large bodies—enormous bodies—of ore below a certain value, which are now just payable, from being mined, and the lives of the mines would, as I said before, be very much diminished. And my last reason is that the mining companies are already heavily rated in that they pay something approaching £30,000 per annum as gold duty, that sum being divided, as I understand, between the Waihi Borough Council and the Ohinemuri County Council. That is a very heavy tax, and the mining companies consider that it is quite sufficient for them to pay per annum.

The Chairman: Has the rate of the gold duty ever been varied?

Mr. Myers: It has never been altered from 2s. per ounce. The mining companies consider that is quite a sufficient amount to pay, and the mining companies are not concerned whether it is used for general purposes by the borough and county, or for the express purpose of improving the existing conditions, or for any other proper purpose. But what we do say is that, having regard to the very large amount which the mines are paying in taxation, they are at least entitled to ask that the local bodies and the settlers shall help them by keeping these rivers clear, and preventing, as we say they should have prevented and could still prevent, the damage of which they complain. I venture to submit to the Commission that the Government took the same view, and I rely upon paragraph 4 of the commission, where the Commissioners are asked to inquire into and report as to "what proportion of the cost of carrying out any recommendations to be made by the Commission should be a charge against the revenue derived by any local bodies from the mines interested in the use of the said rivers." No doubt the Government has had in view that if the conditions are to be altered or the existing rights of the companies affected in any way, Parliament will have to compensate these mining companies—firstly, because the justice of the case demands that they should be compensated; and, secondly, because I submit that it would be necessary unless the reputation of this Dominion is to seriously suffer. In considering a possible remedy, I suggest that several factors should be taken into consideration. First of all, one which I have already mentioned—namely, that but for the contributory negligence of the settlers themselves this evil would never have happened. All that they had to do was to remove the willows and perhaps erect occasionally a stop-bank, although I admit frankly that was a difficulty, because of the want of funds on the part of the County Council. Another very important factor is, what were the methods adopted at the batteries formerly, and what are the methods which are adopted there now—I mean in regard to the fineness of the product that is discharged from the batteries?

The Chairman: Which is only a very small proportion of the total *débris* thrown into the river.

Mr. Myers: No. In the case of the mines at Waihi—the Waihi Mine and the Waihi Grand Junction—I understand no *débris* now goes into the river. In the case of the mines at Karangahake the whole of the *débris* is put into the stream, and cannot be put anywhere else. At Komata, I am informed that the *débris* other than tailings does not go into the river.

The Chairman: So really, as far as *débris* goes, it is only that from the Karangahake mines?

Mr. Myers: Yes. And the third factor to be considered is the economic consideration. It is a very easy matter to formulate schemes that look simple in theory to overcome this trouble, and we have heard different schemes every one of which has received the fullest and most careful consideration of the mining companies. But most of them—indeed, I may say all of them—will be found to be quite impracticable in practice. I propose just briefly to refer to some of the schemes—what have been considered the more possible ones—that have been suggested. One scheme that has been suggested is that the slimes should be put back into the stopes of the mines. Now, the Commission will be told by witness after witness that this is absolutely impossible under the conditions which exist here. It will take a very few words to give a very good reason why the mining companies say it is impossible. All these mines, I understand, for the purpose of filling their

stopes, do a considerable quantity of surface mining, and that is very expensive. If they could save money by adopting this suggestion to put the slimes back into the stopes they would be only too glad to do it. They would be only too glad to put the slimes back into the stopes, because it would save them a considerable amount of money. But they will give the Commission reasons why it is impossible, and I do not propose to go into the details now. Another suggestion that has been made is that the slimes should be stacked. There are several reasons why that is impossible. In the first place, there are no available sites at any one of the mines. In the second place, it will be shown that the slimes could not be held if they were stacked, and that inevitably large quantities of the slimes would find their way into the stream, and, if they ever became dry, would be blown all about the country, and would be a much greater nuisance than ever they have been in the Ohinemuri and neighbourhood up to the present time. I know there are places where slimes are stacked. They are stacked at Broken Hill, at Kalgoorlie, and Murchison, and other places; but the conditions in all the other places are essentially different from the conditions which exist in this district; and the people in the districts where these slimes are stacked complain most bitterly of the damage that has been done to them, and of the damage to their health. But they have simply got to go on complaining, because in the conditions which exist in these places it is impossible to do anything else but stack the slimes. Now, may I just indicate to the Commission one or two instances in this district of what has happened where slimes have been stacked. The Waihi Company on one occasion stacked about 11,000 tons for subsequent treatment, and when after an interval of time, the details of which will be given later on in evidence, they came to treat this stack they found that about half of it had disappeared. And Mr. McCombie, of the Talisman Mine, will give evidence of a precisely similar experience which happened to him. In Kalgoorlie and Broken Hill, and places of that description, as I have said, it is absolutely essential to stack the slimes, because there is no water to take them away, and the country is very flat, and it is impossible to do anything else. Some suggestion has been made that the slimes here could be carried out and stacked upon a swamp some few miles away from Paeroa and Rotokohu. We shall call evidence to prove that is not a feasible scheme, and especially is it not possible if, as Mr. Haszard says, it is affected by the flood-water in the manner he indicated in his evidence yesterday.

The Chairman: Mr. Haszard was specially asked about that, and I understood him clearly to say that the flood-water did not go over that portion of the swamp.

Mr. Myers: I had not an opportunity of being here while Mr. Haszard gave his evidence, but I understood what I have just stated was the nature of his evidence. Whether it was flooded or not is really immaterial, because what we say is this: that the water would inevitably carry the slimes all over the district, and that would lead to a serious trouble which, so far, nobody seems to have thought of. That is this: If a person lights a fire and it does any damage to anybody else he is liable, though there may be absolutely no negligence on his part. Now, what is going to happen to these poor mining companies. It means that after a comparatively short time there would be constant trouble, and friction, and litigation, and the lives of the managers of the companies would really be not worth living. This is really a very serious trouble, and deserves very serious consideration.

The Chairman: You say they have a legal right to put into the stream, but they have no legal right to stack, because some subsequent damage might arise?

Mr. Myers: Just so. Another suggestion has been made that these tailings might be carried by fluming or pipe to some low-lying ground—either to Rotokohu or elsewhere; but we shall call evidence to show that that scheme is not possible.

The Chairman: That practically is the same as the last.

Mr. Myers: Yes, but I am now speaking more generally. I understand that the nearest ground upon which stacking could be done would be the Rotokohu Swamp. I am now speaking of all the mines and all the reduction-works except Komata. I am told there is no land in the neighbourhood of Waihi which would be suitable. The Rotokohu Swamp is four miles from Karangahake, seven miles from Waikino, and fourteen miles from Waihi. The cost of the scheme would be prohibitive; and, apart from the question of cost, it will be shown that the scheme is impracticable. I have excepted from the observations I have made so far the Komata Mine, because that stands in a different position from the others—different, I mean, because it is in an entirely different locality, and cannot possibly join in any scheme, assuming that there is some possible scheme that the other companies at Karangahake and Waihi could join in. So far as the Komata Mine is concerned, the Commission will be told that it is absolutely impossible even to think of any scheme other than that which is adopted at the present time—namely, the depositing of its tailings in the river. These observations bring me now to this: that, after the very fullest and most careful consideration that the representatives of the mining companies collectively and individually have been able to bring to bear on the questions involved, they say that there is only one solution of the difficulty; and that solution is to make the County Council an effective River Board to enable it to do its duty as a River Board, to clear the rivers of willows and other obstructions—that is, increasing the velocity of the water and in an increased ratio its carrying-capacity—and to erect stop-banks where necessary, and any other necessary works; to dredge the river if and where necessary, and to make any cuts that appear now to be necessary or may become necessary from time to time. We submit that this is the only solution of the difficulty, and that it will be a reasonably effective solution of the difficulty. In this connection I want to point out to the Commission that no expert evidence has yet been called that has recommended to the Commission the closing of this river as a sludge-channel. Even the farmers, I venture to think, do not want this Proclamation to be revoked if any other means can be found to alleviate the difficulty from which they are suffering. All they want is that some reasonably effective remedial measures shall be taken. Mr. Metcalfe, Mr. Stewart, Mr. Breakell, and Mr. Perham have reported, and their

reports have been put in. It is to be remembered that not one of them was employed by any of the mining companies to make these reports. So far as the companies are concerned, all these reports must be taken to be absolutely independent, and not one of them, so far as I have been able to understand, advocates the closing of the river as a sludge-channel. Mr. McArthur has been called. He is quite independent of the mining companies, and he seems to hold the same view. All the witnesses whom we will call will say that in their opinion it is not necessary to close the river as a sludge-channel, but that it will be quite sufficient if remedial measures are taken in and about the river itself. I do not know that it is necessary to refer to the reports of these gentlemen, but there are passages in the reports upon which we rely a very great deal, because the views of some of these engineers correspond precisely with the views of our own witnesses with regard to the willows and the effect of their being in the river, with regard to the question of erecting stop-banks and making cuts, and so on. In a very large measure their reports support my case, and to that extent, of course, I rely upon them. However, I shall have an opportunity, no doubt, of referring more particularly to them at a later stage. It may be said, What about the tailings in the future? What effect are they going to have on the river? Are they going to increase the difficulty, or are they going to affect it at all? And the answer that the mining companies make is that there is absolutely no reason to fear that any trouble whatsoever is likely to arise from the discharge of tailings into the Ohinemuri, having regard to the system of treatment in operation. I ought perhaps to qualify that general observation, but I will qualify it in a few moments as I proceed. Now, up to quite a few years ago—I think I am right in saying 1905—the tailings which were discharged into the river were fairly coarse. They were crushed, as I understand, through only a 30- or 40-mesh. However, precise details will be given in the course of evidence. At the present time the Waihi Company is crushing in such a way that something like 90 per cent. of the slimes would pass through a 200-mesh.

The Chairman: And the 10 per cent.?

Mr. Myers: I think that is in evidence. I want to be careful in stating only absolute facts. The position is exactly the same at the Waihi Junction: if anything, the slimes are even finer than those from the Waihi Mine. At the Komata Mine practically the same condition of matters is in existence. All this is due, as the Commissioners will probably know, to the introduction of tube mills—and I understand that tube mills have only been introduced into the mines in this district during the last five years. That is why I say that during the last five years, subject to modifications and qualifications which I shall make in a moment, no damage has been done by the slimes of these companies. The Talisman Company is in a slightly different position. It is still crushing through a 30-mesh; but it has erected tube mills, and these tube mills will be working within a month or six weeks or thereabouts, and they will then be crushing, I understand, through a 200-mesh—everything will pass through a 200-mesh.

The Chairman: Is there any difference in the material they are dealing with?

Mr. Myers: I think probably there may be. The only battery then which will not be using tube mills is the Crown battery. Up to the present time no tube mills have been erected in that battery; but, as a matter of fact, the crushing operations there for a considerable time have been next to nothing.

The Chairman: They are simply developing.

Mr. Myers: Yes. What we say is this—and I think we shall be able to prove it—that the whole of this fine material will be carried out by the river in suspension to the sea. Of course, I said before that no damage had been done at all during the last five years by these tailings which we have discharged. You will understand now the qualification that I wish to make. Firstly, with regard to the Talisman, it is just changing its system; and, secondly, that some damage may have been done not to the bed of the river, but upon the banks. If any such damage has been done it is due entirely to the presence there of the willows. I have said that these fine slimes will be carried away absolutely. It has been suggested that they might be deposited on the Thames foreshore; but I will call evidence to negative that. It is true that at the Thames, and here also, we had some evidence to show that the Thames foreshore had been raised; but the Commissioners will remember that under cross-examination—I am not sure that it was not in examination-in-chief—one witness at the Thames said he was quite satisfied that the raising of the foreshore there was due to the local tailings; and I do not understand any suggestion to have been made, or, at all events, any proof offered, to show that the position of the Thames foreshore has been in any way affected by any material that has been discharged from the batteries in this neighbourhood. The only vestige of evidence that has been called so far with a view to showing that these fine slimes will not be carried out to sea is the evidence of Mr. James Mackay. In his evidence he expressed the opinion that finer crushing would make things worse than at present. My answer to that is that his view is contrary to all experience; that he is not himself a civil engineer or an expert in matters of this kind, and did not profess to be; that his view is contrary to the evidence of all the experts who will be called; and that it is clearly erroneous. Now, if we show that these fine slimes will be taken out to sea, if the river is attended to, if works are done in the river, then I contend that any argument in support of the contention that the Proclamation should be revoked must fall to the ground.

The Chairman: Even assuming that the river is made as you suggest in every way, there is still a possibility—more, a probability—that there will be exceptional floods. If these exceptional floods are charged with very fine slimes, there will still be damage to the farming industry through the deposit of these fine slimes on the land.

Mr. Myers: No doubt; but if proper works are done in the river the tendency to flooding will be very much decreased.

The Chairman: Is there any evidence to show what extent of works your engineers consider necessary to provide for the maximum floods?

Mr. Myers: I do not think we have any evidence to go as far as that. That question is a very difficult one, of course, because the conditions are changing year by year quite irrespective of the mining proposition.

The Chairman: I admit that apart from the mining proposition a flood will do good instead of harm, but a flood with mining slimes may do harm.

Mr. Myers: That cannot be disputed. However, what we do say is this: that if these works are done on the river the liability to flooding will be very much diminished. We also say that if the present accumulations are gradually removed, that also will tend to diminish the difficulty. Unless something is done in that direction the difficulty will be this: that, quite apart from any future slimes that may be placed in the river, if a flood happens while these accumulations are on the banks, that material will inevitably be carried upon the surrounding country. So that if we can show that these fine slimes will be carried away, and if the difficulty of the accumulations here can be overcome, then the inhabitants of this district will be in a very much better position than they have been in at any time for some years past. So far as the accumulations on the banks of the river are concerned, Mr. Kingswell, I understand, proposes to get rid of large quantities of them in a reasonably short space of time. Whether all these banks of tailings will remain if river-improvements are effected, it is impossible for me to say: but in any case river-improvements will have to be effected, and I hope that if they are effected Mr. Kingswell's interests will not appreciably suffer. However, I do not think it is necessary for me to enter further into that aspect of the matter. We construe this Commission as implying that the Government take the view which we are now submitting to the Commission—namely, that the real object of the Commission is to find what, if any, remedial measures can be taken upon the basis of this Proclamation remaining as it is. I venture to submit that this is the only proper construction which can be deduced from the four principal paragraphs of the commission. The fifth paragraph, it is true, is a general one, but, after all, it is obviously intended to be only just and generous with what precedes. What are the first four preceding paragraphs? (1.) Whether any, and what, lands are injuriously affected by the operation of a Proclamation dated the 25th day of March, 1895, concerning the Waihou and Ohinemuri Rivers, in the Hauraki Mining District, Auckland. (2.) Whether the navigation of the said rivers is, or is likely to be, seriously impeded from the same cause. (3.) What, if any, remedial measures can be adopted, without injury to any other persons, corporations, or interests. (4.) What proportion of the cost of carrying out any recommendations to be made by the Commission should be a charge against the revenue derived by any local bodies from the mines interested in the use of the said rivers. And the fifth reads, (5.) And, generally, the Commission are to report on all matters in their opinion arising out of, or touching upon, the silting of the said rivers and watercourses. The basis of that commission, I venture to submit, is that no injury is to be done to the existing mining interests. Beyond any question—and this is indisputable on any other basis than that of the Proclamation remaining—the mining industry will be most seriously prejudiced. Consequently I submit that the Government, in framing this commission, must have had in view the continuance of the present Proclamation. We hope to be able to satisfy the Commission that the facts are as I have stated them, and that the only method that can be adopted lies in the improved condition of the river. Just one other word, and I have finished. One of these paragraphs relates to whether any, or what, lands have been injuriously affected by the issue of the Proclamation. Upon that point a good deal of evidence has been called, and it has been directed to the extent of the pecuniary damage suffered by the farmers. Now, it is obvious none of the parties before the Commission can call evidence, even if that evidence were relevant or necessary, on the extent of this pecuniary damage. I merely mention that to obviate any suggestion which might be made hereafter—I do not mean by the Commission, but in any other quarter—that the parties before the Commission acquiesced in the views expressed by the witnesses, or in any view that may be expressed on this very point by the Commission: and I want to obviate any suggestion that might be made from any quarter that the parties before the Commission ought to have called evidence upon this point. It will be plain to the Commission that it was quite impossible for any of the parties except Mr. Mueller and those represented by him to call evidence upon this particular point, because nobody knew what evidence was likely to be called, and nobody knew what witnesses were to be called, or anything about the case that Mr. Mueller on that point intended to make. Indeed, as I ventured to submit at an earlier stage of the Commission, although evidence has been admitted (and quite rightly so), the matter is really not one specially referred to, at all events, in these paragraphs of the commission.

ERNEST FELTUS ADAMS examined. (No. 61.)

1. *Mr. Myers.*] What is your profession?—I am a civil and mining engineer and surveyor.

2. And you have been practising for how long?—Twenty-two years in this district.

3. And prior to that?—I had training in the Lands and Survey Department, and prior to that was licensed as a surveyor in 1885.

4. Then you have been for many years in this district, and I suppose you know the district pretty well?—Pretty well.

5. In what particular part have you been living?—On Thames, since 1888.

6. But your practice has taken you constantly up and down the district?—Yes.

7. And you have had occasion to watch these rivers during your experience here?—I have been employed on them from time to time at different matters during the whole of that period. I have been employed in regard to this Commission to go over the river and see the effect of the currents in regard to mining and battery tailings.

8. Are you acquainted, by the way, with the methods that are now and which have been in the past adopted by the different mining companies in this district?—Yes, I am fairly well acquainted with them. I am not a specialist in ore-treatment.

9. We have been told that the Thames foreshore has been raised?—Yes.

10. Fairly considerably?—I should say, inshore certainly 3 ft. or over.

11. Over a period of how many years, roughly?—About thirty years.

12. And over what lineal extent?—Practically the whole frontage of the Thames.

13. Can you say what has been the cause of the foreshore being lifted down there?—Yes: the cause I consider is the detritus deposited from the Kauaeranga Creek and generally the *débris* of the creeks running through the township, with a certain admixture of mining tailings.

14. Where from?—The Thames mines and batteries.

15. Has there been a large quantity of such tailings, and can you give us any estimate of the quantity?—I should say roughly there are about two million tons scattered on the foreshore.

16. *The Chairman.*] Do you mean two million tons of tailings, and *débris*, and detritus?—Of tailings alone, without any mining *débris*.

17. *Mr. Myers.*] Would you mind indicating before we come to this part of the river what further investigations you made in the Port of the Thames as bearing on the questions which the Commission has to consider?—I took soundings over the harbour in a line from Tararu Point to the fairway buoy, and from the fairway buoy up the Waihou River, following the sailing-course shown on the chart.

18. Is that the old Admiralty chart?—This is a copy of the chart, with the new soundings shown in red [Exhibit No. 51]. It also shows the alterations that have taken place at low-water mark. I have shown the deviations of the present low-water marks with the marks shown here, but the soundings went further than low-water mark.

19. What were you going to say about the results of your observations as shown on the chart?—I should say, on a line from Tararu Point to the fairway buoy it would average about 2 ft. less water depth than the chart shows. In places it shows shallows to an extent between 3 ft. and 4 ft.—3½ ft. is the extreme. On the sailing-course up the river the soundings in the vicinity of the fairway buoy show from 1½ ft. to 2 ft. more water. Between the two black buoys—that is, the first and second black buoys going up the river—it shows an extreme of 4½ ft. less water than that on the chart. This chart is dated 1886.

20. *The Chairman.*] Who was the chart published by?—The stamp of the Marine Department is lithographed on the original from which I traced this.

21. Is there anything on that to show what was taken as the low-water mark?—No.

22. *Mr. Myers.*] Have you anything further to say?—So far as further soundings up the river are concerned, up to the boundary of the Port of Thames, a little above Turua, my soundings on the average show the water that is shown on the chart.

23. *The Chairman.*] So there has been no alteration?—In places it is deeper and in others a little shallower: it averages up in that way. At Kopu, for instance, where the chart shows 10 ft. I found 13 ft.

24. Did you take a single line only up the river, or more than one?—A single line on the sailing-course. I took a cross-section in only two places.

25. What did you find there?—In one place I got into shallows between Kopu and the second red buoy going outwards, and I took a cross-section there, and found I was out of the channel. I took a second cross-section at the fairway buoy because I was surprised at the depth of water there, and I ran about a quarter of a mile to the south-west to see if that depth was maintained or if I had only got into a hole.

26. What did you get?—Practically the same depth—that is, an increased depth of 2 ft. according to the chart.

27. Did you take any cross-section from bank to bank in the river itself, and compare it with the soundings shown?—No.

28. So it is quite possible there might be a narrow cut, and that the walls of the river may have pinched in?—It is quite possible. The sailing-course now does not represent the deepest part.

29. It may also represent the deepest part because it is used by the vessels and therefore kept stirred; but it is possible the sides and bed may have pinched and risen?—That is possible.

30. *Mr. Myers.*] There is a shallow bank in that neighbourhood?—Yes, on the foreshore.

31. Have you anything to say about that?—Taking the old surveys of 1870, and comparing with the position I fixed two years ago of the low-water mark, I found that the low-water mark in line with the Goods Wharf has extended seawards for about 4 chains. Low-water mark in line with Cochrane Street, which is about half a mile further south-east, has extended seawards 18 chains. The Kauaeranga channel, which according to the same surveys ran nearly parallel with the Shortland frontage to a distance of 22 to 28 chains from it, now runs much more directly, and meets low-water mark about 30 chains south of its former position. There is another feature on the foreshore—the shell bank that Mr. Myers has referred to. The shell bank as shown on the chart is out of position so far as the bank at present is concerned, the present bank being a quarter of a mile further southward. So far as the low-water mark between the Piako and Waihou Rivers is concerned, the Piako channel is considerably to the eastward now of its position as charted in 1886. The south-western side of the Thames River channel has also moved until in places it cuts into the fathom-line marked on the chart. Where the two low-tide channels meet appears to have swung round towards the north-east for a distance of about half a mile—the channel of the Waihou River south of the shell bar now stands at an angle of 45° to the entrance.

32. *The Chairman.*] Is it a dam across the channel or parallel to the channel?—It is on the foreshore, and set at an angle of about 45° and at right angles to the high spring-tide mark. Either end of it is rarely covered by high tides. The middle of it is covered, or a little better, at high tide. The channel south of this shows a considerable encroachment on the old chart channel to the north-east. These are the only important alterations to the channel.

33. Generally from this plan it appears that the river below Kopu practically has really widened and straightened and improved?—Yes, with the exception of just that shallow below Kopu, in which the channel appears to be narrower, and the bar at the mouth.

34. At one spot there is 3½ ft. of water on the bar where as far as one can tell there was 8 ft. previously?—Yes, that is the big difference.

35. You have no idea how that extends laterally?—No.

36. Is it possible it is better away to the west or south-westward?—It might be better away to the north-eastward, but that is purely guesswork.

37. *Mr. Myers.*] Will you complete anything you want to add?—These soundings are in terms of the 9 ft. 6 in. Kopu tide gauge, low water, put there by the Harbourmaster.

38. *The Chairman.*] Has that gauge been fixed by you or anybody else to some definite land-mark datum?—Yes; I have levelled up there in terms of the railway levels.

39. With what result?—Taking the Kopu gauge on the 14th April, 1910, the high-water height on the Kopu gauge was 21·79 ft., which is 100·99 on the railway levels. That is levelling down from the railway-crossing at Kopu.

40. *Mr. Myers.*] Is there anything further you wish to say in regard to your investigations at the Port of Thames?—I think there was only one point of any importance, and that was the accretion or otherwise at Opani Point. There were surveys of the Native blocks that include Opani Point done by Goldsmith in 1869. I find that if he took ordinary high-water mark at that time there has been an accretion of 4 chains at the point and 12 chains on the portion of the block fronting the foreshore of the Thames and the Piako River.

41. *The Chairman.*] Have you formed any opinion as to what that accretion is due to?—I should like to remark that if he used, as was common at that time, high-water mark at ordinary spring tides, there has been no accretion at all.

42. Then, generally speaking, your evidence amounts to this: that, owing to the quantity of material brought down the Kauaeranga Stream and the creeks on the Thames, there has been a raising of the foreshore along the Thames on this side of Tararu Point, and it includes the shifting of the Kauaeranga channel and of the white shell bank towards the south?—Yes; the white shell bank has apparently moved with the Kauaeranga channel.

43. Do you go further, and say that if this continues it is likely to encroach on the channel, or do you leave it at that?—I leave it at that.

44. Any way, you do not imply, as some suggestion was made, that the stuff from the Thames has been running up the river?—I do not know: it might, possibly; but the stuff from the Thames has not been raising shoals on the river opposite Kopu. I believe that matter, in suspension in the water, passes backwards and forwards.

45. You say there is no shoaling in the lower Waihou from the Thames *débris*?—No.

46. *Mr. Myers.*] You did examine the material of which these shoals are composed which you marked on the plan?—Yes.

47. Perhaps you had better indicate in your own way what you found?—The shoals and bars in the shallows I found by examination and by dredging samples were composed of river-sand, clean particles of country rock, pumiceous matter, and fine and coarse quartz.

48–49. *The Chairman.*] Waterworn or sharp quartz?—The coarser parts of it appeared to be crystallized, or portions of crystals, for the most part waterworn.

50. But you will see a distinct difference between different quartz: you will find some quartz sharp and angular even though waterworn, and some worn all over and completely rounded?—It is generally mixed quartz. What a microscopic examination would give I do not know, because I did not make one.

51. *Mr. Myers.*] Did you find anywhere down there any deposits recognizable as tailings?—No, I did not, excepting on the Thames foreshore.

52. And those, you say, are local?—Yes.

53. *The Chairman.*] Why do you think these quartz crystals are not possibly coarse tailings? Are they too large?—Yes. Some of the very fine may have been, but they do not constitute a deposit, in my idea. I understand by a "deposit" there would have to be a fair amount of tailings in one place to make it recognizable as a deposit.

54. Although the tailings may not be distinguishable as a deposit, they may be there all the same as a small percentage?—Yes, as a small percentage.

55. *Mr. Myers.*] Taking it generally, were you able to find that the tailings which are deposited in the Ohinemuri River have done any damage at all within the Port of Thames?—No, I could not find any serious damage.

56. I understand you to say you can find no indications of any damage?—No.

57. You know, of course, the fineness of the grinding at the present time?—Yes.

58. In your opinion, is it likely that any damage will be done in the future, so far as the Port of Thames is concerned, owing to the deposit of these battery slimes finely ground, in the Ohinemuri?—No, I do not.

59. *The Chairman.*] Why?—Because the major portion of the battery slimes will pass out at the ordinary times of the river's flow.

60. What do you base that opinion upon?—Upon the behaviour of even the coarser battery tailings in the river.

61. You mean, in the current?—Yes, and general observation of the Ohinemuri as it is carrying out now these slimes finely ground.

62. I understand you, then, to say or imply that at the present time you find Ohinemuri slimes in suspension within the Thames Harbour District?—I think they are. I think there is very little doubt that they are continually passing down the river.

63. How does the water-section of the Thames, say, at Kopu compare in magnitude with the water-section of the Ohinemuri at the Junction?—It is very much larger.

64. How much larger?—I have a section between Kopu and Turua. I thought that was the fairest section in that estuary. The low-water section just above the Junction is 707·5 square feet, and just below the Junction it is 842·5 square feet. The lower section of the Waihou between Kopu and Turua is 8,230 square feet.

65. What, in your opinion, is the relative velocity of the two places—just below the Junction and the one between Turua and Kopu?—Of course, both are tidal—the lower one especially. The lower tidal velocity, worked by cutter, is 1·756. In order to arrive at that I took a gradient of 8·86 ft. in the 22½ miles between Kopu and the Junction.

66. Have you any observed velocity at the Junction?—No; I worked it out at 2·32.

67. Practically the velocity is the same at the two places?—Yes. To get the one at the Junction I used the fall of the river between Mangaiti and the Junction—14·4 ft. in 1,200 chains.

68. The velocity is practically the same, and the cross-section is ten times as great; therefore, approximately, there is ten times as much water?—Yes.

69. Therefore the slimes coming out of the Ohinemuri below the Junction will be diluted ten times as much as those above?—Yes.

70. Now, we will say there is a certain pea-soup thickness in the water carrying this white material at the Junction: do you consider you have that diluted ten times at Turua?—That is hard to arrive at, but I can give you what there is. I took water-samples on the 8th April, 1910, at low tide, ebb, near the mouth of the river, mid-channel, 8 ft. of water.

71. That is to say, you took is as probably 8 ft.: did you take it at the surface or half-way down?—One 3 in. below the surface and one 5 ft. down. The surface one gave 1 of solids in 1,022 by weight. The 5 ft. one gave 1 in 871 by weight. On the 9th April I took a sample 1 ft. above the bottom on this cross-section of mine at Turua. It gave 1 in 337.

72. That is to say, you took it as close to the bottom as you could get it?—Yes. We have been using for taking samples an ordinary pint beer-bottle, tied neck down a foot above the bottom of the pole. The pole was then stuck down into the bottom. I found we could get very fair samples by this method. These were taken at low tide on each ebb. I was not satisfied with these samples as being fairly indicative; so I took a considerable number more at different states of the tide. These samples were taken on the 24th May, 1910. My brother went out and took them at 6.20 a.m. on the flood tide at Kopu, forty minutes before high water. They are all in a series of four—that is, one was taken at 4 ft. 6 in., the next at 8 ft. 6 in., the next at 12 ft. 6 in., and the next at 16 ft. 6 in., the depth being 18 ft. 6 in. All were filtered together, and the results weighed together, because I was frightened at the time we should not get through with the total number. It took a week as it was. The average for that batch gave 1 in 7,346 by weight. That was just the result I took away with me to give me an idea of how it was going. The final weighing gave a result of 1 in 7,585. The next set was taken at high water in a similar way—four samples; and they gave 1 in 7,872. The next set was taken on the ebb, 1 hour 40 minutes after high water, and gave 1 in 3,427. In the ebb, 3 hours 45 minutes after high water, a similar set gave 1 in 5,636. In the ebb, 6 hours after high water, another set gave 1 in 2,863. The same evening I took a flood sample, 3 hours 45 minutes after that low water, and we got 1 in 1,998. These samples indicate that there is a great amount of sediment in suspension in the river.

73. Have you done anything similar in the mouth of the Ohinemuri?—What I did there was with the idea of showing how long this matter stayed in suspension. It is the only really quiet place on the river. Unfortunately for the experiment I did not notice that this continual admixture of the Waihou water was thinning it in coming down, and therefore this really does not furnish the full amount of information.

74. You did nothing in the Ohinemuri itself?—This was in the Ohinemuri, at the Junction Wharf. The samples were taken when it was as still as I could get it, and had been so for an hour by observation. The bottom sample was about 1 in 10,600; two samples taken at about 5 ft. below the surface eventually gave 1 in 17,000 and 1 in 30,000. The movement on the gauge for an hour was 1 in.—that is to say, it moved up 1¾ in., and it lost ¾ in. The current-velocity ranged from 0·5 ft. per second down to 0·3 ft., and during ebb it was 0·5 ft. again. The samples were taken towards the ebb; but, as I suggest, the heavy admixture of Waihou water coming in at the rate of 5 to 1 really spoilt the experiment.

75. *Mr. Myers.*] You know that large quantities of solid matter come down the upper Waihou and into the lower Waihou, quite apart from any question of mining tailings?—Yes.

76. Have you made any calculations, or are you able to give any information which would indicate an idea, as to the proportion that the mining tailings bear to other solid matter that flows out of the mouth of the lower Waihou?—No; I have not been able to do any work in connection with it to give any thorough and fixed idea.

77. Have you gone far enough to be able to express a fairly definite opinion as to whether the percentage is large or small?—In my opinion, the tailings would be small.

78. You have not made experiments in the upper Waihou, but do you know from your own personal experience and observation whether or not large quantities do come down the upper Waihou?—Yes: I can see large slips on the hills, and I know the Waihou fairly well. A tremendous amount of *débris* has come down the Waihou which in a minute form has got into the river. There was no other means for it to get away.

79. Have you any personal knowledge of the drains that flow into the upper Waihou?—No, but I have been through the country at the head of the Waihou watershed, and it is not the class of country to remain permanently if water can scour it.

80. *Mr. Vickerman.*] Why do you say the percentage of mining tailings would be small?—Taking even that the old chart has used the same soundings basis as I have, I should say that on that 3,000 acres opposite the town there is a rise equal to 12,000,000 tons. The Kauaeranga

River and the other creeks have been the factors in that case. I think about 2,000,000 tons of tailings have been discharged, and the balance, in my opinion, could only have come down from the Kauaeranga River and other creeks.

81. There was a large amount of timber cut down, carrying down huge quantities of stuff?—Yes.

82. So that was exceptional?—At Turua Creek there have been bush operations in the past; but that country has been cut out, and great quantities of *débris* are coming down there now. The Hikutaia has been fairly well cut out, and that furnishes enormous quantities in the same way.

83. That, of course, was all in the past; that is not coming down at the present time?—Well, so far as the Little Maratote is concerned, the contractor was starved out owing to the continual compensation he had to pay. The last was about four or five years ago.

84. Was he driving the timber?—Yes; all these creeks were driven: and the stuff is still coming down, as that increase in the shoal opposite Turua shows. The Waitawheta has a big forest. I have just finished laying out tramways for the companies to get to work and do their driving there. Contractors have been working that bush for years for the Waihi Company. It is a tributary of the Ohinemuri.

85. *Mr. Myers.*] You have a record showing the movement of the river, which explains some evidence given by you this morning?—Yes. [Exhibit No. 52.]

86. You examined the bars and shoals which impede the navigable channels?—Yes.

87. Of what material did you find the bars and shoals composed?—As far as I could tell by observation, river-sand.

88. *The Chairman.*] Shoals above or below the water-level?—Both. We found sand travelling at low tide in the channel.

89. *Mr. Myers.*] What was the origin of those shoals?—The materials scoured down the river from the country generally, with possibly some admixture of battery tailings.

90. There are shoals in the river from which vessels load sand?—Yes.

91. Where is the last one of those shoals going up the river from which vessels load sand?—Opposite Netherton, between the Hikutaia and the Komata Stream—at the confluence. I am speaking in regard to the navigable channel of the river, not the entire bed. It is opposite the Te Ara Whakapekapeka Block.

92. Battery tailings are noticeable on portions of the river down to what point?—Down to about a mile above the Omahu Stream confluence.

93. Can you express any opinion as to how those banks of tailings have been caused, or what has contributed largely or mainly to their accumulation?—I first found the tailings where they shoaled in the slack water on the left bank of the river at the point named.

94. *The Chairman.*] Did you find any at the Omahu Creek?—Yes. I quite expected to find some there; there has been a battery at work up the creek.

95. *Mr. Myers.*] Yes. Anything further?—The first clear signs of tailings in the river are at Willow Island—at that point where the channel is marked on the plan with red as the present channel. Then another half-mile up the river, and then a mile above Omahu. That was the first appearance I saw of tailings on the foreshore. After that they began to appear on the banks right up where they began to be retained by the vegetation.

96. What effect have the willows and the vegetation on the banks with regard to the accumulation of tailings?—There is no doubt where the banks have willows and vegetation on them the tailings deposit there.

97. Do you think that if the Waihou River could have been kept clear of willows there would have been any serious trouble from these deposits?—No, I do not think there would have been any serious trouble on the Waihou as far as the discharge of tailings is concerned, other than in flood-waters and from the previous accumulations.

98. *The Chairman.*] You mean previous to the accumulations?—Yes, and in flood-times.

99. *Mr. Myers.*] While we are on this question of willows, what do you say on that question with regard to the Ohinemuri River?—The willows have been absolutely disastrous there as far as the river is concerned.

100. Referring to the Waihou River, did you and Mr. Bray, County Engineer, take a number of samples from the bed of the river?—Yes.

101. All from the bed of the river?—Yes.

102. How many in all?—Sixteen samples.

103. Did you take any other samples together in addition to those sixteen?—No: I myself took two samples from the Mangaiti. We took the samples, sealed them up, and forwarded them to Professor Jarman.

104. I think you arranged with Mr. Rhodes that they should be examined and reported on by him?—Yes.

105. Have you a record of the precise places from which those samples were taken?—No, but I could detail them. I have no doubt that the County Engineer could indicate the exact places.

106. What particular object did you have in taking those samples?—To see to what extent the battery tailings were with the river-sands, and we thought the locality we selected was the most likely to show that.

107. After obtaining and looking at the samples, did you yourself form any conclusion, irrespective of what you might have heard afterwards?—Yes.

108. What conclusion did you form?—I formed the conclusion that they were mostly river-sands.

109. And not mining tailings?—Yes.

110. Have you seen the report?—Yes.

111. Did that report bear out your own conclusions?—Yes.

112. How did you take those samples?—They were simply scooped up from the bottom with a tin nailed on the end of a pole.

113. *The Chairman.*] I would like you to give some further information as to where the samples were taken from?—No. 1 was taken immediately above the Junction in the Waihou River, fairly close to the right bank. No. 2 was taken in the same place, at the confluence, about the middle of where the two rivers meet. No. 3, an inshore sample, taken just below the Junction on the right bank. No. 4, the same place, and 12 ft. further in the stream, just about the bottom of the groin, and where we were with the punt. No. 5 was taken at the right bank of the Waihou, opposite the visible end of the groin. No. 6, towards the left bank in the same place, about 20 ft. towards the left bank. No. 7, a chain and a half below the visible end of the groin, and towards the bank. No. 8, at the same place, and 20 ft. further towards the left bank. No. 9, opposite the lower bank that has formed the Hape Creek Island. It was taken fairly well inshore. I could not give the exact distance out. No. 10, the same place, only 10 ft. further towards the left bank. No. 11, opposite Kenny's northern boundary, the right bank, well in the stream. No. 12, the same place, and about 20 ft. further towards the left bank. No. 13, about 20 ft. from the left bank in the channel, about the same cross-section line. No. 14, about 24 ft. in the river from the right bank. No. 15, mid-stream in the same place. No. 16, in the same line, but 20 ft. from the left bank. No. 17, on the river-level at Mangaiti, immediately below the bridge on the Waihou. No. 18, river-sand drifted up on the bank at the same place, about 6 ft. below water-level.

114. On what date were these samples taken?—22nd April. Nos. 10, 17, and 18 were taken the day before.

115. Nos. 1 to 16 were taken at what state of the tide?—The tide was on the ebb.

116. You did not, I think, take any of the samples from the bank?—No.

117. For what reason?—They were obviously tailings.

118. With regard to sample No. 18, have you any particular remark to make?—No. 18 was river quartz sand. [Exhibit No. 53.]

119. *Mr. Myers.*] Did you draw any conclusions from your investigations in regard to this material in the bed of the Waihou River?—The conclusion I drew was that battery tailings could not permanently lie in that velocity of current in that part of the river.

120. Having observed the Waihou River at low tide, the samples from the bed, and the shoals, have you formed any opinion as to what is the cause of the impediment, if any exists, to the navigation of the Waihou River?—Yes, the river-sand, and any tailings that may be present—that may be mixed with them.

121. We have been told that of recent years there has been more flooding in this district from the Ohinemuri River than in former years: do you agree with that?—Yes.

122. Can you express any opinion as to what effect, if any, the slimes now put into the river have upon the question of flooding?—If those tailings have a clear way and a fair chance, I do not think they will affect the river-bed in their removal—that is, if they have a fair road.

123. You have had an opportunity of seeing Mr. Devereux's particulars as to the rainfall?—Yes.

124. That seems to have been pretty heavy for the last two or three years?—Yes. I have run out a comparison table for eleven years between the rainfall at Auckland and Waihi; but the information has been practically anticipated by the information which Mr. Devereux gave to the Commission. [Exhibit No. 54.]

125. You have given a good deal of consideration to the question as to what can be done to improve the Ohinemuri and Waihou Rivers?—Yes, a fair amount.

126. And have you formed any conclusion?—Yes.

127. At what conclusion have you arrived?—I have arrived at the conclusion that the willows must come out first.

128. *The Chairman.*] Do you mean stumped right out?—Yes.

129. Why?—In order to give a fair waterway.

130. *Mr. Myers.*] Mr. North has suggested that they should be killed?—I consider that they should be taken away.

131. What else?—I consider that the confluence of the two rivers could be improved—much improved—by a short cut.

132. Whereabouts?—It starts a short distance below the confluence, and ends a short distance above it. Its length would be 900 ft. I ran a line over it.

133. *The Chairman.*] Would you close the old bed of the stream in any way?—Yes.

134. *Mr. Myers.*] Its length would be 900 ft.: what would its width be?—One hundred and sixty feet.

135. Its depth?—Sixteen feet six inches at the top, with a slope of 2 to 1.

136. That would mean excavating how many yards?—Seventy thousand two hundred yards.

137. What would the effect of that be?—The rivers would meet at an acute angle, instead of, as at present, in flood, by direct impact almost.

138. Would it increase the velocity?—In flood-time there would be a higher velocity of the Ohinemuri. It would certainly have the effect of increasing the velocity of the flood-water passing down the channel.

139. What would the level of the bottom of the cut be?—I would suggest taking the cut in dead level. As a matter of fact, the bottom of the Waihou River above the Junction is 1 ft. deeper than the bottom below the Junction.

140. Have you any other suggestions?—I would advise a dredge to be used in the Waihou River and in the Ohinemuri River in the lower meanders.

141. In your opinion, would the adoption of your suggestions materially improve the condition of the rivers, and, if so, in what respect?—Yes, with the further matter of the reduction of these great accumulations that have been allowed to take place. They will have to be removed. It is imperative that they should be removed.

142. *The Chairman.*] Removed in a limited time?—Yes, before we have another March flood.

143. Do you consider that the existence of those accumulations is a danger to the district?—Yes, as far as land-damage is concerned.

144. *Mr. Myers.*] And the effect?—The effect of the finer-ground material passing away almost entirely at ordinary times in the river would practically obviate damage, I consider, to any appreciable extent.

145. Do you think that the management of the river should then be in the hands of an effective body?—Certainly.

146. Can you say from your inspection of the accumulations on the banks of the river, whether, speaking generally, they are composed of coarser or finer slimes?—They are certainly not slimes, as I understand "slimes."

147. Presumably a certain quantity of slimes would be caught coming down the stream by those obstructions?—But they are not deposited—slimes.

148. *The Chairman.*] Have you made any experiments, or have you any information, as to what current will move fine slimes? Do you think ½ ft. per second?—Yes, I think so.

149. *Mr. Myers.*] Have you made any estimate of the cost of the works which you recommend?—In view of the fact that that cut will probably require a considerable amount of work in connection with it, I put £4,000 down as the cost. I have left a big margin for contingencies, because there is so much risk with cuts. As to the willow cost: I have had no experience in shifting willows, but the cost is based on the cost of removing bush.

150. *The Chairman.*] Do you think that a hauling-machine would be strong enough to tear those willows out?—No; but I think it would shift the bulk of the smaller ones that are on the lower bank, leaning over the stream.

151. Would you not be afraid of injuring the banks?—Yes, it might.

152. Would it not be better to cut off all vegetation, removing the projections over the river, leaving the stumps and fibrous roots as long as they continue?—If the stump is dead I think your suggestion is a good one. Of course the killing of the stump really involves the efficacy of this patent, of which I have no knowledge.

153. Do you think a traction-engine—not a hauler—on the banks would be better than a boom and steam-winch?—I was thinking of a hauler on the bank, but the other is a good suggestion. The only thing is that you would want some tackle to shift the stuff.

154. You would want to have a good anchorage, and permission to go on the land?—Yes.

155. Would there be any demand for the material?—No.

156. You do not think it would pay to cut it? The River Board would have to remove it?—It would be cheaper if it could be allowed to be stacked there till dry and then burned, if the landowners would allow it; and, if they did not, the stuff would have to be removed.

157. That would be a considerable cost?—Yes; they would have to be taken by water. At Pereniki's Bend there are no facilities for carting: they have to be punted.

158. Therefore it might be desirable to provide legislation to give the local body charge in this case?—Yes, it might.

159. Otherwise, you might have a recalcitrant owner who would defy them, and put them to great expense?—Yes.

160. With regard to the cost of the removal of the willows, you say you do not know much about that, but you have put down what you think is a fair thing?—Yes, as far as the labour and that is concerned, one can estimate it in a general way, but as far as the exact details of killing the trees, &c., is concerned I am not an expert. About £3,000, I consider, would be the cost of the work between the Paeroa traffic-bridge and Te Puke.

161. What about the lower Waihou and the upper Waihou?—I am only taking in the meantime the work that appeared to me to be pressing.

162. You do not think the lower Waihou is pressing work?—It will become so year by year, but it will take a year or two.

163. Would not taking the willows off the Ohinemuri tend to throw the flood down quicker into the lower Waihou, and intensify the evil?—If the position at the confluence is rectified, I consider that the current, with the added velocity, would compensate matters.

164. *Mr. Myers.*] You do not think the work in the lower Waihou is so pressing as the work higher up?—That is so.

165. *Mr. Mitchelson.*] Do you not think that the work in the upper Waihou is pressing also?—Although it is pressing from a navigation point of view, it is not immediately pressing.

166. *The Chairman.*] You are prepared to say that it would not cost more to clear the willows from the Waihou than from the Ohinemuri?—I think it will cost a little less. They are very thick on the Ohinemuri.

167. *Mr. Myers.*] Give us your next item of cost, please?—There is a dredge, £6,000—a ladder type, discharging into punts.

168. Where would you get one for £6,000?—A great number of them are built for that sum, according to the Mines Reports.

169. *The Chairman.*] Including punts?—£7,000 with an elevator.

170. *Mr. Myers.*] What do you suggest should be done with the material that is dredged?—The material that is dredged from the river could be used for roadwork—light material for roads, or for railway-formation on the Paeroa–Pokeno line. That river-sand is a marketable material, although I cannot say to what extent the market is capable of taking it.

171. You mean the Auckland market?—Yes.

172. Is it not a fact that scows and cutters which go up to Auckland have sometimes to go lower down the river because they find too much silt mixed with the gravel at Hikutaia?—I do not know. On the highest bank I saw there were tailings inshore. The bank itself looked to me to be clean enough.

173. The Commission took samples under water, and were satisfied of the presence of material that was slimes?—Yes.

174. *Mr. Mitchelson.*] The lowest bank of all, about two miles below Hikutaia, just by an island?—Yes, on the shoulder there the tailings collect.

175. *The Chairman.*] Do you propose to dredge the centre of the river only?—The worst points for navigation commence at the Junction.

176. And would you work down?—No, simply because it is the worst point.

177. Is it not better to work up, so as to give a larger sectional area for the water to get away?—As far as that is concerned I think that the worst shoal should be the one to commence at. The worst one on the whole river is that which is indicated on this plan; but it is affected by the tide to such an extent that vessels can get over it at high water. But, not considering the question of tide, this one is the worst.

178. And it will probably get worse as soon as your diversion is made?—Possibly, as far as the Ohinemuri River is concerned.

179. *Mr. Myers.*] Are there not other items of expenditure?—Pumps and elevator, £1,000.

180. What about the cost of landing your dredged material and so on?—The cost would be, including dredging and elevation, 1s. a yard.

181. Apart from that you put the cost down at £14,000?—Yes.

182. *The Chairman.*] Have you considered the question of stop-banks?—That is one of the reasons why I suggest putting a dredge in the meander. I have not had sufficient time to go into the question of the expense of stop-banks. It would require a complete system of levels to be taken throughout. As far as I can see, it would be very ugly country to commence much stop-banking in.

183. *Mr. Mitchelson.*] There are two places on the upper Waihou where it is stated that the water overflows and runs down to Netherton?—I do not know in that case whether it would be a safe thing to put a stop-bank there, because, as far as the channel is concerned there, it is certainly not fit to take large volumes of water.

184. *The Chairman.*] Then that comes to what we want to get at—viz., as to dealing with the Waihou above the Junction?—The river above the Junction is not big enough.

185. The river above the Junction is not big enough because it overflows?—I question whether it ever has been big enough.

186. *Mr. Myers.*] Do you know the Rotokohu Swamp?—Yes.

187. Would you think it feasible to discharge on to that swamp the slimes from all these different batteries of the various mining companies in this district?—I think it would be possible to do it as engineering; I should not like to undertake it as a commercial work.

188. I understand that you have not considered the question of the cost of the works from the batteries to the swamp?—No.

189. My question was rather directed to obtaining your opinion as to the feasibleness of keeping the material there when you have got it?—I think it would be very difficult to do so.

190. What do you think would happen?—I think it would require a considerable amount of stop-banks. In fact, it would have to be banked round. The water would carry a considerable amount of slimes in suspension.

191. *The Chairman.*] You mean to say you could not make a big enough "settling-bed"?—If it were only a matter of, say, twelve months' product it might do, but you have to consider a continuous output.

192. The volume of water contained in that square mile will be so large that you would practically have still water over, say, three-quarters of the square mile?—Yes, over a large portion of the area.

193. And therefore in that still water the slimes would deposit?—Yes.

194. Although they might be easily disturbed again?—Yes.

195. If you put slimes in a bottle with some water, in course of a very short time the slimes deposit?—Yes.

196. There is no reason why they should not deposit in an open area as well as in a bottle?—No reason at all.

197. *Mr. Moresby.*] Supposing you got very heavy rains, what would happen?—The banks would overflow, and carry the finer matter with them.

198. Have you had any experience in impounding matter of this kind?—I have seen the impounding of coarse sand.

199. *Mr. Myers.*] What would happen in regard to the carrying-out to sea of all these finer particles? Supposing these willows are removed and the vegetation is kept off the banks, and these finer slimes are continued to be put into the river, what do you think will happen?—Practically the whole product will go out to sea in ordinary times of the river.

200. *The Chairman.*] How far do you think it will go out into the Firth of Thames?—Until it meets with water still enough to deposit it.

201. Is there any water in the ocean still enough to deposit it?—I do not know.

202. Do you think it is going to be a serious matter to navigation or to the fisheries?—I do not think so. The stuff, I have no doubt, would be carried away in suspension to some place where it will have an opportunity. The whole firth is surrounded by great mud-flats.

203. The effect of adding a large increase to the already large volume of detritus coming down the river must tend to increase the flats, and shallow the Hauraki Gulf?—Certainly, it must tend to do that.

204. You cannot estimate to what extent?—No.

205. *Mr. Moresby.*] What would be the width of the gulf between the first and second black buoys?—About twelve miles.

206. So that there would be a big surface area once the stuff got outside the mouth of the river?—Yes.

207. Do you know the amount of tailings and slimes that go into the river per annum from all the mines in the Ohinemuri?—I understand it is about 2,000 tons a day. I suppose that is for six days a week.

208. That would be short tons?—Yes, tons of 2,000 lb.

209. With respect to the remedy, I think you stated that first of all you would cut away the willows?—Yes.

210. Where would you start to cut away the willows, up-stream or down-stream?—I think that is immaterial. That would be a matter for consideration when the details of the work are being considered.

211. Before you cut away the willows on the Ohinemuri, do you not think it would be desirable to have a dredge also down the river?—I consider that the sooner a dredge is here the better.

212. Before letting the stuff on the banks come down, would it not be better to have something in the river to keep the channel open—to keep it from getting blocked?—Yes, I think it would be.

213. You consider it would be better to have a dredge first before anything else is done?—Yes, I would rather have the dredge first.

214. The dredge could be used for many purposes?—Yes, it could be utilized in the cut.

215. And keep the river open above the Junction, and dredge the stuff out?—Yes.

216. And also, if necessity arose, and the channel became blocked below Te Puke, it could be used there?—It could keep the navigation open to Te Puke.

217. May I take it that the dredge would be a sort of insurance that the channel would be kept open?—Yes, that is my idea.

218. With regard to the willows, I think you have now altered your opinion in this respect: that you consider that if the willows were killed by some stuff capable of doing it, the big willows, or those that cannot be removed, could be left in their place?—Yes.

219. I suppose you would cut those willows down?—Yes.

220. In devising your scheme, have you taken into consideration the fact that the extraction company propose to take out 500 tons a day to be treated?—I will not say that, because I had no idea of any such arrangement. I think there should be an understanding between the authorities in charge and the extraction company in regard to this matter. I think they should work in co-operation if possible.

221. What I want to ask you is this: Have you taken into consideration the fact that that company will be working and regrinding the coarse material?—Yes, I understand they regrind 500 tons a day.

222. In your opinion, provided the river was cleared, it would let the stuff go out?—Yes.

223. Do you consider that these slimes will go out to sea, provided the banks are cleared and the vegetation is also cleared—the willows and other obstructions?—Yes.

224. The slimes are retained by reason of the various obstructions in the river?—Yes.

225. *The Chairman.*] Including the deposit of tailings?—Yes.

226. Do I understand that you propose to dredge the deposits of tailings? Is that part of the scheme?—No.

227. What part?—The meanders.

228. What width of the river?—To form a channel. The width would vary.

229. What width of the river do you consider necessary for navigation, and to what depth?—I should consider a width of about 60 ft. or so in places, but the depth is very variable. The shallows are the obstruction to the navigation.

230. Right down to what depth do you propose to dredge it?—As far as the Junction is concerned, you could take 3 ft. or 4 ft. off that quite comfortably. Every part of the river varies in depth.

231. I want to know what you consider is the minimum depth you would require in order to get a minimum navigable channel?—The minimum navigable channel, I should say, would be about six or seven feet at low water. Of course, I do not think you will ever get it.

232. What do you think, knowing all the circumstances, is a desirable channel to provide for floods—that is, in width and depth?—I think it is impossible to provide a channel for great floods. In regard to floods, the only point where I estimated the Ohinemuri flow was at the Woodstock dam. I did not see the flood, but I took the indications. I have asked Mr. Bray since, and he concurs in estimating it at 10,595 cub. ft. per second.

233. That was the maximum flood?—Yes.

234. Taking the ordinary flood, have you made any similar calculation for a less depth?—The ordinary flood I should roughly estimate would be about half of that. Of course this is above the junction with the Waitawheta. The Waitawheta has big floods occasionally.

235. *Mr. Moresby.*] The Waihou, I understand, does not flood so rapidly, or to such a great extent in so short a time, as the Ohinemuri?—No; it would require twenty-two hours for its top watershed water to come down to the confluence of the two rivers.

236. Take the channel that you propose to dredge, do you think it would be sufficient, if the river were cleared of willows and obstructions, to carry ordinary floods?—Fairly heavy floods.

237. With regard to the Waihou, you know that a cut further up the river is suggested by Mr. Metcalfe—the Ngararahi cut?—Yes.

238. I think the length of that cut is 60 chains, and the width 200 ft.?—Yes.

239. In time do you think it would have any effect on the river?—I should not care to take the responsibility of doing it myself. I think it would be dangerous and inexpedient.

240. *The Chairman.*] Why do you think it would be dangerous and inexpedient?—The water will not necessarily scour the full depth and in a direct line, and a cut of that size would probably disorganize a considerable portion of the river below; and it would probably require a considerable amount of work to be done there.

241. *Mr. Moresby.*] What effect do you consider the making of a cut in that direction would have on the old river-bed—that is to say, between the Junction and where that proposed cut comes in above Te Puke?—It would require a dredge, I should think.

242. *The Chairman.*] That would be closed or dead water, I presume?—Yes.

243. *Mr. Moresby.*] If that cut were made, do you still consider that all the slimes would go out to sea?—I did not say that all the slimes would go out to sea.

244. Do you consider that such a large proportion would go out to sea?—I do not think it would make much difference.

245. Would it make a difference?—I do not think it would make much difference one way or the other.

246. How many miles of river front would that cut affect? Would not that involve great claims for compensation for deprivation of river frontage?—Yes, there would be a certain amount of vested interests to settle. I have not gone into the question. The most important thing, I conceive, is that it cuts out the wharf.

247. With regard to the Waihou River, have you seen the river-sand which comes from that river, and which you consider would make good road-material for light traffic?—Yes.

248. Is there any metal of any sort on that side of the river?—No metal whatever that I know of.

249. And this stuff could be supplied at 1s. a yard?—Yes.

250. What would be the cost of carting over metal from here to that district?—The County Engineer could give you information on that question. I am only recommending dredging here to remove an evil.

251. You do not recommend it as a source of profit, but only as a means of preventing the waste of good land?—Yes.

252. In reference to using the stuff for roads for light traffic, would it not be an advantage to the County Council if some arrangement could be made?—Looking at the matter as a whole, I do not think that any one would be sanguine enough to say that the plant could be run as a profitable concern—that is, the dredge.

253. But if the County Council paid 1s. per yard for the stuff, would not the cost of the operations be materially reduced, and thus reduce the loss which would otherwise be caused by the use of the dredge?—It would certainly reduce it—to what extent the County Engineer is better able to tell you than I.

254. With regard to Pereniki's Bend cut, taking into consideration the fact that the extraction company propose to take 500 tons a day out of the river, would these operations have a disastrous effect on them?—Yes, if the company is dependent on the supply of tailings at that particular point, it would affect them badly.

255. How would it affect them?—The company is practically dependent now, as far as I can see, on collecting tailings in these lower meanders. The effect of the cut would be, I should think, in the case of the first moderate flood, to rush a great part of the old collected material right through the meanders above the cut.

256. *The Chairman.*] What do you define as the "meander"—from the railway-bridge down to the Junction?—No; I refer to the part from the top of the cut up to Mackaytown.

257. Have you estimated what the volume of accumulations is in that portion of the river?—No.

258. *Mr. Moresby.*] If the company had only one side of Pereniki's Bend to the other, would it be worth their while carrying on these operations?—I could not say.

259. You have not examined carefully this part of the river?—Yes, but I have not taken out estimates of the quantity of collected tailings in it.

260. Are you prepared to give an opinion?—No; I have not taken out estimates of the quantity of tailings there.

261. With respect to the samples, we may take it that, with the exception of two of them, they were all taken fairly well in the scour of the river?—The bulk of the samples were in the scour of the river—there is not the slightest doubt about that.

262. Was there much "fresh" in the river when you took these samples?—Sixteen hundred sluice-heads was running in the Waihou River. The river had not really gone down from the big March flood.

263. So that there was an extra scour in the river at that time?—There was an extra volume of water.

264. The report of Professor Jarman just gives the plain percentages?—Yes.

265. And he practically had to estimate them?—Yes.

266. He has not gone into the matter from different points of view?—No.

267. Have you based your opinion on this report?—Yes, to some extent.

268. In giving your answers, have you taken into consideration his report?—Yes, and I have also based my opinion on my own observation.

269. A certain amount of guesswork?—Yes, a small percentage.

270. *Mr. Hanna.*] With regard to these slimes going out to sea, you say that, in your opinion, any material that is ground fine enough to go through a 200-mesh will go right out to sea?—Yes, in ordinary times of the river.

271. Supposing the stuff was ground fine enough to go through a 300- or 400-mesh, is it not likely that it would be carried out further and better?—It would require less energy to move it.

272. If the operations of the extraction company necessitate their grinding the stuff to that degree of fineness, in your opinion, the residuum discharged will certainly carry right out to sea?—Yes.

273. I think you know that this company has titles for about nine miles of the river-bed, extending nearly from the Junction to Mackaytown?—Yes.

274. Do you know that the company has acquired a freehold site near where they propose to erect their plant?—I see where they are erecting their plant at Hararahi No. 3.

275. You have seen their operations at Waihi?—Yes.

276. They grind the particles very fine, and treat them?—Yes.

277. You know the measurements of the proposed cut?—Mr. Bray can give you the details.

278. With your knowledge of the whole district, and having expressed your opinion with regard to the flood-channel proposed to be cut, will you express an opinion as to the advisability of the Pereniki cut?—The only object, I take it, is to relieve the flood-water.

279. In your opinion, would that be a beneficial thing to do—to put a cut in there?—I should not put it in myself except as a last resort.

280. Will you give the Commission your reasons for saying that?—In the first place, the cost of the cut; in the second place, the high scouring due to the velocity of the river in flood-time; and, thirdly, the probable effect on the lower river due to bringing the other heavy material down through the high velocity of the water.

281. *The Chairman.*] Do you claim that there will be a higher velocity in the reaches of the river below, and how far down, or would it affect the velocity of the river?—I think the first effect it would have would be on the velocity of the river itself.

282. What effect would it have on the velocity of the river in the lower reaches?—It would increase the velocity.

283. To what extent, and how far down?—I think a fair thing to put on the flood-velocity would be perhaps 10 ft. per second.

284. How far down the River Waihou do you think that 10 ft. velocity would be continued, and where is it going to die out to its normal state?—That is a very hard thing to say. It would depend on a good many things—it would depend on the tide considerably.

285. You are objecting to it on the ground that it will give an increased velocity: we want to know on what you base your reasons?—The increased velocity, unless this is walled up, would have no effect.

286. Assuming that it is walled up, and stop-gates are put in, and the whole current comes down the cut?—There is 11 ft. of difference in the levels between the bottoms of the river there—so I am informed by Mr. Bray.

287. Pereniki's Bend is the shallower place?—Yes; Mr. Bray can give you the level of the bottom there, and down below. There is a difference in fall of 11 ft.

288. The sectional area at Pereniki's Bend has been determined by nature to be in a certain cross-section with a velocity due to the gradient of the river at that point, and the section at the lower point has been determined by nature to be of a certain cross-section with a velocity due to the gradient at that spot?—Yes.

289. Supposing you cut out the intervening three miles and a half, you will get an increased velocity through it, and no doubt it will tend to change the cross-section at both ends, but it will come to a fixed and determinate section in fairly moderate time. Do you agree that to reduce the tortuous channel would be a reasonable and wise thing to do?—Yes, but it is the up-river effect I am afraid of.

290. The up-river, not the down-river?—Both, but particularly the up-river effect.

291. Do you think the river below Pereniki's Bend is full of tailings?—No, but the bottom of the river, I think, must have a very large amount of heavy material in it—mullock from the mines.

292. Material which the velocity at that place could not remove?—Yes.

293. Do you think if the velocity were increased it would be removed?—Yes—that is, the material which I particularly recommend the dredge for in that part of the river.

294. It has been stated that no mullock has reached below Mackaytown?—I have seen it in the river below.

295. We may take it that you have not made calculations and you have not determined what the bottom of the river is above the proposed cut, or what the bottom of the river is in the meanders?—No; all I can say as to that is from what I have seen where the trees have fallen away.

296. Up on the bank?—Yes. Of course, my remark as to the clay on the bank has no reference to the mullock in the bottom of the stream. In speaking of the clay on the bank I was referring to the class of material the cut would go through. As to the mullock at the bottom, I have seen with my own eyes pieces as large as my fist, and even double that size.

297. That would require a fair velocity to shift it down?—Yes. Some of it is hard rock of pretty high specific gravity

298. *Mr. Hanna.*] With regard to the tailings in the river at Pereniki's Bend right up the river—in your opinion the cut being put in would carry away a considerable quantity of tailings?—Yes.

299. And where would it tend to take them to? What would be the effect at the Junction, assuming, as I believe evidence will be called to show, that the water is lower at the Junction in the bed of the Ohinemuri than the bed of the Waihou?—Yes, probably.

300. That is, in the channel?—Yes.

301. Assuming this will be the case, will there be a further concentration of stuff at the Junction?—What does not bank up will go down with the current.

302. Will it accentuate the trouble of the bank that is there now?—Quite possibly.

303. Supposing that cut is put in there, what would be the effect upon the long meander—that will create a backwater, I suppose?—Not necessarily.

304. Do you think a portion of the river-water would go round there?—Yes, if you divert it—if you block the cut.

305. Assuming the cut is put in?—If the cut is put in, and the bottom of the cut is as low as the ordinary river-bottom, you could divert it.

306. That would mean the assumption of something in the bottom of the stream—that would mean having a sort of gate that you could set one way or the other: that is the only way we could carry on our operations?—Yes.

307. *Mr. Mueller.*] I should like to know where the boulders are as big as your fist and bigger?—Below Macandrew's.

308. Are there not with those pieces lumps of what may be slimes?—Yes, they look like slimes.

309. You disagree with Mr. Metcalfe's suggestion and with Mr. McArthur and Mr. Haszard as regards that cut?—Yes.

310. Those samples of water which you took, giving percentages of solids—I suppose you made no test as to what the solid was?—No; it was purely a question of solid and liquid.

311. You could not say what portion of it is salt from the sea?—It is washed before it is evaporated on paper, to get the salt out.

312. You know the deposits which have been referred to on the banks of the rivers at Alexander's near Netherton?—I have been at Robinson's. There is no doubt they are tailings.

313. You know that the banks formed by deposits of tailings are harder now than they were years ago?—The sides of the banks are. The river-mud has been replaced by harder material.

314. And any deposit such as that would, in your opinion, affect the flow of the river—decrease the flow?—Any reduction of the cross-section would interfere with it, but I do not think necessarily there would be more friction in a hard bank than a soft bank.

315. As to the sixteen samples you took from the river with a tin on the end of a pole: what size was that tin?—An ordinary coffee-tin.

316. And what sized bag did you fill?—About 4 lb. in each sample.

317. The stream was running at the same time?—Yes.

318. You do not know how deep your dipping went into the bottom of the river?—It was simply a surface dipping.

319. I suppose you admit from your observations that river-sand is more easily moved than tailings?—It is harder to move. River-sand will stand a higher velocity than the coarsest tailings.

320. One witness has stated that in the early days in standing with your feet bare on the river-sand you could work your feet right down, but in the case of tailings you could not do that because it is more solid?—Yes.

321. Do you not believe that?—I have seen tailings on the banks, but not in the current.

322. As to willows, do you know the portion of the Waihou River between Kenny's and another place where the willows were cut down over a year ago?—I have seen some stumps below Kenny's.

323. Have you noticed whether that has had any appreciable effect?—I have noticed young willow-shoots coming out of the bank.

324. As regards tailings?—Just opposite Kenny's place is where they were looking for these cross-sections. The willows are still growing.

325. You stated that the bottom of the Waihou River, above the Junction, is even lower than it is farther down?—Yes, lower than the bottom of the cut.

326. What do you think is the cause of that?—Very probably it is on account of a packing of stuff just below the Junction.

327. Would not the effect of that be, to a certain extent, that the Waihou River has to come over that bar at the present time in flood-time; and would not that to a certain extent have the effect of damming back the Waihou River?—Yes, to a certain extent.

328. You say that these finely ground slimes move very easily?—Yes.

329. It takes very little to run them along?—Yes.

330. In fact, you consider that a great portion of them go right out to sea at the present time?—Yes.

331. So that there would be very little difficulty in fluming tailings, provided you once got them elevated sufficiently?—There is not much difficulty in fluming tailings.

332. And these fine slimes would flume much easier than heavier tailings?—Yes, at a lower gradient.

333. What height did you provide for in elevating the tailings?—It would be elevated in hoppers, and probably the hoppers would be comparatively high.

334. What power do you propose to use in that lift?—Oil-power. I put down 1½d. for elevating.

335. Can you give us an idea of what proportion of the 1s. per yard would be for elevating and material?—Threepence the dredge, 1½d. elevating, 4d. for towing, and 3½d. for contingencies.

336. The impounding area that you spoke of—what size was that area?—One thousand and fifty feet square approximately. It stands a little over 6 ft. higher now, but I think originally it might have been a little more—perhaps 10 ft.

337. Comparatively a small area?—Yes.

338. You know from your observations of the fine deposit of slimes that it does damage to vegetation—to the grass?—Undoubtedly.

339. So that wherever the flood-waters go, a certain amount of damage would be done?—Yes, if they have slimes in them.

340. And you do not think that it is possible to have a scheme to provide for what you call great floods?—No.

341. You think that it would be very hard indeed to so improve the river that great floods will not overflow the farmers' land?—That is so. What I suggest is to reduce the accumulations so that great floods will not carry a high percentage of this stuff, and thereby the damage will be minimized.

342. You say that the fine slimes is, in your opinion, carried along by the water, and is not deposited to any great extent?—It is deposited in still water. I think it will deposit if you give it time.

343. If the fine grinding continues at the mines the water will be heavily charged with this finely ground stuff, will it not?—Yes.

344. Where is this fine stuff accumulating now?—It accumulates in certain places to a small extent, and it will continue to do so under present conditions.

345. So that there is always an accumulation of this fine stuff even now?—Yes; as long as the river is in a bad condition it will continue to do so.

346. If mining increases in the same ratio as during the last few years there will be a large quantity of this fine material thrown into the river?—Yes.

347. Therefore if a flood comes in the future and overflows the banks there will be more of this fine stuff to deposit on the grass, will there not?—No.

348. Why not?—There will be no large accumulations under certain altered conditions from there being dirty river-banks.

349. As regards your dredging operations, you suggest that this stuff might be used in connection with the construction of the Paeroa–Pokeno Railway. Supposing as time went on you had more stuff than could be conveniently used for roads or for railway, what would you do with it?—I can see room for a very considerable amount of stuff.

350. *Mr. Bruce.*] In reference to the statement as to the 2,000,000 tons of tailings on the Thames foreshore, you base your statement upon the past crushing?—Yes.

351. You know the point opposite the sandbank, and opposite Turua: was there a channel on each side of it at one time?—Yes.

352. Is there a channel on the eastern side of it now?—No.

353. It is practically filled up?—Yes.

354. What was the lowest depth that you found between the fairway buoy and the mouth of the river?—Three feet and a half of water.

355. That is, in the channel?—Yes, on the sailing-course.

356. What is the depth shown on the plan of 1886?—Eight feet.

357. And there is 3½ ft. now?—Yes.

358. From the manner in which you took these samples would you expect to get any fine slimes?—In the case of fine slimes, I expected to get it if it was enmeshed with the other.

359. You tied a tin-can to the end of a stick: would not the disturbance of the water in getting up the can have a tendency to remove the finer tailings from the can?—I do not think so.

360. Do you know that salt has an appreciable effect in causing slimes to precipitate?—I have heard so, but I am beginning to doubt it after what I have seen.

361. You have never tried putting salt water in one basin, and fresh in another, then putting a certain amount of slimes in each basin, and noticing how long each took to settle?—No.

362. Do you think that would be an effective way of trying it?—I have not tried that.

363. Do you think the altered conditions suggested would mean the taking of a much larger proportion of slimes out to the gulf than is taken out now?—I do not say, a very much larger proportion. I should say a considerable proportion of slimes goes out now, notwithstanding the present condition of the banks. I have not been able to find what I could recognize as an extensive deposit of slimes. There are small deposits showing slimes here and there, but I do not think I can say anything as to a large deposit. Of course a number of small deposits may aggregate up to a considerable one in the long-run.

364. Where there is 2,000 tons of slimes going into the river every day, does the largest bulk of the stuff stop in the river, or does it go to sea, or what becomes of it at the present time?—It is not all slimes now.

365. Take it for granted that 2,000 tons of slimes goes into the river, what proportion of that would go out to sea under present conditions?—It is very hard to say.

366. These tailings would make good ballasting for a railway-line across the Piako Swamp?—No.

367. It is only the river-sand?—A mixture of tailings and river-sand.

368. The slimes would be no good at all?—Not a bit.

369. *Mr. Moresby.*] With regard to remedial measures, and with regard to the annual cost of keeping a dredge on the river here, have you estimated what the annual cost is likely to be?—The capital cost would be about £14,000. The annual cost depends on the disposal of material.

370. Presuming they get paid for raising the material; or, on the other hand, supposing the dredge is working, and we are not getting anything for it?—It would take £2,000 a year to keep the dredge going.

371. And maintenance and the river-banks?—I suppose that would be considerable for the first two years until you got everything settled, even in respect to the willows.

372. Supposing the river was cleared, what would be the annual cost of maintaining it?—It would be very difficult to say.

373. *The Chairman.*] You say it would cost some £2,000 a year to keep the dredge going?—Yes.

374. That means you are going to dredge 4,000 cubic yards a year?—Yes.

375. Have you allowed in the 1s. a yard anything for capital charges, sinking fund, depreciation, and so on?—No: simply on the running.

376. Then, in addition to that, they have to find interest and sinking fund on £14,000, and other charges?—Yes.

377. Which has to be added to the 1s. a yard?—Yes.

378. Have you made any estimate of what that would amount to?—I suppose £14,000 at 5 per cent.

379. Including sinking fund?—In the form of a loan to be repayable in a certain number of years.

380. Supposing you take 5 per cent. on £14,000, there is a further charge of £700 a year?—Yes.

381. Which increases the cost of dredging by about 4d. a yard?—The £14,000 cost would cover the amount in the way I have indicated.

382. There would be another 3d., at any rate, for capital charges?—Yes.

383. *Mr. Mitchelson.*] You have mentioned hoppers: did you include the cost of hoppers in the £1,000 that you mentioned when speaking of the elevator?—No.

384. What would you allow for the hoppers?—They might put up hoppers that would cost £1,000, for it would be very expensive handling that stuff with railway-trucks; but in the beginning and for some time the hopper charge would not be very much.

385. You would have to add the hopper charge to the £14,000?—Yes.

386. What would it be?—Hoppers large enough for this work would be £1,200.

387. That would be £15,200, instead of £14,000?—Yes.

388. *The Chairman.*] Would you not want a considerable number of barges, and do you not think your estimate will have to be increased?—No, not as far as that is concerned. As far as the scows are concerned, their cost is only about £200, and I should think that punts could be provided for about £100 each, each carrying 60 tons.

389. You would have to have three of them?—Yes.

390. *Mr. Myers.*] As soon as the river is cleared, do I understand from you that the slimes would flow out more quickly?—More effectively. It would not make any practical difference to the ordinary current-velocity. It would only be in the case of the water rising above a certain level.

391. Supposing you have got the river cleared, and you have no accumulation of tailings in the river, and that you are just having 2,000 tons daily of slimes put into the river, and a flood comes along, will not the flood carry the slimes quickly to sea?—Certainly.

392. You do not get a flood, as a rule, rising in five minutes?—No.

393. And, that being so, do you think there would be any serious danger of the slimes being carried over much of the surrounding country?—No, I do not anticipate any serious danger.

394. You said you did not think there would be much difficulty in fluming tailings; but when you say that do you mean fluming tailings for a few feet or for some miles?—It is just a matter of cost.

395. That is, assuming you can get a sufficient fall, and you have got sufficient water, and so on?—Yes.

396. Personally, I think you said you have had no experience in that kind of work?—No.

William Frank Grace examined. (No. 62.)

1. *Mr. Myers.*] Your name is William Frank Grace, and you are manager of the Grand Junction Mining Company, situated at Waihi?—Yes.

2. How long have you been in charge of the Waihi Grand Junction Company?—Five months.

3. And you have been in this district, how many months?—Ten months.

4. Since you came here have you made yourself acquainted with the district?—Yes.

5. Prior to your coming here, had you extensive mining experience?—Twenty-five years.

6. Where?—Mexico, United States, Spain, South Africa, Queensland, Northern Territories of South Australia, Victoria, and practically all the Commonwealth.

7. So that your experience has been a large and varied one?—Yes.

8. I think you took a course at the Royal School of Mines, London, and that you are a Fellow of the Chemical Society of London?—Yes.

9. You are also a member of the Institute of Mining and Metallurgy?—Yes.

10. Would you kindly tell the Commission how many men your company is employing at the present?—Between three and four hundred—I could not give you at the moment the exact number.

11. What is the capital of your company?—Five hundred thousand pounds.

12. All paid up?—Yes.

13. Is it a fact that a good deal of your share capital is held by English investors?—Yes.

14. Can you say how much?—No, but I think you can get that evidence in Auckland.

15. It is a very substantial amount?—I should say the major portion.

16. Will you tell the Commission how much money has been expended by your company upon plant, &c., at Waihi?—The total expenditure up to April of this year was £537,524.

17. So that you have put back into the mine the value of the gold you have worked from it?—£287,910 bullion has been won, which has gone back to the property. That is up to the end of last April.

18. No dividends have been declared?—No.

19. You know, I suppose, the general history of the mine?—Yes.

20. Has a great deal of development-work been done?—A very large amount.

21. And you are now winning gold from the mine?—Yes.

22. What sort of ore do you work?—We work all the ore.

23. What grade is it?—Taken as a whole it is considered low-grade in Waihi.

24. It is not fair, I think, to question you closely as to what your costs are, and I do not propose to do it, but what I want to ask you is this: Supposing anything were to happen to cause any alteration in your system of working, or anything of that kind, which would increase the cost of your work by, say, 2s. per ton or upwards, what would be the effect?—You mean 2s. on to the present working-costs?

25. Yes?—That is a complicated question to answer. It might cut out a very large amount of low-grade ore, and make it unpayable, or it might mean 5s. added to the cost of ore that might be payable.

26. It is a *sequitur* from that that it would diminish the life of the mine?—Yes, the output and the life of the mine.

27. Precisely, but to what extent I suppose it is impossible for you or anybody else to say?—It would take a long time to calculate it.

28. Are you able to honestly assure the Commission that it would have a really serious affect in the direction you have already indicated?—Two shillings a ton would be a very serious matter.

29. I mean in the prevention of your company working large bodies of ore?—Certainly, it would cut out large bodies of ore.

30. To what degree of fineness do you now grind your ore?—Taking the average this year, it has been 94 per cent., I believe, through a 200-meshed screen, or, rather, I should say that 95·1 per cent. has gone through a 200-meshed screen this year.

31. That is 4·9 per cent. short of all that has gone through?—Nothing remains on the 100-mesh, 1·9 per cent. remains on the 150-mesh, and 3·8 per cent. on the 200-mesh. I have here a tabulated form giving every year the amount treated. [Exhibit No. 55.]

32. That record shows that year after year your company has been grinding its ore finer and finer?—Yes, exactly.

33. Your company started work in 1906: had no work been done on the property before that?—Yes, a very large amount of development-work.

34. And ever since 1906 you have been depositing slimes from the battery in the Ohinemuri?—Yes.

35. You have heard, I think, a number of different suggestions made for the disposing of slimes in other ways?—Yes.

36. Have you given careful consideration to the different suggestions that you have heard made?—Yes, I have given them all consideration.

37. Speaking generally, do you consider any of the schemes that you have heard suggested so far to be feasible?—Speaking generally, no.

38. Have you heard any suggestion made yet which would not add very considerably to the cost per ton of the treatment of your ore?—No.

39. Are you prepared yourself to make any suggestion for works to be done in connection with the river which, in your opinion, would result in a great improvement?—I should say clearing the willows would have a great effect.

The Chairman: Is there any good going into the question of the willows? What we want to get from Mr. Grace is, has he any new ideas on the subject? If the witness would make us a short statement, I think that will answer the purpose, provided it is not a repetition of what the last witness said.

40. *Mr. Myers.*] What are the various schemes which you have heard suggested?—The question of depositing the tailings.

41. Have you heard it suggested that the slimes should be put back in the stopes?—Yes.

42. Have you, in your experience, been in any mine where that has been done?—Not slimes.

43. Just explain, please?—I have seen tailings put back in dry countries where there was no water underground or very little water—dry countries such as Kalgoorlie, Charters Towers to a very limited extent, and in some parts of Mexico.

44. You have never seen wet slimes put back into the mine?—It is impossible.

45. Why do you say that?—In the first place, if you put them underground wet you could not dry them—they would run all over the place.

46. *The Chairman.*] I suppose it is essential here that the slimes should be wet?—Even if you dry them and keep them underground, you could not keep them dry.

47. *Mr. Myers.*] What effect would it have upon the pumps to put these slimes back?—You could not work in the mine with stuff of that kind.

48. What effect would it have on the pumps?—Cut them out.

49. Are you able to say that would be the effect of the slimes upon your pumps from your own personal experience?—Certainly.

50. Just give us an indication of what you mean?—The pumps are one of the biggest expenses.

51. Do you happen to know the views of the Inspector of Mines or of the Miners' Union with regard to the suggestion to put the tailings back into the mine?—I have not personally made any reference to the matter. I have not even mentioned the thing.

52. What do you put into your stopes now for filling?—Earth from the surface.

53. At an expense of what?—Eighteenpence or 2s. a ton.

54. Assuming that it is feasible to put them back into the mine, would that be cheaper or more expensive?—It would practically cost us nothing if we could handle them.

55. If it were feasible you would be only too glad to save the much greater cost of surface material?—Yes.

56. Can you give any further reasons than those which have already been given for your objection to the suggestion to put these slimes back into the stopes?—It is a perfect impossibility.

57. Have you heard a suggestion made that the slimes should be stacked?—Yes.

58. I am not speaking of taking them away to be stacked?—Yes, stack them locally.

59. Locally first?—I do not know of any ground near where we could stack them without endangering the Town of Waihi. By "stacking" I presume you mean impounding. You cannot stack them; you can impound them.

60. Is it an easy thing or not to impound them?—Almost impossible, because they never settle dry enough to become solid.

61. And then what?—If the bank goes they will run about all over the place.

62. I think you said you had been at Kalgoorlie?—Yes.

63. At Broken Hill?—Yes.

64. They do stack slimes, do they not?—No; coarse tailings at Broken Hill; at Kalgoorlie they were stacking the tailings entirely.

65. I believe the townspeople of both places are highly delighted?—You ought to know a dust-storm there: it is a nuisance.

66. Have you heard it suggested that the slimes might be carried away in a flume or a pipe to some low-lying land?—Yes.

67. Is there any low-lying land in the neighbourhood of Waihi which would be suitable for such a purpose?—None that I know of that is available.

68. Can you tell the Commission what is the nearest ground which would be suitable, assuming that the plan is a feasible one?—I do believe that there is some land further south somewhere, some miles away, but I do not know where.

69. Do you know the Rotokohu Swamp?—Yes.

70. Do you know what distance that is from your battery?—Fourteen or fifteen miles, I suppose.

Mr. Vickerman: Less than twelve miles; it is 12½ miles from the Paeroa Railway-station to Waihi.

71. *Mr. Myers.*] Would you like to carry your tailings over that twelve miles?—No.

72. Seriously, you have considered the question?—I have gone into it with Mr. Fraser, and he has all the figures, and it works out, even for Waikino, at an exorbitant price.

73. Let me ask you in a general way, is it your opinion whether the process by flume or pipe, or any other way—is it a feasible scheme?—Practically speaking, no, except at enormous cost. Commercially it is not possible. It would cost between 2s. and 3s. a ton at the very least from Waikino.

74. What does that mean to you at Waihi?—Probably we should have to add 50 per cent. on to that.

75. We might as well have the figures. Tell us what the estimates are. You have estimated what it would cost to run these slimes away by flume?—Yes.

76. You have also estimated what it would cost to move them by railway-trucks?—Yes.

77. You have also considered the question of the feasibleness of a pipe?—One direct pump?

78. Supposing you take it in that order?—Yes.

79. *The Chairman.*] To run where?—To run to Rotokohu Swamp. This is from Waikino.

Scheme 1, dealing with Residues from Waikino.

Material to be transferred: Solids, 1,000 tons; water, 15,000 tons: total, 16,000 tons per day.
Distance of transmission: Seven miles.
Number of wheels, on a basis of 2-per-cent. fall: Twenty-one wheels.
Diameter of wheels: 45 ft. Effective lift: 35 ft.

	£
Cost of wheels erected, £900 each, 21 wheels	18,900
Fluming: One section of flume 32 in. by 18 in., 2,116 ft. at £1 5s. per hundred erected—£26 9s. per chain	14,812
Motive power: Twenty-one 35 b.h.p. 2,200 volts A.C. three-phase motors 25, fitted with starters, &c.—£200 each	4,200
Generating-station,—	
1,000 b.h.p. (in two units of 500 b.h.p. each), 2,200 volts A.C. generators, at £3 per brake horse-power each	3,000
Two 500 b.h.p. gas-producers; two 500 b.h.p. gas-engines, with buildings, foundations, &c., erected, at £18 per brake horse-power	18,000
Main switchboard and leads	300
Transmission-line from w/o to Paeroa, 2,200 volts A.C. line, 30 tons copper, at £100 per ton, £3,000; 320 posts erected at £4 each, £1,280; 1,000 insulators at 7s. 6d. each, £375; erecting wire, £100. Add 10 per cent. contingencies, £500	5,255
Dumping-ground at Paeroa, one square mile (640 acres, at £20 per acre)	12,800
Workmen's dwellings at dumping-site—6 cottages at £200 each	1,200
	£78,467

Labour and Running-costs.

	£
At generating-station, Waikino, 1,000 b.h.p., at £10 per brake horse-power per annum	10,000
Supervision at twenty-one substations—24 men (each man to look after three stations) at £150 per annum each	3,600
Stores, belting, repairs, &c., to motors, wheels, and fluming	4,500
Labour at dumping end—6 men at £125	750
Interest and depreciation on capital cost	16,478
	£35,328

Summary.

	£
Capital outlay by Waihi Company,—	
Wheels	18,900
Fluming	14,812
Motors	4,200
Generating-station, Waikino	18,000
Electric generators, switchboards, &c.	3,300
Transmission-line	5,255
Dumping-ground, Paeroa	12,800
Workmen's cottages	1,200
	£78,467
Interest, 6 per cent.; depreciation, 15 per cent.	£16,478

On a basis of 300,000 tons per annum, this method of handling Waikino tailings would cost 2s. 4·26d. per ton.

80. *Mr. Myers.*] In reference to the property just referred to, you have looked at it this morning?—Yes.

81. With your knowledge of the class of material you have got to deal with, can you say whether, in your opinion, these slimes are going to stay there when you have got them there?—I very much doubt it. I do not see what is going to confine them if you have got a flood.

82. There is one thing that is not included in your capital cost, and that is your retaining-wall?—That has been left out so far.

83. What sort of retaining-wall do you think would be required?—It would have to be very thick: I suppose about 15 ft. to 12 ft. minimum.

84. What would it have to be built of?—I suppose of the soil.

85. Would you require any foundation?—Yes.

86. Once you got the water inside, is it likely to be held there?—In peaty soil it is likely to percolate through.

87. *The Chairman.*] Slimes would not do?—I do not think so; it would run out. That is my experience.

88. The slimes would ooze through, you think?—Yes.

89. *Mr. Myers.*] Do you know of any place in the world where wet slimes have been stacked, except possibly to await treatment?—No, I have never seen them stacked or impounded on a large scale.

90. Supposing you were told that as a matter of law you had to absolutely prevent the slimes getting out of the impounded area, would you like to try it?—No, I should not like to take the risk.

91. Do you think there is a serious risk?—Certainly.

92. Your estimate refers to taking slimes from Waikino only?—Yes.

93. Does that include a flume sufficient to take anything more than the slimes from the Waihi Company's battery at Waikino?—No.

94. It does not include anything from the Talisman or Crown Mine batteries?—No.

95. Nor from any other mine that may be worked in the future?—No.

96. And it does not include an extension to the Waihi Company's battery, nor to yours?—No; only the Waikino plant.

PAEROA, THURSDAY, 2ND JUNE, 1910.

WILLIAM FRANK GRACE, examination continued. (No. 62.)

97. *Mr. Myers.*] I should like you to state what, in your opinion, would be the cost of transmitting these slimes to the swamp by railway-truck?—Before I start on that there is a little matter in the estimate I gave you yesterday that I should like to correct. The size of the launder I gave you was large enough to take the stuff from the Waihi and Junction and Talisman Mines. It is planned for the whole, except that it does not allow for any branch launders up to Waihi or in connection with the Talisman or Crown Mines. But the fluming is big enough for the whole of the mines.

98. And this work is designed from Waikino?—Yes. I was also asked for information in regard to the tube mills at the Junction mines, and I can now give the dates. In 1906 there were two mills running part of the time: in 1907 there were three running, but I cannot tell you exactly when they were started; in 1908 there were four running; and in 1909 there were seven running, but the three that were added were added at the very end of the year. In 1910 we have eight running.

99. *The Chairman.*] Do you propose to increase the number?—Not for the present tonnage.

100. *Mr. Myers.*] You have now fully dealt with the question of the feasibleness or otherwise of transmitting the slimes to the Rotokohu Swamp by means of fluming or launder?—Yes, tailing wheels and flumes.

101. Will you now deal with the question of their removal by railway-trucks. I think Mr. Fraser, one of the engineers of the Waihi Company, has prepared a detailed statement showing the estimated cost?—Yes.

102. Have you conferred fully with him and gone into the question?—Thoroughly.

103. Do you agree with these estimates?—Yes, with one or two little exceptions where he has possibly underestimated the cost.

104. In order to save time I will put in the estimate prepared by Mr. Fraser, and he will speak about it later. [Exhibit No. 56.] In order to have it on the notes, would you mind going into the details of the results?—I will give a summary of the capital expenditure. This scheme, of course, is divided into two sections because the sands had to be treated separately from the slimes. The capital expenditure on the sands plant at Waikino will run into £4,400, and the slimes department at Waikino will run into £3,450; to take the tailings to Paeroa will cost £24,650: making a total of £32,500.

105. *The Chairman.*] What do you mean by "tailings at Paeroa"?—It includes the cost of handling the tailings at Paeroa and the cost of the land. It is all given in detail on page 2 of the estimate. Then, there is interest at 6 per cent., £1,950, and depreciation at 15 per cent., £4,875, making a total of £6,825. The annual labour expenditure of the sands at Waikino would be £9,883 5s. 6d., of the slimes at Waikino £25,866 10s., and of the tailings at Paeroa £2,660, making the total annual expenses £45,234.

106. *Mr. Myers.*] Now, on the basis of 300,000 short dry tons per annum, that works out at what?—It would cost 3s. $0\frac{1}{10}$d. per ton.

107. That, again, is only applicable so far as Waikino is concerned?—Yes; that is only taking into account the Waikino material.

108. And if it is to be extended to Waihi there would be a proportionate increase?—Yes.

109. Now, that is only the companies' expenditure?—Yes.

110. There is something more?—Yes; the railway would have to supply rolling-stock and a certain outlay for extensions to its lines. That has not been dealt with.

111. I think you put down thirty-five 8-ton wagons at £150 each?—Yes, making a total of £5,250. That is for the sand. To deal with the slimes it would take forty 20-ton wagons at, say, £400 each, making a total of £16,000; and for haulage there would be two locomotives at, say, £2,500 each, making a total of £5,000. There would be an extension of the railway for three miles from Paeroa to the dumping-site, costing, say, £4,000 per mile, making a total of £12,000, or a grand total of £38,250.

112. *The Chairman.*] On that, of course, the Government would expect to get haulage-rate and repay themselves?—Yes; of course haulage-rates are included in the estimate.

The Chairman: Therefore it is not fair to take the haulage-rate both on the estimate and again on the capital charge. You show an estimated sum the Government would have to find, no doubt, but it is fair to consider that that cost will be recouped by the haulage charges.

Mr. Myers: Yes.

The Chairman: It is an interesting estimate, but it does not help us forward.

113. *Mr. Myers.*] Then, again, if the material has to be removed from your battery it means that there will be an increase in the Government expenditure?—Yes, there is a railway extension there as well.

114. You mean the mines at Karangahake, of course?—Yes.

115. I assume from the evidence that you are giving that it will be mechanically or physically possible to take away the material from the Waihi batteries and the Junction battery by means of trucks?—Yes.

116. But would it from the Talisman and Crown?—It would be a very, very complicated matter.

117. *The Chairman.*] Why?—Because they are in such an awkward position to make a connection of any kind with the railway.

118. It is not impossible?—Nothing is impossible, but it would be a very difficult matter.

119. *Mr. Myers.*] Now, will you go on to the third question—namely, that of pumping?—I will take Mr. Govain's pumping scheme—that is, the stage-pumping scheme. Mr. Govain has gone into this thing more thoroughly than anybody.

120. You have discussed it with him?—Certainly.

121. And I think certain conclusions have been arrived at?—Yes. This scheme of stage-pumping has a vertical lift with a three-throw pump, and then a launder to flow down to the next stage and relift it. This only treats with the slimes and not the sands, and is for Waikino only. This estimate is to treat 750 tons of slimes during twenty-four hours, the ratio of water to slimes being 8 to 1. Capital expenditure for the power-station: 2 gas-engines, units 400-horse power each, at £18 per horse-power, erected with buildings, £14,400; 2 250-kilowatt 3-phase generators at £5 per kilowatt, £2,500; switchboard, cable, lightning-arresters in engine-house, £1,000: making a total of £17,000. Transmission-line: Wire-posts erection, and insulators, £3,130; telephones, line and erection, £150: making a total of £3,280. Pumping-station: 1 tank and disintegrator at Waikino, £600; 10 3-throw pumps at £650, £6,500; 10 50-horse power induction motors and starters, at £4 per horse-power, £2,000; 10 sets of transformers, at £1 10s. per horse-power, £750; 10 sets of pipe-lines and valves, with standpipes and valves, £1,200: 5 pump-houses, foundations for pumps and motors, and erection, £1,500: making a total of £12,550. Fluming, launders, trestles, and collar launders for pump, 560 chains at £25 per chain, £14,000. Dumping-site: 640 acres at £20 per acre, £12,800; 6 workmen's cottages at £200 each, £1,200: making a total of £14,000, or a grand total capital expenditure of £61,730. There has been nothing allowed in this estimate for storage-tanks and disintegrators on the line at intermediate stations, or for building any retaining-walls on the dumping-site. The annual running cost of the power-station would be 400-horse power at £12 per horse-power, inclusive, £4,800; pumping-station, 5 stations, 1 man per shift per station equals 15 men at £150, making a total of £2,250; repairs and renewals to pumps and motors, including oil and stores, £1,850; 2 fitters at £150 and 2 labourers at £125, £550, or a total of £4,650. Fluming: Labour, £600: timber and

carting, £400: making a total of £1,000. Transmission-line: 1 electrician, £150; and 1 labourer, £125—£275. Dumping-site: 6 men at £125, £750: making a total of £11,475. Interest at 5 per cent. and depreciation at 15 per cent. on £61,730 would amount to £12,346; making a grand total of £23,821. That is worked out on the basis of 225,000 tons, and amounts to a cost per ton of 2s. 1 $\frac{4}{5}$d.

122. Again, I think, this is only from Waikino?—Yes, and it is only treating the slimes—not the sands at all.

123. In this last scheme of pumping are there any doubtful or unknown factors?—Well, the estimate of stores is very low.

124. No; I mean so far as the conditions of working are concerned—wear-and-tear and so on?—It is a very difficult factor to estimate on a high lift. Of course, that is not so high a lift as the direct-pumping proposition.

125. You have also considered the question of direct pumping?—Yes, I went into it roughly. The wear-and-tear on the pipes and pumps in a direct-pumping scheme makes it absolutely prohibitive.

126. Have you had any personal experience which leads you to that conclusion?—The biggest lift I ever had is 50 ft., and the wear-and-tear on that is enormous, and it is not a direct increase if you double the lift—it is a very big increment; the wear-and-tear is more than doubled.

127. Then you have not allowed in these last estimates in either case for duplicates?—No. I say I have not allowed, but the plants are divided into units in each station, and one unit can carry the whole of the stuff.

128. Is the question of breakdowns or probable breakdowns an important factor also?—Certainly.

129. An unknown one?—Yes. I say we have not allowed anything for redisintegrating at any intermediate stage should there be any serious breakdown or wash-out of the launders.

130. Speaking on this question of direct pumping, is it a scheme that, as far as you know, has ever been adopted elsewhere, or would it be an experiment here?—Absolutely experimental.

131. That is, having regard to the kind of material you use here?—Certainly.

132. You heard Mr. Aickin speak the day before yesterday of a pumping-plant he had seen on the West Coast?—Yes.

133. Does that, in your opinion, bear any analogy to the suggested scheme of pumping to the Rotokohu Swamp, and, if not, why not?—No. They were not pumping tailings at all, but concentrates; and concentrates are very different things from hard quartz—they are very much softer material. I do not know whether he stated the actual amount of the lift, but I believe he gave the length of the pipe as only about 100 ft., which is a comparatively small length.

134. Do you know Mr. Adams's plant at the Thames?—No. I believe they are pumping sands.

135. But I understand it is only a short distance?—I do not think it is very far. There is no necessity for it.

136. It comes back to this: that in your opinion, at all events, none of these schemes are commercially practicable?—No.

137. Do you think there is any way at all of improving the present condition of matters?—Certainly.

138. I just want you to very briefly state your suggestion?—I should say, clear the river of the willows, possibly followed up by removing a certain amount of the accumulated coarse sands in the river.

139. And you know that Mr. Kingswell proposes to treat the accumulations on the banks?—Yes. He is actually removing part of the sands, and the more he removes the less there will be for the other people who may be appointed to do it.

140. Would you give us the quantity of material that you are discharging into the river at the present time?—It is somewhere between 6,000 and 7,000 tons per month of four weeks from the Grand Junction Mine.

141. Are you discharging any sands, or nothing but fine slimes?—I do not call any of our stuff sands; everything will pass 100-mesh.

142. And nearly all of it will pass through a 200-mesh?—Yes, 95 per cent. will pass through a 200-mesh.

143. You call it all slimes?—Yes, I should.

144. Supposing the river is cleared of willows and other obstructions, if there be any, what would happen to the slimes that are going to be deposited in the river?—They will travel all the way down eventually.

145. And go where?—Right out to sea.

146. What will become of them there?—Eventually they will get into still water in the sea, where there are no currents, and they will settle to the bottom.

147. *The Chairman.*] Is there any still water in the sea?—I believe there is when you get down deep enough below the surface currents. I believe they have found dead water by deep-sea soundings in the Atlantic and Pacific Oceans.

148. Thirty or forty miles out?—Yes, quite that.

149. I suppose it would mean a depth below 30 or 40 fathoms?—Yes.

150. *Mr. Myers.*] I suppose what you think is that once they get down to the sea they will not do anybody any harm?—I do not think so.

151. Now as to the question of whether these slimes will settle in a river such as the Ohinemuri or Waihou when cleared?—Well, you might get some small dead pools on the side of the river, and between tides you might have a certain amount of settlement; but that would be lifted on the next tide.

152. *Mr. Mitchelson.*] You mean that if it settles on the ebb tide the flood tide will disturb it again?—Yes.

153. Then it will be always going up and down the river?—No, because on the average there is always a bigger flow down than up. You would find it would settle very little with the eddies and currents you get in the river.

154. *Mr. Myers.*] Are these slimes able to settle in flowing water?—No. Of course, you can get an infinitesimal current, but if you get a current of ½ ft. to a second they will not settle.

155. *The Chairman.*] Are you basing that on any experiments or merely giving it as your opinion?—Practically on the rate of falling. Professor Richards has made special studies of this question of fine grinding, and division, and concentration, and so forth.

156. Where are his investigations to be found?—I believe Mr. Banks has a copy of Professor Richards's work here. I have not had occasion to look at it since I came to New Zealand. It is still recognized by all authorities as the standard work. He deals with the angles of these particles. I notice that at the Panama Canal Commission a good deal of evidence was given there, and they referred back to the Dubois experiments as a standard.

157. Of course, they are pretty old, and dealt only with natural products, and not these artificial products?—Yes, but, of course, Professor Richards has dealt with these questions in a metallurgical sense. He is the authority of the world on concentration.

158. *Mr. Mitchelson.*] How do you account for the slimes settling in the river?—I have not seen any slimes I could distinguish as mining slimes. I could see belts of slimes certainly, but they are not mining slimes.

159. Have you been there during the last day or two?—I went last week some time. I took some samples of these lumps off the bank.

160. *The Chairman.*] It has all the feelings of a smooth character—not prickly in any way, and when dry it bends like putty?—Yes; I have a sample of these lumps.

161. It is not lumpy; it is a very thin settlement over what you might call the foreshore?—It is in the channel. Of course, there may be a temporary settlement between tides.

162. There was all the appearance at the place at which we looked of there having been a succession of deposits in successive tides. The water is very still there?—The channel is a very irregular channel.

163. It is not like working in the launder, and you cannot make the river like that unless you are prepared to concrete the banks and get a defined channel; and I suppose you have not gone into that estimate?—No.

164. Have you or the other companies considered the question of finer grinding. You told us that your mine grinds the finest of the lot, and that 95 per cent. of your stuff goes through the 200-mesh. Have you considered the question of trying to make 99 per cent. go through?—We are trying to do our best, but I think commercially it will not pay. It is almost impossible to prevent a very, very small amount of stuff being carried over every time.

165. I suppose we may assume for argument that you have got very near to the standard at 95 per cent.?—Yes.

166. What do you say of the other companies who are not grinding nearly so fine?—It would be different if we could run the mill in sections and keep the different parts of the mine separate. The different lodes in our mines require different treatment, but unfortunately we have to strike an average. And so in the Waihi Mine they have a different class of ore to ours. They may find it commercially advantageous to crush a little coarser. Eventually they may go in for finer crushing.

167. I suppose it is the desire amongst all companies to remain as they are: they do not want to increase their capital expenditure?—I do not think that is so in the case of mining companies. If you can get an extra 2d. or 3d. it will be done, and some companies go in more for theoretical extraction than for commercial extraction.

168. And lose thereby?—Yes.

169. Have you seen in the journals in the last two or three years an account of an explosion gas-pump invented by a Mr. Humphreys in which there is no piston or plunger?—I never heard of it.

170. It appears to me peculiarly a design whereby you could commercially pump slimes: have you ever considered it?—I believe Mr. Govan has.

171. You use air-pressure, I believe, in some cases?—Yes; the Pohle lift for agitation.

172. Is that at all suitable for ordinary purposes?—I am afraid not. The wear-and-tear is very great even on our small pump, which is only used for intermittent work.

173. The actual cost is a mere bagatelle?—That is so.

174. And there is no reason why you should not keep them in duplicate?—But you have the wear-and-tear on your pipes.

175. You never estimated that?—No; neither Humphrey's scheme nor air lifting. The consumption of power is enormous with an air lift, and is a very expensive method of pumping. We only use it because we require it for a chemical reason.

176. *Mr. Myers.*] You told me you had knowledge of the conditions at Kalgoorlie?—Yes.

177. Do they treat the ore there in the same way as here?—They do not crush as fine as we do, and, again, a large number of the mines are roasting their ore.

178. *Mr. Hanna.*] An important part of your scheme was clearing the river of the willows?—Yes.

179. What part of the river would you start to clear first?—Two or three miles towards Te Puke.

180. And would you go down to the mouth then?—No; upwards to the source.

181. In part of your scheme you took into consideration the operations of this extraction company?—Yes.

182. Am I to understand from you that these operations are certain to be beneficial to the river?—Certainly.

183. I think you know something about these operations: you have seen them in force in Waihi?—Yes.

184. Do they grind as fine as you do?—I think they grind a little finer.

185. May I take it that in their operations they will treat all these coarse particles—say, the 5 per cent. which escape from your mill?—Yes, if they are not carried away by the storm-water.

186. *The Chairman.*] There is some doubt in your mind about that 5 per cent. of coarse sands?—There is a possible doubt about them.

187. *Mr. Hanna.*] If they get lodged amongst the deposits on which the extraction company are operating they will be treated in the ordinary way?—Yes.

188. And thus the whole output of your mills will eventually be treated, and, according to your theory, they will be returned to the river in such a form that they will go right out to sea?—Yes.

189. So that eventually the whole 100 per cent. of the output of these mills will go out to sea in the form of slimes, according to your theory?—Yes.

190. I judge from the evidence you have given that you have had a good deal of experience in different parts of the world?—Yes.

191. And you have been carrying on mining operations in all those parts?—Yes.

192. Have you had much experience in river-courses?—I have had to do with a good many ditches. In one company we had ninety miles of railway, and a good deal of it was through marshy ground.

193. Have you had any knowledge or experience of the diversion of rivers and watercourses?—Yes.

194. Can you tell us what your experiences are in that direction? Have you had any experience of cuts being put in?—Yes; I think it is better not to put any in if you can possibly avoid it, especially in soft ground.

195. You said you knew something about the operations of this extraction company: is it necessary for them to have an abundance of water?—Yes.

196. You know the Ohinemuri River?—Yes, to a certain extent.

197. There is a point known as Pereniki's Bend?—Yes.

198. Mr. Metcalfe has furnished a report to the Silting Association recommending two things for the clearance of the river. The first is a cut from Pereniki's Bend to a little above the Junction, and the second is a flood-channel cut 200 ft. wide, to be gradually scoured right out, and to take the place of this portion of the river. Starting with Pereniki's Bend, would it, in your opinion, be any benefit to put that cut in?—It is a very difficult thing to say. I know an instance where a cut was put in like that, and the river simply took a new channel altogether. It went through the cut first, and then made a different channel from the cut.

199. But supposing that cut were lined on each side?—Of course, if you make a ditch of it and line the sides, it could not very well change then. What is the length of it?

200. About 25 chains?—It would be a very expensive thing to line.

201. You are aware that our river claims extend from there nearly to Mackaytown. Would the effect of that cut operate prejudicially to our working our claims there?—I do not know what depth it is to be put down. If it is going to be put down to river-bottom in both places, I suppose you would be left high and dry, in a sense, in that case.

202. *The Chairman.*] In what sense?—It would gradually silt up there. Eventually the sand would drift round the bend and block it up entirely. Of course, I do not know the nature of the ground at the cut—whether the bottom is rocky, peat, clay, gravel, or what.

203. *Mr. Hanna.*] There is no evidence of the nature of the country at all. I am only taking Mr. Metcalfe's report, because it has been put in. In your opinion, would the effect of that cutting be seriously detrimental to our operations?—Certainly, if it is going to carry the water.

204. Supposing the putting-in of that cut increased the velocity of the flow, would the effect of that increased velocity in the upper reaches of the river, where we have our claims, affect our operations? Would it take away a lot of the material in the river which we propose to treat?—I should think so.

205. Where do you think that material would go to?—Unless you made provision lower down for increasing the velocity or transporting-power of the water, it would probably block further down.

206. By that I suppose you mean it would go down into the navigable portion of the river?—I think so. It is difficult to say where it would stop.

207. Would the increased velocity of the flow caused by this cut operate in any way with regard to the banks on either side?—To start with, the river would have greater velocity and would scour, and then afterwards it would lose this velocity and would deposit the stuff down the river.

208. At all events, you are clearly of opinion that it is better not to interfere with the river if it is at all possible?—Yes; I should try the direct method of clearing the river.

209. Do you think that clearing the river by taking the willows out and by the operations of the extraction company will tend materially to that end?—Certainly it will increase the velocity, and will tend to make the grindings easily floated.

210. You said that the material that went down would settle unless the velocity of the river lower down was increased?—Yes.

211. Seeing that the river is tidal, is it practicable under ordinary circumstances to increase the velocity?—I should say, certainly. If you reduce the coefficient of friction you will get greater velocity.

212. How will the tide operate?—I suppose the tide also will flow up quicker and flow down quicker. You will get greater movement in both directions.

213. *Mr. Mueller.*] You have had mining experience in Victoria?—Yes.
214. Do you know whether the mines there discharge into watercourses?—I believe so.
215. And do you know whether there was any Sludge Abatement Board formed in Victoria?—I never heard of it until you mentioned it in the last case.
216. When were you last actively engaged in mining in Victoria?—Some nine years ago.
217. I am referring to an article in the *Australian Mining Standard* of November, 1908, which mentions the Sludge Board?—That has only recently been established.
218. So you do not know whether that Sludge Abatement Board has done anything?—No.
219. You have had experience in South Africa?—Yes.
220. How long since?—A good many years, but I have kept pretty conversant with the grinding on the Rand and other mining works there.
221. Tube mills are in existence there, and fine crushing?—They are going in for it, but only in a comparatively small way.
222. But some grind pretty fine?—Very coarse compared with ours.
223. Do you know what ore they are grinding there?—I should say the whole of their stuff is coarser than our coarsest. It is like the Victorian crushing: it is very coarse there also as compared with what we have.
224. Do you know the mines round Germiston, in South Africa?—Yes.
225. Do you know the Simmer and Jack Mine there?—Yes.
226. Do you know that that mine has been impounding its slimes and tailings?—Our slimes are a very different kind of thing from their slimes.
227. Do you know that that mine is impounding its slimes?—I do not know that they are impounding any slimes. They were treating when I was there by a different process from now.
228. I am referring to impounding them in paddocks: have you never seen that?—Yes, but not in that particular mine.
229. These impounding-paddocks are formed just by a sort of sod wall being built up?—Yes.
230. And there are several different paddocks that are used alternately?—Yes.
231. That is, the slimes are run into one paddock to-day, we will say?—Yes, it is filled up.
232. To what depth?—It depends on the depth of the thing—3 ft. or 4 ft. if the slimes and water are running.
233. Is not the current taken off to another paddock, and the first paddock is allowed to settle?—Exactly.
234. And so the paddocks are used alternatively?—Certainly.
235. And the stuff settles and the walls are actually built up afterwards out of the same stuff?—In places. I do not know exactly if the Simmer and Jack are doing that, but it is a common practice with so-called slimes. I say "so-called slimes" because I am speaking of an entirely different material from ours.
236. That stuff is paddocked in that way because it will not stack conveniently?—It is too thin and too flat.
237. And do you not know that that stuff has been built up to a height, we will say, of 20 ft.?—I do not know that. It is a good many years since I was there, and the thing was then in its infancy.
238. How many years ago?—It is more than seventeen years ago.
239. Now, at this Simmer and Jack Mine they have what you call "tailings" as well as this liquid stuff?—Yes.
240. So that this stuff they are paddocking is much finer stuff than what they call tailings?—It is their finer portions.
241. Do you know the Robinson Mine?—Yes.
242. Do you know that the Robinson Mine has been sluicing its filling for the stopes down the launder?—Yes, some of them are.
243. It runs in with water?—Yes.
244. And they have to pack the back of the stopes with ore to keep that stuff in?—Yes.
245. And the water just drains off, and they pump it out again?—Yes.
246. I suppose you will say that stuff is coarse tailings?—Yes, comparatively speaking—very coarse compared with ours.
247. Similar to the coarse tailings, say, on the banks of the river?—Yes, about that—40- to 60-mesh stuff.
248. So that the coarse tailings can be used for filling the stopes, and are used?—Yes, in that particular country.
249. In your estimate of these expenses you have, of course, referred to electrical power?—Certainly.
250. I think the figures you gave ranged from £3 per horse-power to £12 per horse-power. You know, of course, that the Waihi Company has the right to use the Horahora Falls, and that they are erecting a large generating and power station?—Certainly.
251. Do you also know that if they have any surplus power they have arranged with the Government to sell that surplus power at £1 10s. per horse-power?—I do not think so. I do not think it would pay interest on the wire.
252. *The Chairman.*] Do you know what price they have arranged?—I believe they must not charge more than £9 per horse-power per annum.
253. *Mr. Mueller.*] Have you taken into consideration in your estimates the power to be obtained from that scheme at Horahora?—I do not know what units they are putting in yet.
254. So your estimates in regard to these schemes which you have explained to us are based upon your own power generated for each scheme?—Certainly. You have to put in special units.
255. You are not basing your estimates as a portion of a large scheme such as that?—No.

256. You mentioned that these schemes of yours panned out, I think, one at 2s. 4d. per ton, and another at 3s. per ton, and another at 2s. 1d. per ton, roughly?—Yes.

257. You consider that imposition is almost impracticable?—It would cost the Junction Company a lot more than that. These figures are Waikino figures, and you could add on 50 per cent., working on a joint arrangement.

258. Supposing that something could be done at a cost, we will say, of 6d. per ton, that would certainly not have such a big effect as 2s.?—Certainly not.

259. It would be much easier for the companies to pay that?—Certainly.

260. So that if the companies were prevented from putting their stuff back into the river, they would have to go to this large expenditure you mentioned?—Yes.

261. Would it not be cheaper for them, then, to say, "Well, let us have the sludge-channel and pay, say, 6d. per ton for the use of the sludge-channel"?—But we have the sludge-channel at present.

262. But it would be a much cheaper proposition?—It is cheaper to get it for nothing at all.

263. But if it was a question of sludge-channel or no sludge-channel, it would be better to pay 6d. per ton and keep the sludge-channel than to pay nothing and lose the sludge-channel: is that correct?—Certainly. That is correct.

264. Even if you were asked to pay something smaller than that?—Certainly, the smaller the better.

265. You get it for nothing, and you want to keep on getting it for nothing?—Certainly.

266. *Mr. Myers.*] You were asked something about the Simmer and Jack Mine: do they grind finely or coarsely?—Very much coarser than we do.

267. I am advised that in regard to the coarseness of the material, you start here tube-milling just about where the Simmer and Jack Company leave off: is that correct?—That is correct, practically speaking. Another thing is that the nature of the ore allows of its being treated by the decantation process. There is no means of making it settle quickly here to a solid-enough consistency.

WILLIAM HENRY BAKER examined. (No. 63.)

1. *Mr. Bruce.*] You are a B.Sc., and are Director of the Thames School of Mines?—Yes.

2. Some six months ago Mr. McLaren, the then County Engineer, handed you some samples for assay?—Yes.

3. You remember me giving you a sample on behalf of the Thames Harbour Board a few days ago?—Yes.

4. These were the exhibits handed in to the Commission at the Thames. You separated and assayed them, and you have submitted this report to the Board?—Yes. [Exhibit No. 57.]

5. The Harbourmaster informed you that these samples were taken from the Thames River bed between Turua and the fairway buoy?—Yes.

6. This sample contained some coarse as well as fine material?—Yes.

7. What was the coarse material formed of?—Essentially river-grits—pumice, crystallized quartz, rock-crystals, and the ordinary detritus you would expect from this volcanic country.

8. You separated that from the fine, and assayed it separately?—Yes.

9. Did you find any bullion in that coarser material?—The coarser material carried practically no bullion.

10. With regard to the finer material, and especially that which went through a 150-mesh, did that contain any bullion?—Yes, an appreciable amount of bullion.

11. Has that material about the same degree of fineness as the material which leaves the tube mills in Waihi and Karangahake?—Yes, it would pass through 150-mesh, and the greater part of the product leaving a tube mill passes 150-mesh. It also had a granular appearance, which you would expect quartz from such a source to exhibit.

12. And you would consider the finer material quartz sand?—It is a very reasonable assumption. In this way: If the finer material had been derived from the river-gravel, that finer material would have assayed the same as the coarse material. Instead, we get increased bullion at once in the fine material, which shows that the source of the fine and coarse is not the same. We know the source of the coarse, and therefore we have to find the source of the fine, and that seems to be a reasonable place to look for it.

13. Judging by the value of the bullion, is that not more representative of the value of the Ohinemuri bullion than of the bullion in the Thames district?—The proportion of gold and silver is more allied to that of the up-country district than of the Thames district.

14. In the matter of the precipitation of slimes, would slimes have a greater tendency to precipitate in salt water than in fresh water?—A very much greater tendency to precipitate in salt rather than in fresh.

15. Do you back your opinion up by any authority?—I can back it up by experiment, and also by reference to Geikie and Salisbury. It is an absolutely well-accepted fact that the presence of any inorganic solution on any colloidal substance will tend to precipitate that colloidal substance, such as clay matter or hydrated silica. That fact is mentioned in most books on geology, and a good deal of work has been done.

16. It has been found so by yourself?—Yes. It is very easily proved. I took some river sand or mud, and took two samples. I took 20 drams and shook it up with 500 c.c. of water. In the other case I took a similar amount of ore and some salt water. In the case of the salt water the solution was practically clear in twenty minutes, and in the case of the fresh water the solution remained cloudy for some hours.

17. *The Chairman.*] But that is not an experiment with quartz tailings: do you infer that quartz tailings are colloidal?—I do, to a certain extent. As an actual proof of that, I got some

clean quartz from the Watchman Mine. Unfortunately I could not get any Waihi quartz, but that was the cleanest quartz I could get. And I made exactly the same test with that, and the same precipitation occurred.

18. Have you examined these samples microscopically?—Yes, but I find very little from that. The constant abrading seems to wear down all the edges. With an ordinary 1 in. lens you could not see very much in it. Each particle seems rather dirtied. Of course, with regard to the precipitation by salt water, in all the mines lime is used for the same purpose, and has practically the same result.

19. What proportion of tailings or slimes do you consider would be in a colloidal state?—That would be a very difficult matter to ascertain either by chemical or mechanical means.

20. What is the effect of polarized light?—I have not tried polarized-light experiments in this case.

21. Have no experiments been tried at all? You have not gone far enough in the matter to say what proportion is in a colloidal state?—No; it would be an extremely difficult test. A simple relative test of the amount of colloidal matter would be the plasticity test.

22. *Mr. Bruce.*] You have had some experience in regard to slimes?—Yes.

23. From your experience would you say, supposing that these slimes from Waihi and Karangahake pass down the river until they come in contact with salt water, that they would then, in your opinion, start to pecipitate?—Yes, I am certain they would.

24. And a large proportion of them, I presume, before they got to the mouth of the river?—Yes. Probably the largest percentage would have precipitated before they reached the mouth of the river.

25. That would be to a certain extent due to the lesser velocity of the river below to what it is at Paeroa?—Yes.

26. A portion of these slimes, then, would settle out at the fairway buoy?—Yes.

27. What would be the result? Would these tailings be deposited generally over the foreshore, or would they stack up on the township side of the Thames?—The tendency would be for these tailings to spread themselves out fan-shape; but if there were any natural bars occurring you would get these bars further increased by this material.

28. *The Chairman.*] I suppose you have been living on the seashore parts of the town?—Yes.

29. Have you noticed any change yourself?—The shore seems to be rising.

30. How many years have you been at the Thames?—Practically all my life, on and off.

31. *Mr. Bruce.*] You had some experience in Western Australia?—Yes, for three years.

32. You were Assistant Director of the School of Mines at Kalgoorlie?—Yes.

33. Is it the practice in Western Australia to allow the mining companies to deposit tailings and *débris* in the main streams?—There are very few streams there. All the tailings are either stacked or are used as fillings.

34. They do not grind to the same fineness as here?—Yes; probably 35 per cent. of their stuff would pass through a 200-mesh, speaking from memory.

35. Have they any difficulty in paddocking these slimes?—No difficulty at all. A certain amount of inconvenience is caused by a little blowing away.

36. But there is no difficulty in stacking fine slimes of 200-mesh?—No difficulty at all—that is, of course, under the atmospheric conditions existing.

37. *The Chairman.*] Have you any suggestion to make by which the slimes by the addition of any material could be deposited?—Of course, the mines at present use lime-water to a pretty large extent.

38. In your opinion, is it feasible, assuming the conditions are suitable, to paddock the slimes which are made in the Ohinemuri district?—Well, with regard to Waihi, there should be sufficient room there to stack their tailings; but under an 85 in. rainfall, it is a question whether these tailings would actually stay where they were stacked. That is a matter which could only be settled after experiments in the particular district.

39. I suppose clay could be deposited on top of the tailings?—Yes.

40. Would that prevent it blowing or washing away?—If they were stacked it would be rather difficult to add clay.

41. The ordinary method of stacking is by belt conveyer or aerial tramway: could you not, on the same appliance which would carry the slimes for stacking, also carry clay with which to cover it?—Slimes can leave a belt conveyer, but I believe there would be a difficulty in the clay leaving it. Still, if it was possible to put clay on top it would certainly keep it in place.

42. You know the various swamps that drain into the river: the waters coming in there carry certain matters in solution?—Yes.

43. Would these be acid or alkaline?—Probably acid.

44. Would these not tend to keep the slimes in suspension rather than cause them to fall?—Not necessarily.

45. Can you give us any idea as to what the effect would be?—No; that is a matter I have not experimented with.

46. In general, I understand that the tenor of your evidence may be summed up that you are of opinion that the bulk of the slimes are deposited at the mouth of the Thames, on the ground that a large portion is colloidal, and that the colloidal material, in falling and depositing, carries down entangled with it the crystalline portions?—That is my opinion exactly.

47. And, therefore, the opinions which have been expressed that these slimes are going out a hundred miles into 30 or 40 fathoms of water before they are deposited are probably erroneous?—Yes.

48. And what is true of the mouth of the Thames where the water is salt is true to a smaller extent where the water is brackish, and true to a still smaller extent where the water is slightly brackish?—Yes.

49. So that we may expect to have a deposit of slimes in the river so far as the water is brackish?—That is undoubtedly what happens from the tests I have made. Of course, no doubt a lot of the stuff that will pass 150-mesh is being deposited, say, at the railway-bridge here.

50. You think so?—Yes. I made a grading test of that stuff by Pereniki's Bend, I think it is called.

51. What did you find?—That 38·8 per cent. passed the 150-mesh.

52. Did you obtain these samples yourself?—Yes.

53. Is that a solitary sample?—This was my method of taking the sample: I had a tailings-trier, which is like a cheese-tester, about 15 in. long, and for a distance of a chain, paced along the bank 6 ft. above low-water mark, I prodded this trier into the bed.

54. Did you take any at low-water mark?—Not exactly at that place.

55. Where?—I wanted to find out the source of this material I had analysed for the Harbour Board; so I got another sample out of the cut on the bank at Thorp's. I believe that was put in at the request of the Commission.

56. What did you find there?—That 81 per cent. passed the 150-mesh.

57. So you deduce from that that the lower you go down to water mark the finer the deposit is?—That is a question of the conditions on the bank and the velocity of the current.

58. Did you take any sample under water-line?—Yes. At Thorp's I first took one about 18 in. above water-line, and that contained 42 per cent. which passed 150-mesh. From the side of the boat I swept the bottom of the river in about 5 ft. depth of water, and only 3·4 per cent. passed the 150-mesh.

59. That was river-sand, in fact?—No; to a great extent, tailings, because I made assays, and I got up to 29 gr. of gold in the coarser material, but not in the finer. It was typical battery-sand.

60. Do you deduce from that that the finer portions of the slimes float nearer the top of the water?—Of course, the whole mass at its source will be thoroughly mixed, and as we get down the river it will be graded by the velocity of the current.

61. Do you mean the velocity of the longtitudinal section of the river, or of the cross-section of the river?—At the cross-section, and then, of course, the velocity at the side will be considerably less than the velocity in the middle. Therefore, we get a sectional deposit running from the fine to the coarse, and also a longitudinal deposit running from the coarse to the fine.

62. Are there any other experiments you have made?—I made one with regard to the amount of voids that exist in the river-gravel—that is, from the point of view of finding how much the sands then would carry on forming a bank. I found that the river-gravel has 48 per cent. of voids.

63. And what did you find on a mixture of the gravel and slimes?—I did not make a test of that. It would be void to a less extent.

64. So it is possible that the river-gravels might contain up to 50 per cent. of voids?—Yes; that is in regard to the formation of a sandbank, because if a sandbank were formed with these tailings and gravel the bank would settle firmer, and it would be most difficult to remove it by scour of the tide or river-current.

65. And, therefore, it would become harder than if composed of only river-sands?—Yes.

66. Therefore, that is the explanation, in your opinion, of the statements made that it has been found that the shoals in the river, and at the mouth of the river, and in the estuary, and the bottom generally have become harder of recent years?—I think that is a reasonable deduction.

67. Is there anything else you wish to add?—That is all.

68. *Mr. Moresby.*] You say you took samples at Thorp's: do you mean, by the orchard, or the gentleman who lives up the Ohinemuri?—Between the Junction and Te Puke there are the two open cuts, and I took a sample from one of them.

69. In that portion of the river between the Junction and Te Puke, did you find you could trace sand or slimes in the river?—At that particular place I took practically a cross-section—four samples from the middle of this cut. At the middle the stuff was very fine, at the next one it was rather coarser, and at 5 ft. below water-level only 3 per cent. passed the 150-mesh. At 14 ft. or 15 ft., in mid-stream, there was very little sand or tailings—that is, only the natural product of the watershed existed in the middle; but on the waterside you have these artificially produced products.

70. Is that the only place between these points that you examined?—I went down past Te Puke two miles, and I found some silt-deposit on the river-bank. With the exception of a little vegetable matter the whole passed the 150-mesh, and an assay test showed it contained 21 gr. of gold and 26 dwt. of silver.

71. *The Chairman.*] Is that the proportion of gold and silver that you find in the Waihi and Karangahake Mines?—At the same place I swept a sample from the bottom of the river, and that was practically river-gravel.

72. I think it would be interesting to us if you would make a statement in writing of the result of your experiments?—I intended having a statement ready, but unfortunately I have only had since Monday.

73. *Mr. Myers.*] Do I understand from you that, so far as your samples from the Waihou are concerned, the samples from the middle of the river were river-sand?—Yes: they contained a very small proportion of what could be definitely stated to be battery-sand.

74. You find more at the sides, where the velocity is less?—Yes, more typical battery-sand.

75. How long have you been at the Thames?—On and off, for a period of thirty years.

76. Then you know these rivers pretty well?—Not as well as I should. I very seldom go up this river.

77. At all events, you have been up from time to time?—Yes.

78. And I suppose you have observed the gradual growth of the willows, and so on?—Yes.

79. I suppose they have affected the question?—Absolutely no doubt, by retarding the velocity of the current.

80. And would it be fair to say that the willows are so close and so thick that they affect the velocity, and, therefore, probably the deposition of the tailings to a very large extent?—To a very large extent.

The Chairman: I think we are satisfied about the willows, and you need not refer to them for the future.

81. *Mr. Myers.*] You say that in some samples the material was granular in appearance?—Yes.

82. How did you discover that to be the fact?—That particular test you mention I made by wetting the sample. I dried a sample, and passed it through the sieve; and in the other case I put it through the sieve wet. Of course, the only way of telling whether a substance is granular or not is by an ocular demonstration.

83. What do you mean when speaking of a granular appearance?—Wanting in sharp edges and angles—rather as distinct from crystalline.

84. Then, am I to take it that you draw the conclusion that this material was granular in appearance merely from ocular inspection, and not by the microscope?—I examined it by microscope, but, as I said, the microscope was only provided with a 1 in. objective: we are no further ahead.

85. Have you made many microscopical examinations of material that has passed through, say, 150-mesh?—Not a great many.

86. After having passed through tube mills, I mean?—No.

87. Have you made any?—Yes, I have.

88. Lately?—No; in Kalgoorlie, three years ago.

89. Is the ore at Kalgoorlie similar to the ore in this district?—Quite dissimilar.

90. Then, may I take it that you have not examined under the microscope any portion of the product of a tube mill in this district which has passed through 150-mesh?—That is correct.

91. Would it surprise you to know that a product which has passed through 150-mesh in a tube mill is particularly angular, and not granular at all?—Not at all. I have noticed it myself. Quartz passed through 150-mesh is quite coarse to the touch and sight. Clay has a totally different appearance.

92. Then, so far as this material you have spoken of as being granular is concerned, do you think that its appearance alone indicates that it has passed through a tube mill?—Of course, you cannot say it has passed through a tube mill because it is ground finely.

93. But if you find a material which is granular when we know that that material which comes out of a tube mill is angular, does not that rather tend against your conclusion?—No, that admits of a rather easy explanation. My analysis in regard to that "granular" material refers to the sample passed through dry. The granular nature of it is due to the presence of clay matter round the quartzose matter.

94. Then you did not clean your sample first?—Not in that particular case, but I did one dry and one wet to make absolutely certain to find out which grades carry any value, if any.

95. *The Chairman.*] That is to say, you found the particles of quartz had rolled over and absorbed a certain amount of clay skin?—Exactly.

96. *Mr. Myers.*] You said that lime is used by these companies in their processes up here?—Yes.

97. What effect has that on the colloidal action?—Lime has the same effect as salt. Of course, the reason of the precipitation of colloids is rather a debatable subject. It is still being written on. There is no finality.

98. What effect has the lime on the colloidal action?—It will cause a settlement. They use is as much to neutralize the acids.

99. I am told that the effect is to destroy the colloidal state?—It does in this way: that it causes a precipitation of the stuff which would otherwise be held in suspension as a colloid. Of course, the term "colloid" refers more to the physical state than to, say, actual existence.

100. Let me put it to you in this way: Do you say that that physical state is or is not destroyed?—It is in so far that previously to the addition of lime the substance would be held in suspension. The addition of the lime destroys this power of remaining in suspension.

101. *The Chairman.*] It cannot alter the chemical composition of the material; but does it or does it not alter the physical characteristic beyond that it throws it down?—I do not think so.

102. *Mr. Myers.*] I am told that the addition of lime affects the physical state of the particles, and destroys the colloidal state: do you dispute that or not?—As a working hypothesis we can assume that as being correct.

103. Then you are prepared to admit that?—Yes, as far as practical battery-work goes.

104. Have you ever had any experience in practical battery-work?—Yes.

105. Where?—At the Thames.

106. If you are prepared to admit that the colloidal action is destroyed, would you mind telling me how it is subsequently restored?—Let us imagine that it is destroyed.

107. You are prepared to admit that hypothesis?—I will assume that it is. I am not prepared to admit that it will be, but it may be partially.

108. Assuming that, tell me how you suggest the colloidal action is restored?—By the movement of the particles down the waterway. A certain amount of attrition between the particles and the water must go on, and we get new surfaces exposed, and in the mass the quartz is not homogeneous. You may get a skin of quartz and a skin of chalcedony, which is an amorphous form of quartz.

109. Then it comes to this, upon the assumption you have kindly made at my request: There is a process of grinding going on during the course of these particles down the river?—Quite likely.

110. Now, the colloidal action you spoke of when you were answering Mr. Bruce——

111. *The Chairman.*] Is it not the colloidal action which you are now suggesting?—Certainly, it is the same.

112. Was it not the original colloidal action?—The result is the same.

113. I know, but when you were answering these previous questions did you not assume that the original colloidal state was affected by the milling operations and the addition of lime?—It is affected by the addition of lime.

114. Did you or did you not assume that the colloidal action was destroyed?—I did not assume it was destroyed. You assumed that.

115. And you admit you are not positive about it?—The addition of lime does not cause immediate action. The precipitation may take place after quite an appreciable amount of time.

115A. Is it not probable it acts mechanically, and not chemically?—I think it is purely a chemical action.

116. Is not the quartz in a colloidal state entirely amorphous?—Yes.

117. You can almost say the two terms are interchangeable?—Yes. In the newer books on colloidal substances all the amorphous substances are classed as colloids.

118. You think the addition of lime actually causes crystallization to take place?—It appears as if crystallization does take place.

119. *Mr. Myers.*] That is your theory?—Yes.

120. And you are not speaking in regard to this particular point as the result of any experiments or any practical experience?—Only this: that, supposing you take a flask with, we will say, battery quartz—at first it will settle very readily in salt or lime water. If you shake that up again it takes some time to settle again; so if the colloidal nature were destroyed altogether we should not get the second settlement.

121. Is it fair to put it this way: that your conclusions depend considerably upon the particular question that I have been putting to you—namely, whether or not the colloidal action is destroyed during the milling process?—Yes.

122. You said you made a test with two samples of equal value in salt and fresh water respectively?—Yes.

123. And of equal weight?—Yes.

124. Would you mind giving me the ultimate volume of the settled material in the case of each sample?—I did not obtain these.

125. Is that not a matter of some importance?—I do not think so.

126. As bearing upon the conclusions at which you have arrived?—No; the ultimate volume would be practically the same.

127. Do you think it would be the same after three or four days' settlement?—In this way: it would be rather difficult to measure the volume there, because in the case of the water by itself you find just resting on the top of the solidified mass a slight flocculent zone: in the case of the other you have practically a continuous surface.

128. Supposing it turned out as a matter of fact that the ultimate volume after three or four days' settlement differed, would that affect your conclusions in any way?—I do not think it would have any bearing on them.

129. No bearing on the question of settlement in salt water?—No.

130. *The Chairman.*] Do you mean by "volume" lying closer together?—Yes.

131. *Mr. Myers.*] You spoke of stacking tailings in Western Australia?—Yes.

132. We may take it that the atmospheric conditions are absolutely different?—The rainfall is 10 in. or 15 in., and the winds are rather more than they are here—rather stronger.

133. And the country is flat?—Yes.

134. You know Hanna's Lake there?—Yes.

135. Does the country fall from the mines to that lake?—Yes.

136. Where are the tailings stacked?—Each mine has a different method. The Great Boulder output of tailings is something like 13,000 tons a month, and they are all put on their ground at their back door.

137. They are all stacked near the batteries?—Yes, except in the case of the Perseverance, which takes them two miles by electric tram.

138. What class of material?—The residues of the treated ore contain about 18 per cent. of moisture and just ordinary sand.

139. And it is not as fine as the stuff we have here?—I can give you the grading test of all the mines.

140. You said that only 35 per cent. of their stuff would go through a 200-mesh?—So far as I know.

141. Is the nature of the ore in Kalgoorlie you are speaking of quite different from the material you get here?—Quite different.

142. Is it roasted over there?—In some cases. About half the mines wet-crush, and about half dry-crush.

Mr. Bruce: After consulting with Mr. Rhodes, I desire to make this statement on behalf of the Thames Harbour Board: namely, that the Thames Harbour Board do not advocate the revocation of the Proclamation which is in question except as a last resort. That conclusion was arrived at by formal resolution at an ordinary meeting of the Board after thorough consideration.

CHARLES EDWARD STORIE examined. (No. 64.)

1. *Mr. Bruce.*] You are a mining engineer and metallurgist at present residing at the Thames?—Yes.

2. You have had considerable experience in connection with your profession throughout Australasia?—Yes.

3. And you worked for some time in America as metallurgist and electrical engineer?—Yes, in the United States.

4. You are acquainted with the different methods of dealing with silt and sludge from hydraulic sluicing and reduction-works?—Yes.

5. You have also been engaged on special investigations in dealing with the pollution of rivers through sluicing?—Yes.

6. This sluicing would of course include hydraulic as well?—Hydraulic sluicing, pump sluicing, and stamp-milling.

7. You are acquainted with the methods of dealing with this trouble?—Yes. I have been connected with the methods for impounding tailings and sludge for some time. I was in Victoria.

8. Would you please explain to the Commission the various methods of impounding sludges and tailings you have been used to?—The first difficulty arose through hydraulic sluicing and the pollution of the main streams in the State of Victoria. There was so much flooding of the low lands and conflict with the agricultural interest caused by the free discharge of sludge into the upper reaches of the rivers that the Victorian Government appointed what is known as the Sludge Abatement Board. By "sludge" I mean boulders, slimes, sands, and fine detrital matter from the mines and hydraulic sluicing.

9. *The Chairman.*] It includes slimes?—Yes.

10. *Mr. Bruce.*] What was the date of the appointment of that Board?—About 1902. The remedies proposed by the Board were practically the same as those adopted by the Californian *Débris* Commission. The remedies proposed were the impounding of the hydraulic tailings by brush dams—ordinary saplings or stringers, and rock-filled crib dams, and in exceptional cases masonry and concrete. The water from the spillway of these dams was allowed to contain up to 500 gr. of solids to the gallon of ordinary slimes, and 50 gr. to the gallon of cyanide or other residues. Anything in excess of that was considered harmful.

11. *The Chairman.*] How many grains are there in a gallon?—I cannot tell you offhand. The effect of this impounding prevented floods, and prevented any further actions for damages by the farmers. The working of the Sludge Board has been highly satisfactory both in Victoria and New South Wales—both Boards being on identical lines—and they have restored harmony between the agricultural and mining interests, as has been the case in California. The treatment of battery sands and slimes at Bendigo and Ballarat and other milling centres has been brought under the operations of the Board in the same way, and the same methods of remedy have been applied. They seem to work harmoniously together; there has been no trouble.

12. In both these cases is it not principally hydraulic sluicing, where 99 per cent. or more of the material is boulders and sand, and only a small percentage is slimes?—No; the percentage of slimes and fine detrital matter is very high, and higher than in the hard rock bottoms of New Zealand.

13. Can you give us any figures as to the proportion of slimes to detritus?—In some districts 25 per cent. is the proportion of fines to solids.

14. You mean solids other than slimes?—Including slimes.

15. Are these slimes in Victoria comparative with the slimes here as to size?—Yes.

16. They are comparative: are they the same?—The majority of them are composed of decomposed salts and clays. They are aluminous slimes.

17. They are not quartz slimes?—Not quartz-particles.

18. Therefore the conditions are entirely different?—No; in some instances, such as milling centres, the slimes are identical with the other slimes.

19. And I asked you what proportion milling slimes bore to the whole?—I misunderstood you.

20. Taking a rough guess, would there be 99 per cent. of detritus to 1 per cent. of milling slime?—I should say, 4 or 5 per cent. in Victoria, because there is such a lot of country rock crushed with the quartz.

21. Take the case you have opened with—hydraulic sluicing?—They would amount to about 25 per cent. slimes and sludge.

22. Twenty-five per cent. of slimes and sludge, and that is aluminous?—It is partly aluminous and partly quartz grit. Of course, there is a lot of fine grit in the gold-bearing clays over there. Practically fully 50 per cent. of the wash of the deep-lead stuff from the puddling-machines is slime.

23. But is that aluminous or siliceous?—Partly aluminous and partly siliceous.

24. What part siliceous?—Ten per cent. of the slimes.

25. Or 5 per cent. of the whole?—Yes. Lowdon Valley is practically filled with puddling-machine slimes from the deep leads.

26. The use of the term "puddling-machine" seems to imply aluminous slime?—Not necessarily.

27. Can you puddle these slimes here?—Puddling is the effect of producing slime. The addition of water to the gravel produces slime and carries off the earthy matter and siliceous matter also in suspension.

28. We are told that if you take one of these slimes and let it dry it will contain no moisture, or practically very little moisture; but the idea of puddling is that it contains a very large proportion of moisture?—Quite so; it is practically solids held in mechanical solution.

29. And you think these Ohinemuri slimes could be so puddled?—They are practically puddled by the mechanical mixing.

30. But they do not remain puddled?—They will separate out from the water.

31. Do the other slimes separate out?—Yes, they go into a compact solid.

32. You are not using "puddle" in the sense I mean, that it will contain and will not part with a large part of the water, but will always remain in a pasty, messy condition?—You can have dry puddle. Drying is practically a matter of temperature and climate. My opinion is that these slimes produced by puddling are as fine as any slime that can be made by artificial or mechanical means by grinding. What will apply to them will apply to these in the matter of impounding.

33. Have you any scheme to put before us showing how these slimes could be impounded?—I have a suggestion to make. My suggestion is that the present Ohinemuri River down to the bend some distance above Paeroa should remain a sludge-channel as it is at present; that a masonry barrier should be placed across the main river at a suitable point to be determined by survey; that 200 or 100 acres should be acquired as a settling-basin above the dam; and that flanking brush dams should be constructed from the masonry. The whole stream should be allowed to discharge into that area, and should be impounded in that area until it had dropped its suspended mud to the bottom. This would create an artificial lake and gradually silt up. Additional brush construction or masonry construction could be added from time to time.

34. Where?—On to the existing embankment, raising the level. By raising it to a point of, say, 6 ft., and making the depth of the dam, say, 6 ft., I assume the area would hold about 1,306,800 tons of tailings. That is over 100 acres with a mean depth of 6 ft. That is practically three years' sludge at the present rate of discharge into these streams. An increase of 3 ft. would accommodate another one and a half years' slimes. I suggest a brush dam because it has been most effective elsewhere for a similar purpose, and it is absolutely the cheapest to construct, and can be constructed out of manuka, which is on the spot or close to it. The only masonry required would be at the main channel. The immediate effect of impounding the sludge would be for the overflow water to scour its channel out below the dam. Of course it may be suggested that flooding would undo all that the dam had done; but to prevent flooding I would suggest a deep cut outside the 100 acres, the material from the cut to form a training-wall to add to the impounding-capacity of the dam.

35. What do you mean by a "training-wall"?—This cut would be for the discharge of flood-waters at high level—to divert them into this channel or cut, and throw the earthwork on to the levee or training-wall to form the boundary of the impounding area of 100 acres.

36. You have a masonry wall and a brushwork wall, and you would put the earthwork on the top of it?—No. The slime in the water coming down stream would very soon settle on the brush-work and make it impervious. The dam for the cut will be above the impounding area altogether. I would not admit flood-waters into the settling-basin, and for the further prevention of floods I would suggest a dam further up stream to control the freshes.

37. And, in fact, if more than one is necessary you would make as many as are necessary?—I would have two as a minimum, and that impounded water would be released when the floods had subsided lower down. That is practically an outline of the proposal, and it is based upon the method adopted by the Californian *Débris* Commission on the Yuba River. It is known as the Yuba Dam.

38. What depth do you consider to be necessary to allow the slimes to be deposited?—I consider that owing to the increased area there would be no velocity in the stream: the water would spread out fanlike.

39. You would make as long a spillway as you could get, so as to reduce the velocity?—Yes.

40. You imply that the water running only an inch in thickness over that area would deposit the slimes?—Yes, because it comes in perhaps 20 chains further up stream. By the time it gets to the barrier it has such a retarded velocity that practically only 10 per cent. of the original sludge remains in suspension.

41. You say the first depth of 6 ft. would hold three years' slimes?—Yes.

42. Then there would be a period before the end of the three years when it is possible the slimes would be carried over?—Well, additional construction on the original walls would provide for that to hold even another three years' slimes. It would be built up by stages. That is the final method adopted by the Californian *Débris* Commission and the Victorian Sludge Board.

The Chairman: Is this put forward as the Thames Harbour Board's scheme?

Mr. Bruce: As Mr. Storie's.

The Chairman: You told us that the Board passed a resolution deciding not to advocate the revocation of the Proclamation except as a last resort.

Mr. Bruce: That is so.

The Chairman: Are you bringing this forward as a scheme to prevent it?

Mr. Bruce: As one of them.

The Chairman: You have others?

Mr. Bruce: Mr. H. H. Adams has another.

Witness: These are sections of the Victorian sludge dam for impounding hydraulic slimes and battery sands and tailings. They are contained in the annual reports of the Sludge Abatement Board, which I have for 1905, 1906, and 1908, and which I will hand to the Commission. [Exhibit No. 58.] I would also hand in for your information these engineering sections of the dam on the Yuba River, with an article prepared by Captain W. W. Harts, Chairman of the Californian *Débris* Commission, and an officer of the United States Army Engineering Corps. [Exhibit No. 59.] It is taken from the *Engineering and Mining Journal*. This is another article, but it is not official. It is by an authority on sluicing and hydraulics in the United States—Hutchings. It is also from the *Engineering and Mining Journal*.

43. *The Chairman.*] This is sluicing-work, which is different?—It is only a question of degree—the greater affects the less.

44. I do not know. Sluicing tailings are a very much coarser material?—Yes; but that is seventy or eighty miles from the source, and the slimes are carried so far by these streams, which are mountain-torrents to a great extent. In my opinion this scheme would be effective on this Ohinemuri River, with the 100 or 200 acres I have mentioned, that being the only flat ground available. I do not know of any other place up the river where impounding could be effected.

45. You have not given any estimate of cost?—The cost of that masonry dam is given. It is about 18 ft. high, 2 ft. at the top, thickening down to a 10 ft. sole, and about 1,250 ft. long, and it runs into about £20 per lineal foot. That is the actual masonry-construction. It is reinforced concrete. It is not altogether on rock, but on made ground to a certain extent. That is the last dam adopted by the Californian *Débris* Commission, and the Sacramento River was treated in exactly the same way. You will also notice a section in that of a cut and training-walls that were put in to prevent flooding and to carry flood-waters outside the impounded-tailings area.

46. *Mr. Bruce.*] In impounding these tailings you say the smaller area of 100 acres would provide for three years, approximately?—Of course, as a matter of fact, if the river is used as a sludge-channel that will fill up first, and increase the capacity of the dam very materially.

47. In impounding these tailings would it be possible at a cheap rate to lift them and direct them to the Rotokohu Swamp, which lies between the Ohinemuri and Waihou Rivers?—I do not know the elevation of it.

48. Would it be possible to lift them up to that swamp by mechanical means at a reasonable cost?—It would be possible, but I do not think it would be necessary. This sand would settle in a solid mass.

49. One of my reasons for putting the question was that the dam could be used as a catchment for the purpose of lifting the tailings into the larger area, so that the trouble of building the dam up higher from time to time would be done away with?—Of course it could be done, but it could not be done while the slimes were with the water, because you would have a plastic, tough, tenacious mass to lift. Of course you could lift it by dredger, and a belt conveyer would carry it.

50. It could be elevated by a belt conveyer?—Yes.

51. *The Chairman.*] We have been told that it is not economically possible to convey slimes by belts?—It would all depend upon the degree of the tenacity of the slime. If the slime was a thick plastic slime it would not be effective. It would not discharge very well from the hopper.

52. It is only a question of velocity, and it would be thrown off?—I am afraid you would not throw very much off the belt of pure slime.

53. It would mean scraping without necessarily touching: you could have a cutter down to within $\frac{1}{16}$ in. of the belt?—That could be done: but I do not think it would be necessary. I would leave it in the basin as a permanent storage-tank.

54. And go on until you had 100 ft. in depth?—Until the elevation became prohibitive, and then I would extend the area.

55. Of course the area would extend as you go up?—Yes, on account of the rise in the crown. Then probably you would reach a level which would be a menace to the people up-stream.

56. Such a level that you could not discharge tailings at Karangahake up-stream?—Yes.

57. Which would be the limit?—Yes: that would mean an extension of the area downwards or westwards towards this swamp. It would mean an encroachment towards the swamp. But if the whole of the Ohinemuri Stream, carrying tailings and *débris* as it does at the present time, were diverted into the Rotokohu Swamp, you would have to bring the water back into the channel.

58. There would be no serious trouble about that, because the Rotokohu Swamp at present drains into the Ohinemuri?—I was not aware of that. That would not be an engineering difficulty, but I do not know what the levels would be. I have not gone into the matter. I merely make the suggestions for what you consider them to be worth.

59. Merely as an investigator?—These are the lines I would propose the investigation should follow.

60. And you base the whole of it upon the assumption that the slimes will drop if you can have a spillway of some hundreds of feet?—Yes, or that such a small proportion would go over the lip that it would be harmless to navigation. I would also suggest that the stream below the spillway to the Junction should be dredged, and increased velocity given to the water owing to a free channel.

61. There is a doubt in your mind that the whole of the material would not be deposited?—I am certain the great proportion would be left. I merely suggest an area of 100 acres as a simple factor: 200 acres would hold double the capacity, and so on.

62. *Mr. Bruce.*] You say 200 acres would be preferable to 100, on account of providing a larger settling-surface?—Yes.

63. You are acquainted with the consistency of these slimes which come from Waihi and Karangahake?—I am not acquainted with them specifically. I have seen slimes like them.

64. What do you think would become of slimes that had passed through 150-mesh discharged into the river at Waihi and Karangahake?—The transportation of the particles depends on the velocity of the stream. In absolutely clear water without any current they would settle.

65. I will take the Waihou River. From the Junction to the mouth of the river there is estimated to be a fall of 8½ ft. in twenty-two miles: would the tendency be for a settlement of the slimes in that distance?—Yes, I should decidedly say the tendency would be to settle.

66. *The Chairman.*] You think the fall insufficient to keep the slimes in suspension?—Yes.

67. *Mr. Bruce.*] Then a large proportion of these tailings would remain in the river?—Yes, the greater bulk of them. It would be a settling-dam practically without an extensive area. I do not know what the velocity of the stream is, but I do know that in sewerage-construction a minimum velocity of 2 ft. per second is allowed—anything below that causes a deposit of the silt.

68. A proportion of this slime, I suppose, would go out of the mouth of the river opposite the township of the Thames?—Yes, the finer particles would go out to the Thames.

69. Would they have a tendency to settle there?—Yes.

70. And a proportion, no doubt, would settle there, in your opinion?—Yes, but the greater bulk would settle above the Junction, in my opinion.

71. *The Chairman.*] Why?—I should say that the larger volume and greater velocity of the Waihou acts as a barrier against the Ohinemuri at the Junction. In fact, I have noticed a distinct back eddy there at low water, showing that the velocity is retarded by striking against the Waihou.

72. *Mr. Bruce.*] The impact of the Waihou against the Ohinemuri?—Yes, the stronger against the weaker.

73. Would the salt water have any precipitating effect upon these slimes?—Yes, decidedly.

74. They would have a greater tendency to settle in the salt water than in the fresh?—Yes. That has been the experience and teaching in the past.

75. Can you back your opinion up by any standard authority?—I could give quotations from Professor Giekie's text-book on geology. On page 310 there is a statement on this subject.

76. *The Chairman.*] Is that dealing with natural detritus?—Yes, ordinary natural stream-silt—the finest mud. The addition of 10 per cent. of salt water causes a rapid precipitation of the fine mud in suspension.

77. What is the fine mud chemically composed of?—Siliceous and aluminous matter.

78. Principally aluminous?—Yes; but all the rocks are siliceous, more or less—it is only a matter of degree.

79. In every other place Governments have objected to deposits in main channels or rivers?—In one instance, in New Zealand, at Lake Waihola, on the Taieri River, the Government stopped it.

80. *Mr. Cotter.*] Do I understand that you have come forward with this scheme without even having taken the trouble to see the Rotokohu Gorge or Swamp?—I have seen it; I know where it is—the approximate position of it. I know the whole river from here up to Karangahake.

81. Have you taken any levels?—Aneroid levels.

82. Have you made any investigation as to the class of country across which this wall would require to be built?—Yes, I have examined what could be seen.

83. Have you taken any soundings or depths, or anything of that kind?—No.

84. Do you know anything about the rainfall at Waihi?—I have heard what the records show.

85. Have you taken that into your calculations?—Yes.

86. Do I understand that you have calculated as to what height you would require to build that wall before allowing any of the water, or mixed water and slimes, to be placed there?—No, I have not calculated out the scheme. I have not come here with an elaborate scheme. I have merely come here with a suggestion.

87. In the estimate you have made about the height of the wall, can you tell us what height it would be above this town?—The rise from here, I believe, to Karangahake is 50 ft., and to Mackaytown 20 ft. less, so that it would probably be 20 ft. above this level, approximately.

88. Do you not consider the impounding of such a large area of water, or water and silt, in such a position in relation to this town would be a very dangerous expedient?—No, I do not.

89. You are not a resident here?—No.

90. I suppose, from the distance of the Thames, where you reside, you can treat the matter quite philosophically?—Yes, I think we are out of the zone there.

91. Can you tell the Commission of any place where a town like this is situated so close to an impounding area?—Yes, several. There is one town where the embankment is nearly treble the height, and the people are not alarmed. In that case it is silt-water, whereas in this case it is semi-solid, and therefore there would be less risk.

92. In either of those cases was there any other method available?—Only polution of the rivers; and that was the alternative that was adopted to prevent the agricultural interests being affected.

93. Have you heard the suggested scheme of the alleviation of this trouble by the introduction of a dredge and the cutting-down of willows?—I have heard it suggested.

94. Having a dredge working below Te Puke, and, when necessary, if occasion arose, above it?—Yes, I have heard of that suggestion.

95. Do you think that such a scheme would not be effective?—It might be effective as far as Paeroa is concerned—I think it would be very effective. It would simply shift the difficulty on to the next chap—say, at Hikutaia or Turua—and it would go down to the Thames ultimately.

96. Is that the only reason why you would not consider the scheme effective?—No: I do not consider it sound from an engineering point of view, because it would be only removing the difficulty from one place and shifting it to another, and that is not a remedy.

97. *The Chairman.*] Do you think it is a palliative?—I do not consider that it is a palliative even, unless the dredge were continually in operation, and dealing with the whole stream. It would be a palliative then.

98. *Mr. Cotter.*] Have you had any experience with regard to the moving-power of a river such as the Waihou or Ohinemuri with reference to slimes—I mean material that will pass through a 200-mesh?—Yes, in some of the Victorian rivers. The rivers I refer to are rapid-flowing, and carry a large amount of water.

99. Are the rivers you refer to to be compared to either the Waihou or Ohinemuri as regards velocity and the quantity of water they are carrying?—Yes.

100. What year are you referring to with regard to your experience?—1903–4.

101. In those days was the crushing carried to the extent of the 200-mesh?—Yes, at Walhalla, on the Thompson River.

102. Was that a small plant?—Yes.

103. Then the general operations of the batteries were not to grind to the 200-mesh?—No. In that particular case it was all quartz-mining. They were crushed into about the 120-mesh.

104. Is not the fineness of the material very important—in fact, *the* important factor—in regard to the point we are talking about?—If the slimes is in question, then fine grinding is the determining factor.

105. Then you have had no experience where the mines have, to a large extent, used the process of fine grinding?—No; that is not adopted in Victoria at all, for the reason that the gold there is very much coarser than here, and is not mixed with sulphides, and fine grinding is not necessary.

106. *Mr. Myers.*] I suppose in evolving this scheme of yours you gave careful consideration to every other scheme that you thought might be feasible?—Yes.

107. Did you happen to be in this district in January, 1907?—No, I was at the Thames.

108. Did you happen to be here in September, 1909?—No, I was in South Australia.

109. Were you here in March, 1910?—No.

110. So that you had not any personal experience of the floods in this district at those particular times?—No.

111. Supposing you had 14 in. of rain in sixteen hours at Waihi, what do you think would become of all these works of yours?—If the scheme I suggest were carried out on sound engineering lines, and the barrier were constructed in a suitable place, the great bulk of the rain can be impounded or kept partly in check. It can be controlled.

112. What would be the cost of all this? Have you made an estimate of the total cost of carrying out such a scheme?—No; I could not even conjecture the cost. I have not the necessary details to go on.

113. Do you know, for instance, that a large quantity of other material than slimes is brought down the Ohinemuri and its tributary streams?—Yes.

114. What will you do with that?—Treat it all alike.

115. Supposing you build up this impounding-area year by year, are you not going to affect the river?—No, not as long as you confine the slimes to the level of the river.

116. What is the difference between the bottom of your proposed impounding-area and the river-line at the nearest point?—I should say a good 30 ft.

117. How near is the river to your impounding-area?—A quarter of a mile off.

118. You are of opinion that the finest particles of slimes go out to sea: what do you mean?—I mean that if you take the slimes from the tube mill, I am pretty well prepared to guarantee that they are not all the same size, and that some of them would be impalpable. The weight of those particles would be very minute—relatively they would be very much more minute than the larger particles that come out of the mill. It is only a matter of the degree of fineness. I cannot give you an absolute mathematical definition of what a particle is.

119. One way of getting at that is—is it not?—through what mesh would it pass?—Your determining mesh is 150, I understand.

120. Do I understand you to mean by the "finest particles" particles that will or will not go through a 150-mesh?—Particles that will go through.

121. Then I take it that particles that will go through a 150-mesh will go out to sea?—No; there are particles amongst those that will go through a 250-mesh, probably. Those particles that will go through a 250-mesh might go out to sea, and others might go on to a bank a distance down the stream.

122. All you can say is that there are particles and particles?—Quite so—some of them finer than others.

123. *Mr. McVeagh.*] You have not computed the velocity necessary to hold these slimes in suspension?—No, not in this particular case.

124. You know Waihi?—Yes, I have been there two or three times.

125. How long on each occasion?—I think two or three days was the longest time.

126. You have not taken the levels of the country with the view of the construction of these dams?—As I said before, I have not gone into the details of the scheme.

127. I suppose the rainfall is an important matter to consider in connection with the construction of dams?—Yes.

128. And another important matter to consider is the catchment-area, I suppose?—Yes.

129. What is the catchment-area affected by the rainfall which you propose to provide against——

The Chairman: There is no object in trying to ascertain that from the witness when he says he does not know anything about the details.

Mr. McVeagh: Very well; I will leave it at that.

WILLIAM FRANK GRACE further examined. (No. 65.)

1. *Mr. Myers.*] You were present when Mr. Baker gave his evidence with regard to the effect of lime upon the colloidal state of the particles under the circumstances he referred to?—Yes.

2. What do you say upon that point?—The lime destroys the colloidal state.

3. Have you any particular reason for holding that view?—I have taken slimes which have been precipitated, and after a second agitation—in one case with the addition of extra lime, and in the other case without the addition—there was practically no difference in the rate of settlement.

4. I think you made some experiments with slimes in both fresh and salt water?—Yes.

5. Will you please state exactly what the experiment was, and what was the result?—I took two equal quantities of salt and ordinary town-supply water. We added an equal weight of slimes to each bottle, agitated it, and allowed it to stand. In the case of the salt water the settlement

began quicker than in the case of the ordinary water. That went on for about an hour or an hour and a half; and after that the fresh water caught up. After several hours' standing the deposit in the fresh water had settled down closer than it did in the salt water. There is a certain acceleration in the case of the salt water to start with, but it never settles down so thickly as in the fresh water.

JAMES EDWARD THOMSON examined. (No. 66.)

1. *Mr. Tunks.*] You are an authorized surveyor and civil engineer?—Yes; of the firm of Thomson and Farrer, of Hamilton.

2. I think you made some computations in regard to the scour of the drain between Gordon and Te Aroha?—Yes, about six weeks ago.

3. What was it you were endeavouring to ascertain?—The amount of material that had been scoured out of the drain and emptied into the Waihou River.

4. What was the result of your calculation?—I was able to account for 1,076,000 cubic yards of material.

5. Did that include all the drains?—No.

6. In addition to that, were there any streams?—Yes, Waiorongomai and Wairakau—they also had been scoured out. A tremendous quantity of stuff had been scoured out of them. The drains originally were 6 ft. wide, and they had been scoured out in some cases a couple of chains wide.

7. So that the original stuff that was taken out went in too?—Yes.

8. Did you find indications of scouring along the banks of the Waihou?—I did not go down the river.

9. What was the nature of the country?—It was very easy to scour. There is a lot more to come, too.

10. *The Chairman.*] What do you suggest as a palliative measure to prevent further stuff being washed into the Waihou River?—It is hard to say. The willows seem to do more harm than good.

11. If drains with stop-gates were constructed, would that have the effect?—I hardly think so.

12. You have no suggestion to make?—No; it must come down until it reaches an even grade.

13. You have not estimated what quantity of stuff it is necessary to take out of them in order to bring it down to an even grade?—No.

14. *Mr. Tunks.*] You mentioned the quantity of stuff scoured out: what does that mean?—It would mean about a chain in width, 10 ft. deep, and about seven miles long.

15. Equal to the destruction of a road of those dimensions?—Yes.

16. *The Chairman.*] What is the extent of the light pumice country?—I have not been further up there.

17. It might cease immediately above?—Yes.

18. Do you know the country higher up the Waihou?—No. There would probably be close on a million yards of stuff from this stream which I have not accounted for.

19. And, again, there might not be?—It is hard to arrive at a definite conclusion.

20. *Mr. Mueller.*] During what period have you known this country?—Only during the last twelve months

21. You do not know during what period the amount you mentioned represents?—No.

JOSEPH NATHAN examined. (No. 67.)

1. *Mr. Cotter.*] You are a stationer residing at Paeroa, and you are a member of the Ohinemuri County Council?—Yes.

2. I think you came to Paeroa in 1895?—Yes.

3. And you took a section in Te Puke Road?—Yes, and I have business premises in the town also.

4. Do you remember when it was, after that, that you were first disturbed by water coming about your gates?—Yes, in 1898.

5. That flood came right to your house?—Yes, about 2 ft. of water was around the section where I was living in 1898.

6. And actually came into the house itself?—Yes, it came into the lean-to at the back of the house. From that time we have had floods round about the house—three or four every year. We have already had two this year. My house is below the railway-station.

7. *The Chairman.*] Did you notice that the last floods were higher than the one in 1898?—Yes; that was the highest up to that time. The flood in this year was an extraordinary one, and some of the older residents told me they had not experienced such a one for many years. In 1909 there was another big flood. That was stated to be phenomenal. That was about 6 in. higher than the one in 1908. We have had so many since that I did not keep a tally of them. The flood this year was also phenomenal. That was about 5 in. higher than the 1907 flood, and about 11 in. higher than that of 1908.

8. Is that all you have to tell us with regard to your private property?—We have floods three or four times every year all round the house. They do an immense amount of damage. The 1907 flood occurred in the summer-time, and after the water receded there was a terrible smell all round the place from the decaying vegetable matter, and the hot sun shining upon it. It was a menace to the health of the town, and it is a wonder an epidemic did not break out. The water first came into the business premises in March last.

9. How many times has the railway been suspended?—I think three, in the 1907 and 1910 floods.

10. *Mr. Potter.*] The last time it came into your business premises and into a number of others?—Yes.

11. I think, on the last occasion it was fortunate that it came in the day-time when persons were at their business, and therefore you were able to remove your stock?—Yes.

12. If it had occurred in the night-time it would have had more serious effects?—Yes.

13. In regard to the last flood, can you tell us of any difference between the water that was left behind compared with the water of previous floods?—No, they are all pretty well the same. They always bring down mining tailings. The tailings can be seen on the footpaths round about the railway-station. On this occasion there was half an inch of very fine silt left on the floor of my business premises. Whenever the river overflows, the domain is a sea of water.

14. You say the last flood left a deposit of silt in your shop?—Yes; we had to scrape it off the floor.

15. You have seen water down at the railway-station—at Mrs. Capill's boardinghouse—to what depth?—From 2 ft. to 3 ft.

16. Can you say whether you have noticed any difference in regard to the rapidity with which floods occur now compared with the olden times?—The first time the flood was in the street it was not very swift, but the second time it was considerably swifter, and on the last occasion it was difficult to walk against it—it was splashing up against the verandah-posts. The current was very strong in the main street.

17. When you first came here, how long did it take for the rain to raise a flood?—For the first three years when I came here it rained very frequently—in fact, it rained off and on for weeks, and there was no flood. In fact, there was continuous rain for three weeks. A week's rain really made no difference. But now, after two or three days' rain the river invariably overflows at some point; and where I am living it is always in flood after two or three days' rain.

18. To what cause do you attribute the frequency and severity of the floods?—To nothing else but the emptying of the tailings into the river. I have been down the river many times during the last fifteen years, and I have been at Waihi many times, and I have seen the stuff gradually working down the river as far as it has gone now from place to place. At one time there was hardly a sign of it at Mackaytown. It has gradually accumulated there. Formerly, in taking trips down the river there was none of the stuff perceptible on the banks; now you can see it everywhere.

19. You know the deposits that can be seen from here to Mackaytown?—Yes.

20. Supposing nothing is done with regard to those deposits, what do you think will be the effect on the Township of Paeroa?—I think the township will be absolutely ruined. As it is, property in Paeroa has very much depreciated.

21. *The Chairman.*] What did you give for your section?—Thirty pounds. That is, where I live. Now I cannot part with it. I have put a house on it worth £300, and if anybody likes to offer me about half the price of what the house and section cost I will take it and go. I would now take £165 for the place. The section next to me has an unoccupied house upon it which is getting ruined, because no one will live in it if they can get a house anywhere else. It has been empty for a long time. The tenants left it on account of the flood. The property in the town has also depreciated—I refer to the business premises.

22. *Mr. Cotter.*] How long have you been a member of the Town Council?—About sixteen or seventeen months.

23. Will you tell us why the Council has not done anything with regard to willow trouble?—Owing to the want of means. These floods occur so frequently—causing wash-outs on roads and at bridges, and doing other damage—that the Council have not the means at their disposal to keep these places in repair, and there has been absolutely no money for clearing the river.

24. *The Chairman.*] Has your Council done anything to erect a stop-bank with the view of trying to prevent the flooding of Paeroa?—No; so far as I know they have not considered it.

Mr. Vickerman: You get a lot of your flood-water from the drain at the back of your house.

25. *Mr. McVeagh.*] When did you buy your residence section?—A few months after I came.

26. Values were extremely high just then?—No.

27. Was there not a great deal of activity at Paeroa at that time?—Yes, there was a great deal of activity, but you could get a quarter-acre section at from £20 to £30.

28. Did you start to carry on business directly you came here?—Yes.

29. You found business pretty active at first?—Yes.

30. There has been a considerable falling-off. Do you attribute it entirely to the floods?—Not entirely, but I attribute it in a great measure to the floods. People will not come out to shop and do business when they have to wade through water.

31. What percentage in the decline of business do you attribute to the floods?—I could not say.

32. Is it not a fact that a great deal of the stagnation here has arisen from the fact that the railway carries the people right through to Waihi?—No, that is not the cause. Before the railway was built they used to come from Waihi in coaches, which used to take them straight down to the steamer or to the railway-station.

33. Is it not also a fact that a great deal of the stagnation in Paeroa is due to the decline in the mining activity?—In 1895, 1896, and probably in 1897 a lot of prospectors used to come here and stay the first night and then go on to the goldfields.

34. You say that has had no effect on Paeroa?—No; I said that the floods decreased the business, but there were other causes as well.

35. You have told us that nothing was done by the Council in respect to the willows, on account of the want of funds?—Yes.

36. Was an application made to the Government for assistance?—Yes, within the last six months we applied for £1,000, and we experimented with a few of the willows.

37. Was that the only occasion when an application was made to the Government?—We have made application many times to the Government to have a fair allocation of the gold duty under the Gold Duties Act.

38. Was it in your time that the application was made to the Government for assistance to remove the willows?—Yes; it was with the object of keeping the navigation of the river open that we applied for a reallocation of the gold duty. We asked for an inquiry into the subject before the Warden. We have not been inactive. We have done all we could to get money to keep the river clear and for other purposes.

39. How long has it been patent to the mind of the Council that the willow nuisance is a serious cause of trouble?—I do not think it has been patent to the Council at all that that was the cause of the trouble.

40. Was it not the Council that got Mr. Breakell's report?—No; the Silting Association.

41. *Mr. Mueller.*] You have told us about your experience in connection with the floods, and your private house and business premises?—Yes.

42. I take it that is not an isolated case?—No; it applies to the inhabitants all round the place.

43. *Mr. Vickerman.*] Where the houses were flooded that you have referred to was an old swamp, and you could not expect anything else. They used to keep a canoe there?—Yes; there has been a large drain put in there.

44. It is six or eight feet below the bank of the river?—I did not know that.

CHARLES ROBERT BELLINGHAM examined. (No. 68.)

1. *Mr. Cotter.*] I think you did your best within the limited time at your disposal to obtain for the benefit of the Commission information in regard to the total area and the persons affected by the silt—the part destroyed—that is, so damaged as to be useless—and the badly affected area?—Yes.

2. You are not a surveyor?—No.

3. I think that to the best of your ability you got the information which you have tabulated here from the best available means?—Yes.

4. I think in most instances you got it from the parties actually alleged to be affected?—In most instances.

5. And in some instances where you could not see those persons you got the information from neighbours?—That is correct.

6. You have given in this statement the names of the blocks, and the statement shows the total area held by those persons?—9,977 acres 1 rood 7 perches; total area destroyed, 372 acres and 7 perches; total area affected, 7,508 acres 1 rood. [Exhibit No. 60.]

7. Can you give us any idea as to what your definition is of "destroyed" and "affected"?—The definition of "destroyed" is, covered with white silt and slimes; and "affected," is covered with water.

8. You went on to the land yourself to see the inhabitants?—In some cases, on the Ohinemuri River, but not on the Waihou River. On the Waihou I started to call on the people on the Monday. That was the day the Commission sat, and therefore the people were all here. Therefore I had to see them when I could.

9. You have no personal knowledge of that district?—I have personal knowledge of the Ohinemuri River and district.

10. And from your personal knowledge of the Ohinemuri you think the particulars given to you are correct?—I think they are.

WILLIAM MCWATTERS examined. (No. 69.)

1. *Mr. Cotter.*] You are a general storekeeper residing in Paeroa?—I have been until lately, but at present I am land agent and accountant.

2. You have been in Paeroa continuously for the last twenty years?—Yes.

3. At the time you first came here, can you tell us about the condition of matters so far as the river and the floods are concerned?—When I first came here we were not affected so far as the main street was concerned.

4. There were then slight overflowings of the river, but not sufficient to affect the main street?—The low-lying portions of the town were inundated occasionally.

5. What year was it that the flood first affected the main street?—January, 1907.

6. Where were your business premises then?—In the Normanby Road. It did not affect the front portion of the premises on that occasion. A little came in at the back. I was at Rotorua at the time, but my employees told me what occurred when I came home.

7. Do you remember the next flood?—Yes, last year some time.

8. What was the effect of that flood so far as your premises were concerned?—Our back yard was flooded twelve or eighteen inches, and in order to prevent water coming in the front door it was necessary that we should cut away the footpath. When the premises were built originally they were a good deal above the level of the street, but the street has been built up until the footpath is on a level with the shop.

9. The footpath had to be cut away to let the water run under the house to prevent it coming into the shop?—Yes.

10. When was the next flood?—Just a month or two ago—the March flood.

11. What was the effect of that flood?—We adopted the same plan with regard to the footpath, but the water came in in spite of what we did, and there was a depth of 2 ft. 6 in. in the yard at the back, and there was three or four inches in the shop.

12. And on that occasion when the water receded did it leave a deposit of stuff on your premises?—We swept it out as the water was receding, but there was even then a deposit left in the shop.

13. *The Chairman.*] Was it tailings?—Yes.

14. *Mr. Cotter.*] That flood fortunately occurred in daylight?—Yes, and we were able to lift most of the furniture. I reside on the premises. The vegetable-garden was completely ruined.

15. What was the effect of it with regard to your building?—We suffered much damage with regard to the building, and we have had to raise an adjoining building in consequence of the damage done by the flood.

16. So far as you are concerned do you think that is an end of the matter—these floods?—I should like to think it was.

17. You know the deposits of tailings from the bridge up to Mackaytown?—Yes.

18. What, in your opinion, will be the probable result if those tailings are not removed or dealt with in some way?—If the floods increase in the future in the same proportion as they have done in the past, we shall not be able to live here.

19. You have a pretty good idea of the value of property in Paeroa and the surrounding neighbourhood?—Yes.

20. Has the recurrence of these floods affected the value of property in any way?—I think it has depreciated property very considerably, more especially in the low-lying portions.

21. Do you find it difficult to either sell or let property in the low-lying portions?—Extremely difficult. Tenants, if they can possibly get other houses, will not occupy houses in the low-lying portion of the town now.

22. I think something happened to a house of which you are the agent?—Yes; it was lifted bodily off the blocks, and carried to the back of the section.

23. I think even in that case the inhabitants had some difficulty in getting out?—Yes. There are two houses there, and they are both unoccupied.

24. I think you are Secretary of the Domain Board?—Yes.

25. What happened to the domain in consequence of the last flood?—The whole of it was covered with water, varying from 2 ft. 6 in. to several feet. The croquet-lawn was entirely covered by water, and when the water receded a deposit of silt was left on the lawn. There was also some amount of silt on the tennis-court.

26. *Mr. McVeagh.*] During the last three or four years has there not been a marked decrease in the Township of Paeroa?—Not in permanent population, I think, inasmuch as almost every house here is occupied now.

27. Some few years ago every house was occupied?—I understand so.

28. And a good deal of building operation has been going on for some years?—Yes.

29. Is any going on now?—I think the floods frightened them, perhaps.

30. You think these high floods are due to the accumulation of silt? That is a great factor.

31. In what months did the floods occur?—One in January, one in September, and the last one in March.

32. How long have you been in Paeroa?—Twenty years.

33. Can you give us any information as to when these willows started to grow?—They were here when I came here.

34. The floods occurred during the months when the willows were in full leaf?—Yes.

35. *The Chairman.*] We have had it in evidence that in the last three years there were fifty new houses built in Paeroa. Can you confirm that, and state where they were built?—I should not doubt it. Most of them were built at the far end of the town, and some of them on the higher portion at this end.

36. If there have been fifty new houses built in the last three years, that accounts for the houses on the low-lying land being empty?—Yes. As a matter of fact, I have only one unoccupied house on my books beside the two which I have mentioned which are not habitable.

EDWARD SHAW examined. (No. 70.)

1. *Mr. Moresby.*] You are Foreman to the Ohinemuri County Council?—Yes.

2. I think you live at the Junction?—Yes.

3. You have 10 acres of land there adjoining the river?—Yes.

4. And I think you also lease some other lands from the Natives?—I did. Up till last September I leased 8 acres from the Natives and 6 acres from Mr. Niccol.

5. All adjoining?—No, one paddock intervened between the Native block and mine, and the other was high land next to what is known as the hockey-paddock.

6. I think you have been living on the banks of the Ohinemuri River for many years past?—Yes.

7. How many years?—I have been thirty years in the district.

8. How many years living on the river?—Twelve years right on the banks, but living in the town the balance of the time.

9. You might shortly state what the river was like when you first became acquainted with it thirty years ago?—It was a fine, clear stream—a deep navigable river.

10. Could a steamer go up and down as far as Paeroa?—Yes, as far as the present Paeroa – Te Aroha Bridge.

11. I think the photo already produced of the "Ngunguru" at the town wharf is your property?—Yes, lying at the Wharf Street Wharf.

12. What state were the willows at that time on the river?—They were a fair size, but nothing to compare with what they are to-day—not so bad.

13. They have got worse gradually?—Yes.

14. And you consider they are worse now than they have ever been?—I do.

15. They are thicker now?—Yes, and retarding the progress of the water.

16. Do you remember the wharf known as Snodgrass's Wharf?—Yes, well.
17. Has that part of the river, in your opinion, filled up?—Yes, considerably.
18. Can you say how much from the bottom?—Practically 10 ft. there.
19. Have you made observations yourself there?—No, I have not bored there, but I know from casually looking at it that is the case.
20. I suppose you know the wharf lower down?—Yes, Wharf Street.
21. Do you remember the steamers coming to that?—Yes.
22. And also the Railway Wharf?—Yes.
23. Did that Railway Wharf afford a good berthage for steamers?—Yes.
24. How much do you consider the river has filled up in that particular place?—Fully 10 ft.
25. *The Chairman.*] Do you mean all across the bed or only along the berthage?—Practically across. I have taken soundings there.
26. *Mr. Moresby.*] When did you take soundings there?—Yesterday.
27. What depth of water did you get there?—The reach from Pereniki's Bend to the wharf averaged 4 ft. 9 in. on the top of the tide when I left the Junction to come up. I came up on the tide.
28. What was the least depth you found?—Three feet. The launch was drawing 2 ft. 6 in., and we were aground a couple of times. We just touched. Going back we had to use the pole in several places.
29. Well, it could barely be 3 ft. in places?—Yes.
30. What was the maximum depth you found in that reach?—Six feet in places,
31. Any shoals?—Yes. I have soundings here from the Junction up, taken yesterday.
32. Are you prepared to put them in?—Yes. [Exhibit No. 61.]
33. At what time was the tide high?—About 2.15 or 2.30.
34. *The Chairman.*] What state was the tide when you got back to the Junction?—When I left the Junction it read 2 ft. 8 in. on the gauge. It took me 2 hours and 40 minutes to go up to the Railway Wharf and back, and when I got back the gauge read 2 ft. 4 in.
35. What is the rise in tide at the Railway Wharf?—I cannot say.
36. At the Junction?—I should say, yesterday, 3 ft. I think there might be an error of 8 in. until I got back.
37. *Mr. Moresby.*] Can you tell us the depth of water at Pereniki's Bend?—In the bend 1 chain below the willows, in the bed of the river, 17 ft.; 1 chain above the willows, 11 ft.: soundings round the bend for a length of 5 chains gave 3 ft. to 4 ft.: the average of the soundings from the bend to the Railway Wharf was 4 ft. 9 in.
38. *The Chairman.*] What was the average below the bend to the Junction?—I think it would run to about 11 ft. 2 in. There were a few holes—one of 20 ft., one of 21 ft., and one of 22 ft.
39. What was the shallowest place you found on the top of the tide from the Junction to Pereniki's Bend?—4 ft. 9 in. immediately below Cooper's drain. All these were taken in the channel in the deepest water I could find. The greatest depth was 22 ft. at Tapu Point.
40. Were these holes large-sized holes or only small pot-holes?—They would extend 10 ft. or 11 ft. for 2 or 3 chains. The greatest depth is in the bend, and then below as you come out of the bend.
41. How many soundings did you take?—I took twenty-six soundings between the confluence of the Ohinemuri and Waihou Rivers and Pereniki's Bend.
42. That is, in three miles and a half?—Yes.
43. What portion of the bend?—Right in the channel in the bend at the willow-tree.
44. *Mr. Moresby.*] You live at the Junction, and know that part of the river very well?—Yes.
45. What is the state of that portion of the river at the present time?—It is very much silted up to what it used to be.
46. We have been told there is a bank opposite the Hape Creek: you know that bank well?—Well.
47. And you also know the island which the groin comes off?—That is so.
48. In your opinion, during the last one or two years has that part of the river at the Junction itself got worse?—It has on the west bank, and half-way across the river; but across to where the little steamer is working is fair depth. The depth at the coal-hopper at the wharf is 12 ft. 9 in.
49. But at the Junction itself?—It is considerably worse than ever it was.
50. In the last year or year and a half has it shoaled up at all?—It has practically since the 1907 flood settled it for traffic.
51. Do these small steamers now have a difficulty in getting past that?—Yes; it is not very long since Captain Adlam, of the "Rotokohu," asked me to get something done, as he had to go over the point of the groin to find the channel.
52. You know the portion of the river between the Junction and Thorp's Bend?—Yes.
53. Has that part of the river improved or otherwise during the last two years?—No; in accordance with the soundings taken I find it has shallowed up very much to what it was.
54. I think you took samples of the island at the Hape Creek yourself?—Yes.
55. What does that island consist of?—So far as I could see—and I have been amongst it all my life—mining tailings.
56. Did you dig with a spade there?—Yes, I dug through it. I got a slight trace of Waihou sand in it.
57. How far did you dig down?—Four feet.
58. Has that island extended at all recently?—Yes, considerably below Hape Creek in length.
59. Can you give us any distance?—I consider it has a total length now of about 15 chains.
60. From the Junction generally to the Puke has the river narrowed at all, in your opinion?—Most decidedly.

61. I think you put in some cuts?—Yes, I put two in for the information of the Commission.

62. What did you find the length of these cuts?—I think 35 ft., and 4 ft. deep. I might say, although we put them in, we did not get depth to get down to original soil in either case. That is my opinion.

63. *The Chairman.*] I suppose you could not mistake the original soil?—No.

64. *Mr. Moresby.*] Therefore, I may take it you consider the banks have come in very considerably?—Yes.

65. *The Chairman.*] Do you mean more than 35 ft.?—Narrowed from 12 ft. to 40 ft. at that one bank.

66. *Mr. Moresby.*] And at this other cut?—It has come in from about 25 ft. to 40 ft.

67. What do you average it at?—I should safely say 20 ft. each side.

68. Mr. Metcalfe averages it at 30 ft., and you average it at 20 ft.?—Yes.

69. From these observations you have made do you consider there is any danger to navigation at Te Puke if something is not done?—I think, if things are allowed to go on as they are, navigation must cease.

70. You are speaking about the Auckland steamers?—I am. One stuck over the tide last night at the bend.

71. Is that going down?—It left at 2.30, and got stuck on the county boundary.

72. *The Chairman.*] Do you know the shoals at the county boundary?—No.

73. You really do not know much about the river below Te Puke?—Not below the Netherton creamery.

74. How much do you estimate the river has narrowed in the Netherton reach?—At what is called Waimarie Bend I should safely say in places a chain. It would average 40 ft. all over Waimarie Bend.

75. And you think the bottom has shallowed there?—Not in the channel, but on each side of the channel.

76. *Mr. Moresby.*] There is a ferry goes across the river just below Te Puke?—Yes.

77. Had you, as Foreman of the county, to undertake any work there?—Yes, we had to extend the jetty 10 ft. so as to allow the punt to reach the floating jetty on the opposite side. For six months before moving it we were shovelling silt to allow the punt to come in.

78. So you extended it 10 ft.?—Yes.

79. Is the punt now able to travel across easily?—On the eastern side it is only a matter of a short time and we shall have to extend that. We never had any trouble with it before—that is, at dead low water on the Paeroa side.

80. What will you have to extend that?—About 10 ft.

81. When will that work be necessary?—It will not be necessary in the winter, because there will be plenty of water in the river, I suppose. It depends on the rainfall.

82. *The Chairman.*] You will have to do it early next summer?—Yes. We have now, two or three times a week, to send men there when the tide is out to take away the silt and allow the jetty to sink. There are barrels underneath to keep the jetty afloat. If that is not done, the weight of a wagon going on causes the barrels to burst through the floor of the jetty.

83. *Mr. Moresby.*] So the banks have come out on both sides in the last two years?—Yes.

84. Now, assuming that the navigation was to close at Te Puke, is there any other place between Te Puke and Kopu where the steamers could stop with convenience?—Not that I know of, without considerable expense. I do not think it is possible except at Kopu.

85. If the steamers stopped coming up, do you think that would have any effect in causing the river to silt?—Most decidedly. I think it is the screws that keep the channel open.

86. *The Chairman.*] What are your reasons for saying there is no suitable place other than Kopu?—The next place, I suppose, would be Hikutaia, and that is a long distance from the river to the railway. It would cost a considerable amount to make roads to Hikutaia, and I do not think you could get a landing on that side then.

87. Supposing you took a place half a mile down, would it not be possible to run a jetty out into the stream?—Yes, but that is not to say it will not silt up too.

88. But the depth of water is there?—Yes, in places.

89. And there is sufficient room for vessels to turn?—I should not like to say that without taking soundings.

90. *Mr. Moresby.*] Have you taken soundings half a mile below Te Puke?—I have taken soundings practically to Alexander's.

91. Are you able to say what the depth of water is half a mile down, just below Te Puke ferry, or immediately below the ferry?—I really forget. I think it is 7 ft. 6 in., but I cannot say what the state of the tide was when I took it.

92. You have a knowledge of the floods which have taken place in this district?—I am sorry to say I have.

93. You might give some details of the floods, starting as far back as you can remember?—The largest flood I remember previous to 1898 was in 1887.

94. Was that flood in the Waihou or Ohinemuri?—In the Ohinemuri.

95. What happened on that occasion?—Why I remember it so well is that timber came down, and we got the timber against the old bridge, and the water overflowed at Pereniki's Bend and flooded the whole Junction at the time. It is an exceptional flood that crosses Pereniki's Bend at any time.

96. That is before any tailings were put into the river?—Yes.

97. When was the next flood?—The next flood, to my recollection, was in 1898. It was a very large flood also. I remember on that occasion carrying people out of Rye Lane.

98. Did that come down into Paeroa?—Yes, it dammed up the Junction and right through.

99. Is that the first flood you remember coming down the main street of Paeroa?—Yes.

100. What quantity of silt was in the river in 1898?—The whole lot would not amount to more than a fortnight's crushing in the Waihi Mine now: I dare say it would, though.

101. Was it very bad at that time?—No.

102. Had the river shoaled up at all?—It was showing signs of it.

103. *The Chairman.*] Where?—Along the banks in the Ohinemuri—at the island in particular above Marsh's.

104. But not below the traffic-bridge?—No.

105. *Mr. Moresby.*] What flood do you remember after that?—The next one was the 1907 flood.

106. Was that any worse than the previous floods?—That was the daddy of them all up till then.

107. I think that came down the streets of Paeroa?—Yes. It did a fair amount of damage, and it brought silt with it.

108. Before that, what was the river like with silt? Can you give us any idea how far the silt extended?—Silt was noticeable right throughout, as it is now practically, but not to the same extent.

109. And had considerably extended since the 1898 flood?—Yes.

110. What is the next flood you know of?—In 1909, on the 3rd July. That came over the streets. All the floods I have mentioned were big.

111. And the next one?—On the 29th August, 1909—known as the "Queen Dido" flood, prophesied by Wragge. We got ready for it. The next one was on the 4th September, 1909, and that also overflowed the banks, and came down the streets. The next was on the 30th March, 1910.

112. Was that the daddy of the lot?—That is so.

113. Did that flood cause much damage in Paeroa?—Yes, more than any previous one. It caused all the asphalt to be washed away in the streets of Paeroa, and all roads and footpaths had to be cut up to let the water free from underneath the stores. The water also got in and covered the domain with 2 ft. to 3 ft. of water.

114. Did it do any damage to the tile drains in Paeroa?—Yes, it silted up the tile drains.

115. Of late years do you consider these floods have got worse in Paeroa?—Undoubtedly.

116. And you consider there is a tendency to get worse?—Yes.

117. What do you attribute that to?—To only one thing—the silt.

118. And unless something is done, what do you consider the prospects of Paeroa to be?—Very poor. Any one who was here and saw the last flood would not give much for Paeroa. They will have to go.

119. I think you have seen the damage which has been caused to the county roads?—That is so.

120. What is the total amount of damage to the main road that the Engineer has reported to the Council?—About £2,100 for the Main Road. We call the Paeroa-Waihi Road the Main Road.

121. Where did that damage occur?—In the gorge principally.

122. *Mr. Mitchelson.*] Could you attribute the damage in the gorge to silt? There is no silt up there?—No; to flood.

123. You cannot put that on to the silt?—I do not know: maybe a portion of it caused it where it has filled the river high up.

124. Do you mean it has filled the river lower down and prevented the water getting away as quickly as it otherwise would?—Yes.

125. What is the difference in the level where the damage was done on the Main Road in the gorge and, say, the island at Marsh's Flat?—I suppose practically there is close on 20 ft. of a fall.

126. *Mr. Moresby.*] Of recent years have the floods risen higher on the side of the Main Road than in previous years?—Yes; we have proved that by our metal-heaps.

127. How do you notice that?—Since the road has been opened we have always had places for breaking and stacking metal, and the floods in 1909 removed a portion of the metal in one or two places. In the last flood the Council lost some 600 yards.

128. Had the floods previously been up to these metal-heaps?—Just to the outside edges of the heaps.

129. I think there is some heavy machinery to be carted over this road at the present time?—Yes.

130. You have to bring in all the machinery from Waihi for the Waihi-Paeroa Gold-extraction Company?—Yes.

131. What repairs have you to effect before you can get the machinery in along the Main Road?—Three contracts have to be let.

132. What have you to expend on it?—The Engineer will explain that.

133. Who has to bear the maintenance of that portion of the road between Paeroa and Waikino?—The county.

134. Do they get any contribution from Waihi?—None whatsoever.

135. Is there any other damage besides that you wish to speak of?—Yes; four bridges were swept away over the Ohinemuri.

136. On this portion of the main road?—One of them is not: one is on the old Tauranga Road. Three of them are on this portion of the road.

137. They have to be replaced?—Yes.

138. Has the water been up to these bridges before?—Never, to my knowledge.

139. You told us at the beginning of your evidence you own some land and lease some land?—Yes.

140. Are there drains going from your land into the river?—Yes.

141. Have you taken any steps to prevent the water coming on your land?—Yes. I erected a flood-gate with the assistance of the Council. Before the big flood of 1907 I could keep the freshes

off my land and keep it dry. I did not mind the water getting in if it was clean, but I tried to keep it back to keep the white paint or slimes from getting on the land.

142. Had you any cattle?—Yes. In 1906 we started milking for the creamery with my own paddock and the adjoining one leased from the Natives. I was not here then, but my boys did the work.

143. How long did you continue milking for the creamery?—I did so for the seasons of 1906–7–8, and a portion of 1909, and then I was forced to give up.

144. Why?—Owing to the numerous floods. My cattle had nothing to eat, and I was forced to pay for grazing them on high land, and that was too expensive.

145. Owing to the slimes covering the grass?—Yes. My place is immediately under Pereniki's Bend, and I get the full force when it overflows.

146. It comes right across there?—Yes. My trouble begins after the flood goes down. There is nothing at all for the cattle to eat for practically a month unless heavy rain comes immediately afterwards and washes the grass to a certain extent.

147. Before the floods came and the slimes came on the grass, what would your creamery cheque average?—I had ten cows milking, and I was receiving £10 15s. per month after deducting the house-milk. It would average about £9 for eight months in the year. I had a good class of cattle.

148. How did you do in your second year?—I leased a paddock on the high ground from Mr. W. G. Niccol, and I used my own land as well. I averaged about £8 that year.

149. And the third season?—About £6 15s.

150. Were the floods getting any worse?—Worse and worse all the time.

151. And after that?—I sold the cattle in the spring of 1909, very much against my will. But the floods were so continuous in 1909 that I thought it wise to get rid of them.

152. Have you any knowledge of what effect this paint, as you call it, has on the cattle?—Yes. I noticed in the second year I was milking that if the cows had to feed on this stuff they got a cough and there was a falling-off in the milk and in the test, and in their flesh also. They got poorer.

153. So you suffered yourself on account of these floods?—Considerably. I grow my own crops —potatoes, &c.—to see me through the year, and I have lost them on several occasions. I had a sample of the slimes taken out of my garden, but I neglected to bring it up.

154. *Mr. Mitchelson.*] What depth of silt or slime was put on the land?—It forms ⅛ in. and sometimes ½ in. on the top of the paddock. I do not actually get the silt; it is the slimes I get.

155. And of course the grass is poorer afterwards than before?—Yes.

156. *Mr. Moresby.*] Which is the worst, so far as the grass is concerned—tailings or slimes?—Slimes is the worst. I tried to knock it off once with a brush harrow, but it was no good. Once the sun got on it, it was useless; it stuck there like cement.

157. *Mr. Myers.*] Then I gather that you consider you have a personal grievance by reason of your own losses?—I have seen ruin on all sides.

158. That is other people's grievance: you have suffered losses yourself, and therefore I put it to you that you consider you have a personal grievance?—I consider I have a personal loss. I had a good property.

159. How long have you been County Foreman?—Three years.

160. And when did you give up your farm?—In September, 1909, I gave up the cattle; I still hold the farm.

161. Did I understand you to say that before the 1910 flood there was damage done to the road in the Karangahake Gorge?—Yes.

162. Do I understand you to say that the difference between the level of the road where that damage was done and the island by Marsh's is about 20 ft.?—Judging by the eye, I should say so.

163. Am I correct in understanding you to say that that damage was partly due to the silt in the river below?—It would help it.

164. I want to quite understand whether you mean that your idea of the difference in level between the road in the Karangahake Gorge where this damage happened and the island near Marsh's farm is 20 ft. or thereabouts?—Somewhere about it, in my idea.

165. Then, even if the difference is only 20 ft., do you think that the damage was partly due to the fact of silt being in the river below?—If the mouth of a drain is blocked the water will back up. I think that at the island it is practically so, owing to the amount of material there that should not be.

166. I want to ascertain where this road is: is it beyond the Woodstock dam?—At the Woodstock dam, this way.

167. Do you happen to know the difference in level between the Woodstock dam and the end of the Talisman tail-race?—No, I do not.

168. Would it surprise you to hear that the difference in level between the Woodstock dam and the end of the Talisman tail-race is no less than 78 ft.?—You surprise me.

169. I am assured that is the fact?—You surprise me greatly.

170. Would it surprise you to know that the difference in level between the end of the Talisman tail-race and Marsh's farm is no less than 19 ft.?—Yes.

171. Now, if these figures are correct, you see there is a difference of 97 ft. or thereabouts, and not 20 ft., between the level where this damage happened and the neighbourhood of that island near Marsh's farm?—The railway time-table will soon show it.

172. I understand the railway time-table gives 19 ft. between Karangahake and Mackaytown? —That is not the bed of the river, though.

173. Well, at all events, supposing the difference in level between that road where the damage happened and Marsh's farm is 97 ft., or anything like it, would you still say that the damage up

there was contributed to by the silt in the river below?—No, I should not like to say so. It is more from above.

174. What is more from above?—The damage would be caused from above.

175. What do you mean?—Before it came down through the gorge.

176. Do you change your opinion?—No, I reckon it has helped it. If that island was out of there the water would be lower.

Mr. Myers: You may be right, but it certainly seems a shock to common-sense.

Mr. Cotter: I do not know whether Mr. Myers is misleading the witness, but the railway time-table shows distinctly that Mackaytown is 55 ft. above sea-level and Karangahake 76 ft., so that only makes a difference of 21 ft.

Mr. Myers: That is exactly what I am saying. I said there is a difference of about 19 ft.

The Chairman: I do not think it is necessary to go any further; we are satisfied on this point.

177. *Mr. Myers.*] I want to show the vast difference there is, for another reason, of course. (To witness): You took your soundings yesterday: how long were you taking the soundings?—Two hours.

178. What kind of implement did you take them with?—A long pole with a lead on the end of it.

179. Was anybody with you?—Yes, Lionel Saunderson and Charlie Bray.

180. Was that the County Engineer?—No.

181. Do I understand you to say that the river has shoaled first of all between Pereniki's Bend and the Junction?—Yes.

182. Do I understand you to say that the river has shoaled also at the Junction itself?—Yes.

183. Are you saying that by comparing your soundings with your previous recollection or with previous soundings?—No, because I am on the river continually in the summer.

184. Then it is your previous knowledge and not previous soundings?—That is so.

185. Do you say that the shoaling at the Junction has been caused by mining tailings?—I do.

186. Are you prepared to admit that the shoaling at the Junction has been caused or contributed to by material coming down from the upper Waihou?—A proportion.

187. What proportion would you venture to say?—I should not like to say it is anything like the proportion that it was fifteen years ago, when the draining was going on at Shaftesbury.

188. Would you go so far as to say half-and-half?—Not at present, in that portion.

189. What proportion of Waihou and what proportion of Ohinemuri is the silt at the Junction?—I should say 90 per cent. silt without hesitation. That is outside, and not in the channel—on the island and at Kenny's, down the Hape Creek.

190. And 10 per cent. from the upper Waihou?—Yes.

191. Do you say 90 per cent. of mining-silt?—I do.

192. And do you say 10 per cent. from the upper Waihou, or that the balance of 10 per cent. consists partly of stuff from the upper Waihou and partly of stuff coming down the Ohinemuri, but other than mining-silt?—Ten per cent. other than mining-silt coming down the Waihou.

193. Out of that 10 per cent. other than mining tailings, how much do you suggest comes down the Ohinemuri and how much down the upper Waihou?—I said 90 per cent. comes down the Ohinemuri. We know where the stuff comes from.

194. Do you say that the channel of the lower Waihou is shoaling just below the Junction?—In some places it is, from my knowledge of it before.

195. To what do you attribute that?—In the channel itself I found Waihou sand.

196. And no mining-silt?—A slight percentage.

197. Negligible?—No, because I proved it otherwise.

198. Do I understand you to say that between Pereniki's Bend and the Junction there is an average of 11 ft. 6 in. in depth?—About 11 ft. 3 in. by the soundings I took.

199. You only took twenty-six soundings in the distance, so they must have been a long distance apart, and another man might go over the same course to-morrow and take twenty-six soundings and get quite different results from yours?—I went to the deepest parts I could find.

200. How did you find the deepest parts?—I went to the deepest parts of the river, as I knew it.

201. You got at least 22 ft. depth?—Yes.

202. Could you tell what the bottom was there between Pereniki's Bend and the Junction?—At this 22 ft. depth I brought up a sample of silt which had stuck on to the bottom of the pole. It is very easy to verify it.

203. Is that the only place where you struck silt?—I know in my own mind it is silt all the way.

204. Are you prepared to admit that the bottom between Pereniki's Bend and the Junction is river-sand, or do you assert that it is mining-silt?—Mining-silt principally.

205. Why do you say that there has been a shoaling between these two places when you get depths now at 22 ft. and an average of 11 ft. 3 in.?—I tell you I took these soundings in the bends other than two places in the reaches.

206. Can you explain how it is you should find the Junction silted up—by the Ohinemuri, bear in mind—when you get these big depths between Pereniki's Bend and the Junction?—I have taken twenty-six soundings in three miles and a half.

207. I will tell you frankly what my point is: It is that there is no mining-silt between Pereniki's Bend and the Junction at all; and I put it to you, can you understand or explain, if the Junction is silting up as you say with mining-silt, why there are the big depths of water up as far as Pereniki's Bend?—I do not doubt there are pools in the river. They scour each flood. There is nothing extraordinary about it at all.

208. You say the tendency is for the floods to get worse, and you attribute that to only one thing—the silt?—Yes, and the willows. I must admit that.

209. I suppose you attribute it to the silt and partly to the willows?—Partly.

210. Do you not consider the question of rainfall is an element?—Evidently it is.

211. *Mr. McVeagh.*] You were asked some questions relating to the levels of the points intervening between the Woodstock dam and lower down the river: you know the centre of the Township of Waikino?—Yes.

212. That is higher still than the Woodstock dam?—Yes.

213. Do you also know the cottage just at this end of Waihi, immediately after you pass under the railway-line along the road?—Yes.

214. Do you know that people had to be rescued from the top of that cottage?—I believe so.

215. *Mr. Mueller.*] You say your land lies between Pereniki's Bend and the Junction?—Yes.

216. You know that land pretty well?—Yes.

217. Do you know that one of the suggestions to alleviate this difficulty has been a cut from Pereniki's Bend to near the Junction?—Yes.

218. Can you give us any idea as to the nature of the land that would be traversed by that cut?—From what I saw from draining and sinking on my own property it is stiff clay.

219. *The Chairman.*] What maximum depth of water have you seen coming over Pereniki's Bend?—The last flood sent about 2 ft. of water over.

220. And at a comparatively good velocity?—Yes, and the river at my place was considerably below that level, because the water had to drop about 4 ft. into the river when it went over the banks at my place.

221. Therefore, if the soil was at all pliable or soft it probably would have cut and scoured?—Yes.

222. And the fact that it did not cut shows that it is good clay?—That is so.

223. Will you hand in to the Commission that statement of the soundings you took?—Yes. [Exhibit No. 61.]

FRANK CHARLTON examined. (No. 71.)

1. *Mr. Tunks.*] I think you are a farmer residing at Te Aroha?—Yes.

2. I think you had a property at Netherton some years ago?—Yes.

3. When did you first go there?—About sixteen years ago.

4. When did you leave?—I think, in 1907.

5. Were you there during the flood of 1907?—Yes; I left immediately after.

6. What was your reason for leaving?—Owing to the floods.

7. Can you describe your land, and tell us who occupies it now?—It is the Rangiora Block, and Mr. Walter Moore occupies it now.

8. I think you had disposed of your property before the flood came?—Yes.

9. What do you attribute these floods to?—To the drainage of the land, and the swamp sinking behind.

10. What land do you refer to?—The land immediately behind, and the swamp immediately behind the farm.

11. Was the evidence of sinking very noticeable in that land?—Yes, from 2 ft. 6 in. to 3 ft.

12. From what direction do you say this flood of 1907 came on to your property?—From the back.

13. From——?—I should say from the Awaiti direction—that is, from the upper Waihou.

14. You were still living there although you had sold the property?—Yes.

15. Did you trace out the course of the water, or was this just what was generally understood at the time?—It was generally understood that the freshes that came over that portion of the land came from the Awaiti.

16. Did you get any slimes or mining *débris* at that time?—No.

17. The water was clear?—Yes.

18. I think you have said something about a bank of pumice behind Netherton, somewhere near the school?—Yes; I suppose it is about a mile from the Netherton creamery. That is the course of the waters when the upper Waihou overflows.

19. *The Chairman.*] Do I understand you to mean that this bank of pumice has been deposited by the waters of the upper Waihou?—It is deposited there, but I cannot say when it was deposited.

20. *Mr. Tunks.*] It is deposited as a result of the flood-waters from the upper Waihou?—Yes.

21. *The Chairman.*] What is the extent of this bank?—It would run into 50 or 100 acres roughly.

22. What height?—I cannot say what depth. I can say this: that a drain that was put through it was about 2 ft. 6 in. deep.

23. *Mr. Tunks.*] In your opinion, that pumice came from——?—From Te Aroha somewhere.

24. Was it all pumice, or pumice mixed with something else?—Mixed, but principally pumice.

25. I think you owned some other land some years ago in another part of the river?—Yes, higher up.

26. Opposite Thorp's orchard, in Komataraututu No. 1 Block?—Yes, about fourteen years ago.

27. Did you ever get any flooding there?—Yes.

28. What direction did the flood-waters come from there?—In the first place the water would come from the upper Waihou, and then, of course, as the river rose it would come from the other river.

29. You got it in the back first and afterwards in the front?—Yes.

30. You had made up your mind to leave Netherton before the 1907 flood, and had sold before that flood?—Yes.

31. You had made up your mind because of the floods in previous years?—Yes.

32. *Mr. Moresby.*] You did not want to stay there and get flooded out like others?—No.

33. Things were getting worse, and you thought it was time to leave?—Yes.

34. You thought you would be a wise man, and get out of it as soon as you could?—Yes.

35. I think, for a year or two prior to that things were getting gradually worse down at Rangiora?—I do not know. I think the 1907 flood, as far as I know, was the highest. The floods previous to that came in from the back.

36. But the floods had been getting more frequent and worse?—I do not know.

37. I suggest to you that your place was silting up in the front on the river?—Yes, wherever the willows were on it.

38. I think you had a boat which used to lie alongside your wharf at all times of the tide?—Yes.

39. I understand that at low water now it is high and dry 10 ft. away?—I have not seen it for four years, and I cannot say.

40. *The Chairman.*] Had you any damage done to your land by silt before you left on the river-bank?—Not on the land.

41. It was so small as to be negligible?—Yes.

42. *Mr. Mueller.*] This Komataraututu land is just at the back of the block of land called Ngararahi?—I do not know the names of the blocks. I bought that block to connect with a Government block I had immediately opposite Thorp's.

43. There was not a great stretch of land between your land and the upper Waihou?—No, there would not have been more than 50 chains.

44. So that the Waihou overflowed its banks about what is shown on the map as Ngararahi?—Yes.

45. That would be a couple of miles above the junction of the two rivers?—Yes.

46. *The Chairman.*] What was the character of the soil on your Komataraututu Block?—Sandy soil.

47. How far down have you ever dug into it?—Five feet.

48. And it was sandy the whole way down?—Yes, within a radius of 2½ chains from the river-bank. Of course, you get less sand away from the river.

49. What do you get then?—Into hard clay.

50. *Mr. Mueller.*] The land which you owned further down at Rangiora was not so liable to flooding as some of the adjoining lands at Netherton?—That is so.

51. You know that most of the land about Netherton is of a fairly clayey nature?—Yes, within a radius of half to three-quarters of a mile from the river. It then falls away into a peat swamp.

52. *Mr. Mitchelson.*] The bulk of that Netherton land right down to Turua was a kahikatea swamp?—Yes, solid.

53. *The Chairman.*] You told us that the evidence of the swamp land having sunk was very noticeable: how did you arrive at the estimate of 2 ft. 6 in. to 3 ft.?—By the timber left there.

54. The timber roots go down to the clay?—Yes.

55. And the soft stuff between sinks down, leaving the stumps standing?—Yes.

56. *Mr. Flatman.*] Did the willows on the river-bank increase in size to any great extent from the time you first took up the land until you sold it?—Very much so. When we came up the river first in 1874 there were very few willows on the river. In fact you could almost count them.

57. Do you think the willows help to flood your land?—I cannot attribute the flooding of that land to the willows.

58. But apart from your own land?—Well, I should say the willows have helped a great deal towards flooding the land.

Richard Eustace Williams examined. (No. 72.)

1. *Mr. Myers.*] You are mine-manager and deputy superintendent, and now acting-superintendent in Mr. Barry's absence, of the Waihi Gold-mine?—Yes.

2. You have had experience in mining for how many years?—Forty-three years.

3. In New Zealand or other parts of the world?—England, United States, the Commonwealth of Australia, and New Zealand.

4. How long have you been engaged in the Waihi Mines?—Seven years and a half.

5. Supposing it was suggested to you that you should place back in the stopes for filling purposes the slimes produced from the mill batteries, what would you say?—We simply could not do it.

6. Why not?—Well, it would be necessary first of all to take the slimes and spread them on the surface and aerate them to get rid of the cyanide fumes, otherwise they would be injurious for the miners at work; and then you would have to put them down in the mine assisted by water. You could not possibly dump them down through the ordinary small filling-shafts such as we have. In dropping six or seven hundred feet they would become pug, and it would be impossible to take them out—that is, to dump them into the small filling-shaft into the stopes.

7. What would the effect be on the mine of putting this stuff back with water?—The workings would become a regular quagmire.

8. A sludge-channel?—Yes.

9. Whatever people in other parts of the world or here might think about putting the slimes back into the mine without weathering, you say you would not care to do it?—Of course, they would be no support at all. If it got any side pressure we should simply have mud volcanoes down the mine.

10. It would be cheaper, assuming you could put them back in a wet state?—It would. We would gladly put them back. It pays us better to quarry stuff on the surface at about 9d. a yard than bother with the slimes.

11. Suppose you could put the slimes back in the stopes in a wet state without weathering?—They would be absolutely useless.

12. Would that be cheaper to you than surface mining to fill the stopes?—Of course, if we got the tailings up at the mines. The mills are a long way from the mines.

13. You would have to take the stuff a considerable distance in order to get it back to the mine?—Yes.

14. Have you discussed this suggestion of filling the stopes with slimes with any representatives of the Miners' Union or with the Inspector of Mines?—I have not actually discussed it with them. I understand there was an objection raised by the late Inspector of Mines, Mr. Coutts, about the cyanide-fumes, and he would not allow the tailings to be put down the mines.

15. That was not a personal conference between you and him: where did you hear that from?—I do not know that I could name the party. It was generally talked about.

16. I think you have known of cases where tailings and sands have been returned to the mines for filling?—Yes; in Western Australia most of the mines filled with the tailings.

17. Is that the same class of material as the slimes here?—No, it is not.

18. Even with the class of material over there, do you know of any particular instance or instances of damage or accident?—I know of a case where two men were suffocated with tailings. That was in the Paddington Consols Mine in Western Australia. It was put down to the fumes.

19. What is the class of ore that you mine here, speaking generally—high grade or low grade?—It is mĕdium-grade ore, running from £2 10s. to £2 13s. to the ton.

20. Have you got ore of a lower grade than £2 10s.?—Yes, more lower grade than above it.

21. Now, supposing you were ordered to adopt a process which would result in adding, say, 2s. to 2s. 6d. per ton to your working-cost, what do you think the effect would be?—I should advocate and recommend the taking-out of the best ore, and leaving the balance in the mine.

22. I know you cannot give us anything like accurate details, but can you say whether the quantity which you would then recommend being left in the mine would be small or large?—It would be a very large quantity.

23. *Mr. Vickerman.*] What percentage?—That is a very difficult matter.

24. *The Chairman.*] What is the lowest value of the ore you are working?—We can work ore down to £1.

25. *Mr. Myers.*] And you have ore which is worth considerably less?—Yes, 10s.

26. But which you are able to work now?—We work low-grade ore by mixing it with the higher grade.

27. But in order to do that, presumably the low-grade ore has to come out of the mine at the same time as the high grade?—Yes, under our present system of working.

28. Now, supposing that very low-grade ore were left in the mine, do you see any prospect of its ever being worked alone after the rich stuff has been taken out?—Absolutely no.

29. You have a big dam: is it at Waikino or Waihi?—It is between—about a mile and a half below the Waihi Mill.

30. What is the carrying-capacity of that dam?—I cannot tell you.

31. What is the maximum depth?—I think it is 10 ft. at the weir. It is about 110 ft. between the wings.

32. Do you remember there was a big flood at the end of March, 1910?—Yes.

33. Did anything happen to the dam?—About 3 ft. of earthwork at the back of the wing was washed out down to within 2 ft. of the weir. We managed to stop it with two or three bags.

34. At all events, we may take it that the dam did not carry away, or any part of it?—No.

35. *The Chairman.*] Did any water come over which would otherwise not have come over?—During that flood the water rose 5 ft. above the wings, and the wings are 8 ft. above the weir.

36. Do I understand the weir is 110 ft. long?—I think that is so.

37. So you had 13 ft. of water running over the spillway?—Yes, and the earthwork made a by-wash down to within two or three feet of the top of the weir, and we stopped it, and then ran a concrete wall below that to make a permanent job and prevent it occurring again.

38. So the rumour we heard that the weir carried away and a large volume of water came down is untrue?—That is so.

39. *Mr. Cotter.*] Can you give us any idea of the quantity of tailings you were discharging per day into the river when you went to the Waihi mine seven years and a half ago?—We were crushing then about 800 to 900 tons a day.

40. And at that time what class of ore were you treating? What I mean is this: You do make a distinction, do you not, between the ore you send to be milled?—No. Taking it the way we do, there are thousands of tons of ore that are probably not worth 10s. which we cannot separate in the course of working.

41. And was that the same state of affairs as existed seven years ago?—It always exists in any lode. Portions of it may be low-grade, worth probably 10s., and the other may be worth £3 to £4, but by mixing and averaging we cannot very well leave a portion. If we had a large block of ore that would only give 10s. or £1, well, we could not deal with it.

42. Then, do I understand that it is only when you get a large block of low-grade ore that will not pay for the working that you leave it?—That is so. But where we have high and low grade mixed, if any further tax were imposed there is a lot of the ore we are working now that we could leave.

43. *Mr. Mitchelson.*] And would leave?—Yes.

44. *Mr. Cotter.*] Give us the minimum tax that would make you leave that?—Three shillings would make us leave that twenty-shilling ore.

45. Anything under 3s. would make a difference?—Yes, every penny makes a serious difference.

46. Then, if a tax of 1d. per ton were imposed on the amount of tailings you put into the river, that would make a serious difference in the amount of ore you crush?—It would make a serious difference, but we should not stop.

47. Do you mean to say that the imposition of 1d. per ton upon the quantity of tailings you put into the river would make a serious or any difference in the number of tons of ore you crush?—Certainly it would make a difference on 400,000 tons a year. Do you mean to say we should close up?

48. No, I do not. I would not suggest such a thing if the imposition was to be £1 per ton, let alone 1d. You do not treat ore except what you expect to return a profit?—That is so, if we know it.

49. What is the margin of profit you allow before you will reject the treatment of any class of ore?—I do not think that is a fair question.

Mr. Myers: I do not think Mr. Cotter should ask questions of that kind.

49A. *The Chairman:* You cannot ask them to disclose their business, Mr. Cotter, if they object to it. Besides, I am not sure that Mr. Williams is in a position to give you the information. I presume he is instructed from the head office as to what he is to do. (To witness): Are you in charge of the mine?—I am in charge of everything just now.

Mr. Cotter: Do you think there is any objection to giving me an answer to the question as to what is the lowest-grade ore that you treat at the battery?

Mr. Myers: I take the responsibility of telling the witness he ought not to answer the question. We are quite willing to give the Commission that information, but not publicly.

Mr. Cotter: I am quite willing if the witness will put the answer on a bit of paper. I presume my friend will have no objection to my showing it to the Commissioners?

Witness: I shall not put anything on paper.

50. *Mr. Cotter.*] Do you really mean that?—Absolutely that.

51. You mean you could, but you will not?—That is so.

52. *Mr. Mueller.*] I understand that the Waihi Company is inaugurating an electrical scheme at Horahora?—Yes.

53. And by that method you hope to cheapen your cost of production to a certain extent?—Yes.

54. And by getting in that electrical power you hope to be able to treat still lower-grade ore than you have been treating in the past with profit?—That is so; we are trying to make reductions all the time.

55. Anything you can save on the cost of production allows you to put through a cheaper class of ore?—Yes.

56. About seven years ago you were putting through 800 or 900 tons a day, and at the present time——?—We are putting through, roughly, from 33,000 to 35,000 tons in twenty-four days—about 1,420 tons a day.

57. With this electrical scheme your great plan will be to try to put through a larger quantity of stuff, and so save cost?—We are increasing every year.

58. And with this electrical scheme you hope to still further increase?—Yes.

59. When do you expect to have this electrical scheme in operation?—I should say, in three years.

60. If this scheme turns out as you hope it will do, will your company not work the ore which has been left in the mine up to the present time?—No. You mean, left as unworkable and unpayable.

61. When you have your electrical scheme, will you not go back over any part of the mine?—No.

62. Your main objection to putting tailings down into the stopes is the effect of the cyanide-fumes?—No. There is no support at all, and in places, in putting that stuff down we should lose half the ore through the quartz sinking through the slimes. It is regular pug.

63. Cyanide-fumes are another reason?—Yes.

64. You know it has been done in Western Australia and is being done?—Yes, but the conditions there are quite different. You can put tailings on the surface, and they simply bake in the sun and become dusty.

65. How long is it since you had anything to do with the mines in Western Australia?—I was over three years ago for a visit.

66. How long is it since you have been actively working there?—Nine years.

67. Can you tell us what percentage of this 1,400 tons per day passes 150-mesh?—I think at the present time about 80 per cent. passes the 190-mesh.

PAEROA, FRIDAY, 3RD JUNE, 1910.

EDWIN GRIPPER BANKS examined. (No. 73.)

1. *Mr. Tunks.*] You are the chief metallurgist of the Waihi Company?—Yes.

2. You produce a number of samples taken from the Waihou River?—Yes, they were taken by myself and Mr. Stewart from various parts of the river on the 24th May. There are twelve samples.

3. *The Chairman.*] How did you take them?—With an iron scoop. As I have said, they were taken from various parts of the river, and I saw each sample drawn up.

Waihou River Bed Samples, taken on the 24th May by Messrs. Stewart and Banks.
(Exhibit No. 62.)

Alexander's Wharf: No. 1, 25 ft. from edge of low water, right bank, 5 ft. of water. No. 2, three-fifths of the way from right bank, 4 ft. 9 in. of water. No. 3, three-quarters of the way from right bank, 4 ft. of water.

Next wharf below Alexander's: No. 4, 100 ft. from right bank, 3 ft. 6 in. of water. No. 5, 100 ft. from left bank, 4 ft. of water. No. 6, 80 ft. from right bank, between the two wharves, 3 ft. 6 in. of water.

Waimarie Bend: No. 7, 33 ft. from water's edge (inland), bottom of hole 2 ft. deep. No. 8* (no sample kept—all mining-silt), 20 ft. from left bank, 3 ft. of water. No. 8, 40 ft. from left bank, 4 ft. of water. No. 9, 45 ft. from right bank, 11 ft. 6 in. of water.

Just above Gillard's house (at place mentioned by Wight): No. 10, 35 ft. from left bank, 6 ft. of water. No. 11, centre of river, 5 ft. 6 in. of water. No. 12, 30 ft. from right bank, 4 ft. 6 in. of water.

All samples were taken at nearly low tide. Nos. 1, 4, 6, 11, 12, show what might be a very small percentage of mining-silt: No. 8* was almost all mining-silt: No. 7 was fine silt, clayey material, and organic matter. All the samples excepting Nos. 7 and 8* consist almost entirely of ordinary coarse and fine river-sand and pumice. Some of the samples show blue clay from the river-bed, thus showing that in those particular spots there is not any mining-silt below the river-sand.

CHARLES BRAY examined. (No. 74.)

1. *Mr. Cotter.*] You are Engineer to the Ohinemuri County Council?—Yes.

2. And you came to Ohinemuri in August, 1904?—Yes.

3. You remained County Engineer for what period?—From August, 1904, until April, 1907 and was reappointed last December, and took office in January. I have been living in Paeroa a the time.

4. Mr. McArthur was the previous County Engineer in 1904?—Yes, Mr. J. F. McArthur.

5. From August, 1904, have you been well acquainted with the Ohinemuri and Waihou Rivers?—I am fairly well acquainted with them, particularly with the Ohinemuri River.

6. And with the county roads?—Yes.

7. At the time you first came here, in August, 1904, I think the Auckland steamers were then only running to Te Puke?—Yes.

8. Were any vessels then coming up from Te Puke to the Railway Wharf and the Junction?—Scows and loaded punts.

9. Take the bed of the river opposite the Criterion Hotel, Paeroa, down to Snodgrass's old wharf, from 1904 up to the present time: has it remained the same or not?—Certainly not.

10. In your opinion, has it lowered or risen?—The whole section has risen and closed in, except probably in one portion of the stream.

11. The bed has risen to what height?—I have no former knowledge of what it was to judge from the sections taken. There must be fully eight or ten feet of silt in there.

12. *The Chairman.*] That is, in the bed of the river?—Yes.

13. Right from the bottom?—Yes.

14. That is only an expression of opinion?—Yes.

15. *Mr. Cotter.*] In the ordinary run of the river what is the position of that now?—To shoal the river up very considerably.

16. At the time you came here where did you live?—Just on the other side of the bridge.

17. You had frequent occasion to be on the river: what was the depth of the bottom of the river at that time?—Immediately opposite the house and a little above the bridge I should say there was fully 6 ft. of water.

18. You left that place, I think, three years ago?—Yes.

19. And at the time of your leaving was there still 6 ft.?—No, not by any means.

20. What was the position?—I judged that it was 6 ft. by paddling down the river with the view of examining the piers of the old wooden bridge. Before I left that place to live elsewhere, my lads, who were some ten and twelve years of age, were able to walk right across the river.

21. *Mr. Vickerman.*] It would be only about 18 in. deep?—I do not think it would be any more.

22. *The Chairman.*] And of course the river had not widened correspondingly?—No: it had closed in on the banks.

23. *Mr. Cotter.*] Had the banks then closed in as much as they now are, or have they since that time closed in more?—I think, above the bridge it has probably closed in more. At the bridge it is really a little wider now than it was last September.

24. *The Chairman.*] At the time of the March flood how high below the traffic-bridge was the high-water level?—The last March flood was at the top of the part carrying the truss.

25. The centre truss?—Yes.

26. *Mr. Cotter.*] So far as the level of the river is concerned from Irishtown up to Mackaytown, what is the position of the bed of the river?—The bed of the river has risen very considerably, and also from Irishtown the channel of the river has shifted from the left bank to the right bank.

27. Previous to the March flood were there considerable deposits of mining tailings extending up the river?—Yes, almost to the Waikino battery.

28. And the March flood did what?—It appears to me to have swept most of them away.

29. Further down the river?—I think so.

30. There are some overflow washes you have something to say about near the Mackaytown Hotel?—Immediately above the Mackaytown Hotel, at the back of the Mackaytown Station, when I first came here there was an overflow wash—that is to say, the ground between the silt-bank and the permanent bank of the river was lower, and when the river was in flood would allow the river to go round and increase the section-area at that point. That is practically all closed up now. The same remark applies coming down the river to a place at the back of the abattoir.

31. What effect has that on the county road?—Very little effect on the county road, but it will probably have an effect on the bridge. I think the effect there would be to raise the river in flood-time somewhat higher than it would be had those washes allowed the river to spread. The result has been that bridges have been swept away.

32. *The Chairman.*] How many bridges?—There is the Tauranga Bridge. It was a three- or four-span stringer bridge with concrete foundations and timber legs. The other bridge lower down was just below Waikino, and was known as Benner's Bridge. It was a suspension bridge. The third bridge was a suspension footbridge at the Owharoa Station—the Mackaytown Suspension Bridge. I might correct a statement that Mr. Shaw made last night. He said the whole of the four bridges would have to be re-erected. He overlooked this fact as to the Owharoa Bridge: that there is no necessity for that, because a traffic-bridge has been built just below it, and that bridge was not affected.

33. *Mr. Cotter.*] Are those the whole of the bridges affected by that flood?—No. The bridge on the Mill Road was washed right off the foundations, and what is known as Cooper's drain at Bertelsen's suffered. The new bridge that has been erected on the Paeroa–Waitoa Road was lifted right out of position, and will have to be replaced. The list I have given does not include little bridges and culverts.

34. Now with regard to the damage to the roads?—The main damage received on the road was on the Paeroa–Waihi Road—the Main Road. There was more or less damage done all the way on the Main Road from the Waikino Bridge down to Irishtown, or Doherty's Creek. That road is really now unsafe for vehicular traffic—that is, to the gorge; it would be unsafe for about half a mile altogether. The estimated cost of repairing the Main Road only—widening it, and the necessary protection-works—is estimated at about £2,300. I mean widening it to a width of 16 ft. That would be a little narrower than its original width.

35. I suppose you are going to do the work in a more permanent way than it was before?—The road apparently was as sound as it could be. The road will be cut right back into the solid rock. We will not attempt to rebuild it. In the gorge it is proposed really to cut a gallery out.

36. These road-repairs are not contributed to by any other body; the Ohinemuri County Council has to pay the whole cost: the Waihi Borough does not contribute to that portion of the road?—There is one short piece at Waikino which we have repaired at a cost not exceeding £20, to which the Waihi Borough Council has contributed one-third. Below Waikino the county has the whole responsibility.

37. You can tell us now, so far as the Ohinemuri County is concerned, what proportional part of that is rateable property?—The estimated area of the county is about 306,000 acres, and, as near as I can arrive at it, approximately about one-ninth of that area is rateable.

38. How does that come about?—The area, taking the Waihou River as being practically in the centre of the county—on the eastern side of the Waihou River the whole of that area is within the goldfields area, and the greater portion of it not taken up by mining claims is in the hands of the Crown at the present time, and pays no rates.

39. Do not the portions let on pastoral lease pay rates?—Yes, but they are a very small part of the eastern portions of the county. Only one-ninth of that country includes property from which the county can collect rates.

40. Can you give the Commission any idea as to the area owned and occupied by Natives?—No.

41. With regard to the rivers we are speaking of, can you tell us whether the Natives own considerable portions of land adjacent to the streams?—Starting from the junction of the Ohinemuri and Waihou Rivers, nearly the whole of the land along the banks of the Waihou River to the southern boundary of the county, with the exception of one or probably two sections, belongs to the Natives. Upon that land, so far as I know, no rates are collected.

42. You have told us about the overflow wash near the Mackaytown Hotel: a little lower down than that is Mr. Marsh's place?—Yes.

43. From the time you came here in 1904 up to the present time will you tell us what alteration, if any, has been made to that place? We only want your general observation and general information on the subject?—Apparently there is a great deal more silt on Mr. Marsh's place now than when I came here five or six years ago.

44. That is the place where the bed of the river has risen because the slopes of the sides have closed in?—Yes, the sides have closed in.

45. At Mr. Cock's and Mr. Barrett's places the same answer, I suppose, applies to them?—Yes, because when I came here one could not see silt on the upper banks of the river like there is now.

46. Practically what you say is this: that since you came here the silt has extended to that flat land?—Unquestionably, in those parts of the river—at Mr. Cock's and Mr. Barrett's in particular.

47. And at the Chinamen's gardens and at Buchanan's?—They are not in a similar position.

48. Since 1904 what is your idea with regard to the floods in the township?—The first flood I have knowledge of was that of 1907. The ones previous to that we should call freshes.

49. From 1904 to 1907 they were merely freshes?—Yes. The 1907 flood was really the first flood I had experience of in the district. After that, the next flood I have a note of is that of last August and September. There were practically two floods within a week. There was a great deal of difference between the two, but there were two floods, one in the latter part of August and the other in the early part of September. The first waters had not gone off before the second waters came down. The last flood, in March, was an exceptionally large flood compared with the other that I had seen.

50. That was worst?—Unfortunately. I can give you the different heights at the Paeroa Bridge for 1907, 1909, and 1910. At the Paeroa Traffic-bridge, we will take as a basis the 1907 flood: the top corbel of the bridge was awash. The other flood did not come up to within about 11 in. of that—namely, of the September flood. The flood in March, 1910, was 8 in. higher than the January flood, 1907.

51. In your opinion has the condition of the bed and banks of the Ohinemuri River—their present condition—in any way contributed to the damage caused by those floods?—I should think that the condition of the river would materially contribute to the damage.

52. Why?—Owing to the very large deposits—if I may use the term—of silt and *débris;* also, I think, to the very large amount of obstruction by the willows. The willows in the river act as a catchment for *débris*, &c., and have materially retarded the natural flow of the water.

53. Do you consider that the willows have been a contributing cause?—Unquestionably.

54. You do not consider them the sole cause?—No.

55. In many places in this river do you not find very large deposits of mining tailings where there are no willows?—Yes.

56. Taking the condition of the bed and the banks of the Ohinemuri River above the traffic-bridge, do you consider that the present condition of matters is a serious menace to this town?—I certainly think so.

57. Will you tell us, as County Engineer, in general terms, what was the damage done to the town in the last floods?—The damage was chiefly this: Our light bridges were pretty well all lifted, and the whole of the Main Road was swept with the floods, with the result that all the fine stuff on the road was affected. It was an excellent road. The flood swept along the whole of our road—more particularly in the main street and the roads on the western side of the main street. The whole of the asphalt in certain places was affected. In regard to the streets, from the county point of view, that was really the greatest damage done. New footbridges had to be put in at several places.

58. So far as the river from here to Te Puke is concerned, the banks are pretty well covered with mining tailings?—I should say that there are heavy deposits of tailings from the Paeroa Bridge down to, say, 20 chains below Pereniki's Bend. And from there going down the river there are more or less heavy deposits on the banks; but I am inclined to think that there is very little in the bottom of the river. That is from the 20 chains below Pereniki's Bend. At Kuaoiti, on the right bank of the river, there is a very heavy deposit of tailings. I may say in reference to that that we have had the experience of men who have been trying to find a section-peg, and who have not discovered it, and they went down 16 ft. Going from there down the river there are more or less silt-deposits on the bank of the river until you reach Suck-in Bay, opposite the Ngatomo Block, where there is an enormous deposit. That is just about the Junction. From Suck-in Bay, going down the river, there are not many tailings showing practically to the Junction, and there are very few tailings showing until you come to the island at Hape Creek. At Hape Creek there is apparently a shoal or island of tailings formed, varying a great deal in width and in extent—I should think fully 8 chains. I have the sections which have been taken from time to time, which will show that the amount of the deposit extended over a period from 1901 up to the present time. [Exhibit No. 63.] Section No. 8 is opposite a bridge at Forest Hill, above Hape Creek. Section No. 9 shows you a still higher deposit of tailings, at the bridge near Mr. Kenny's—that is, the bridge over Hape Creek. I have also here two sections of the Ohinemuri River (Exhibit No. 63 also). Section No. 1 is practically on the river by Brambey's. This is the last section taken since the March flood. Section No. 2, at Pereniki's Bend, has only been taken twice. The pegs cannot be found; they have been completely buried by the tailings. Section No. 3, near the Kuaoiti Creek, cannot be found now. Section No. 4 is near the old mill. It appears that the March flood has swept the two pegs clean out of the river. At Shaw's Bend the pegs have not been found for many years. No. 6 is near the Junction Wharf; but as a matter of fact it is up the river some 5 chains at least from Mr. Shaw's house. This is the last section. It has deepened very considerably.

59. We have got to below the Junction. Will you tell us the conditions of the river from that point to Te Puke?—Yes; there are, of course, as I have stated in reference to the Ohinemuri, banks of apparent mining-silt formed in various places along the banks of the river. I might refer, for instance, as we are going down, to McKee's frontage on the left bank; and then as you go down to Thorp's there is a very large deposit on the right bank. That deposit—I do not know exactly what depth it is, but it is several feet deep, and goes fully 40 ft. out. In dredging along different portions of the river with the view of ascertaining if there were tailings there, I may say that when we got into the channel, generally speaking, as far as the naked eye can judge, there were no tailings, but when you work out and across towards the banks you seem to get a few tailings.

60. *The Chairman.*] Where is the first place coming up the river where you find silt in large masses in the bed of the river?—Not until you get to 20 chains below Pereniki's Bend.

61. *Mr. Cotter.*] Let us continue on down the river?—There are large and small silt-deposits on the banks. I cannot help thinking that it is only a question of time when they will close in to such an extent as to very materially reduce the sectional area of the river.

62. What have you to say with regard to the Netherton tailings?—I can only practically confirm what Mr. Shaw has said.

63. You have seriously considered this question of the silt affecting the river, and I think it has been on your mind for a number of years?—Yes.

64. You have told us you think that if nothing is done it is only a matter of time when the lower river will be seriously affected?—Yes.

65. In your opinion what should be the first remedial measure that should be adopted? You have heard a dredge spoken about. Is that, in your opinion, the first remedial measure that should be adopted?—For the navigation of the river?

66. To protect the navigation of the river?—Yes; by using the dredge I think the sectional area of the river will be improved, and also its carrying-capacity.

67. You have read Mr. Breakell's report?—Yes.

68. Do you agree with that, that a large or considerable portion of the dredged material might be profitably used both by the County Council and by the Government?—It might be used for light roadwork in certain places.

69. It would not do for heavy traffic?—No, I do not think so.

70. Do you consider that the willows should be attempted to be cut before the dredge is there and in working-order?—No, I think not.

71. In your opinion the cutting or rooting-out of the willows should proceed—from which end, the lower or the upper end?—From the lower end, I should say, and work up.

72. What do you consider with regard to the questions of only destroying them or of actually rooting them out?—I think I should not root them out. I would personally prefer cutting them down—the bole of the tree—practically flush with the bank, or the ground on which they are growing. I might say that I have only had one experience, and it acted very well. I think if the young shoots were subsequently cut off, the trees would gradually die.

73. *The Chairman.*] Can you give us an estimate of the cost of cutting down the trees at present existing on the banks, removing them from the banks, and removing any snags and stumps which have fallen into the river?—I have prepared an estimate. In my estimate I have practically provided for dealing with willows from Te Puke right up to the abattoirs—about nine and a half miles of river. I estimate the cost would be £320 per mile to cut all the willows down on both banks.

74. *Mr. Mitchelson.*] Why stop at Te Puke?—You have to stop somewhere. The trouble is not so serious at present below Te Puke as it is above there. I reckon on cutting down the whole of the larger willows, especially those growing on the bank and those overhanging the banks, and removing the trees to suitable places, and burning them, if possible, after they become dry. As to the willows growing well over on the permanent banks, I should only recommend that they be cut back where necessary, and trimmed, and kept in their proper place. I do not think it is necessary to interfere with the willows that are growing half a chain or more from the bank of the river. As to the snagging, I can only give an approximate estimate. The estimate of the willows comes to £2,940, and the cost of snagging I put down at £350—that is, snagging where required on the same length of river.

75. *Mr. Cotter.*] It has been mentioned by Mr. Adams that in conjunction with yourself there was some suggestion about altering the meeting-place of the two rivers at the Junction?—Yes; Mr. Adams and myself, after discussing the matter, decided to recommend making a cut below the Junction about the northern boundary of the Native reserve known as Raupa. Personally, I would prefer making it longer, and coming into the stream at a more acute angle than Mr. Adams has suggested.

76. Do you still consider that it is advisable, for the purpose of clearing the river and keeping it open for navigation, to make this cut?—I do not know, after all is said and done, that it affects that matter very much, but I certainly think it would have a tendency to improve the Waihou River above the cut, because it would give a more direct entrance and increase the velocity of the current, and would have a tendency certainly to improve the Waihou, and for some little distance below the new confluence.

77. It would, in your opinion, have a tendency to prevent the overflow which goes down by Netherton?—It would have a tendency that way, of course.

78. *The Chairman.*] What is the nature of the ground—soil or clay? Is it suitable for a cut?—I understand from what Mr. Adams said that he considered it is clay.

79. *Mr. Cotter.*] Have you considered the larger cut—the Ngararahi or Metcalfe's cut—down to Te Puke: its cost, what beneficial effect it would have, in your opinion, and whether it would be worth the expense that would be incurred; whether there would be any objection, and, if so, what?—I think, from the flooding point of view, it would probably be very beneficial to the land on the western side of the Waihou River, but I certainly cannot agree with Mr. Metcalfe when he estimates that it would cost £4,000 to make a cut, and says let the river do the rest. I certainly should object to that. To allow an immense body of water like the Waihou to remain unharnessed might be serious.

80. *The Chairman.*] You would take the cut down to the full section at once?—Yes.

81. The cure might be much worse than the disease if you had an overflow of the channel?—Yes.

82. Have you taken levels between the top and the bottom of that cut?—No.

83. Is there a serious fall in that portion of the river?—I should say, apparently, as far as one can judge, the fall in the Waihou appears to be about a foot per mile, so that one could easily approximate what would be the fall between the two cuts.

84. Have you fixed the levels of the lower Waihou?—Yes; there is about an 8 ft. fall from the Junction Wharf to Kopu.

85. As to the nature of the land in the Ngararahi cut, is it clay?—Yes; it may have a pumice-deposit within a short distance of the banks on each side, but that is purely local. The great bulk of the land, I think, is clay.

86. The plan at McKee's shows stiff clay?—Yes; I was speaking more particularly of the country about McKee's, and I am basing my conclusion on that. I see the difference in the fall of the river from Te Aroha to Mangaiti is 9·1C. I remember that in making the thing up we found that the average fall of the river was just about the same. It has all the appearance of being about the same.

87. *Mr. Cotter.*] In your idea of dredging and cutting willows do you anticipate making the river effective again up to Paeroa?—The river, in my opinion, could be made navigable up to the Railway Wharf.

88. *The Chairman.*] That is desirable?—Yes, but the magnitude is very great, and it might break its back.

89. Have you any idea of what the trade to the Railway Wharf was before the last boat came up six or eight months ago?—I was informed that there were at least from three to five scows there at the time the American fleet visited New Zealand in 1908. The trade has slowly diminished until it has reached a vanishing-point.

90. Is it not a fact that the steamer cannot get up and down on the tide—that the distance is too great?—I understand that has been stated.

91. *Mr. Cotter.*] What have you to say with regard to the proposed cut at Pereniki's Bend? And in answering that question I should like you to consider the position of the extraction company?—We have to apparently keep them in view nearly all the time.

92. *The Chairman.*] As to the improvements of the river with the view of reducing the floods and protecting Paeroa, what do you think should be the length of Pereniki's Cut at the bend?—In my idea the cut as suggested by Mr. Metcalfe would be too direct. I think the cut should go in front of Mr. Shaw's house instead of at the back of it.

93. Assuming that it goes in front, what length would it be?—Thirty-two chains and a half.

94. What do you think the difference in the levels would be at both ends?—Seven inches and a half—that is, by water-level.

95. This cut would cut out 3 miles and 40 chains, and substitute 32½ chains?—Yes.

96. So that you would save over two miles?—Yes; 3 miles 8 chains.

97. And that would give you a reduction in the water-level at Paeroa?—I do not see how it could help doing that: it must do so.

98. And would that give a more direct flow for the floods and freshes, and would it not tend to reduce them?—I think that would be unquestionable.

99. As there is only a difference of 7½ in. between the ends, what effect would that have upon the waters in the meanders—would it be a matter of more than inches; would it be back-water without any direct current through it?—Yes. I may add that there is a very marked difference between the height of the bed at the lower end and at the upper end of the cut, and I think that in flood-time the velocity of the water would increase very considerably through that cut. The result of that would be, I should think, that the waters above the cut would be lowered very materially. I think the result would be that the water under normal conditions would probably be a foot lower at the upper end.

100. Then, practically, we have arrived at the question you have been asked, that it would not affect the extraction company to any serious extent?—I would not take it upon myself to answer a question of that sort.

101. Do you hold the opinion that mining tailings have come down the river until they have got to 20 chains below Pereniki's Bend?—Yes, that is my observation.

102. And successive floods may bring the stuff down, and that shoaling of the bed of the river may go on?—Yes.

103. *Mr. Cotter.*] Will you kindly tell the Commission what is the length of the mileage of the roads that you have to keep in this county?—Yes; the total is 220 miles of roads and tracks, and a proportion of those are main roads—viz., about 60 miles. What I would call district roads would be about 80 miles, and there would be about 80 miles of tracks.

104. How many mining townships are there in the Ohinemuri County exclusive of Waihi?—Waitekauri, Waikino, Karangahake, Mackaytown, Komata.

105. The construction and maintenance of roads to and from mining townships is very heavy?—Yes, the cost is heavy.

106. And the same applies to any necessary bridges?—Yes; where you have to erect a bridge going to a mining district you have to prepare for heavy traffic.

107. I think you took certain samples of material from the bed of the river?—I took one sample from the river-bed.

108. Who was with you when you took the sample?—Mr. Shaw.

109. And those samples after being taken were sent to the Dominion Laboratory?—Yes, to Dr. Maclaurin.

110. And it has been only since the Commission commenced sitting that you received the report?—Yes. [Dr. Maclaurin's report: Exhibit No. 64.]

111. *The Chairman.*] In giving us the cost of repairing the roads you omitted to give us the cost of reinstating the bridges?—Yes. I might say that it is not proposed to reinstate or re-erect the Tauranga Bridge at the present time. Benner's Bridge is estimated at £275, and the Mackaytown Bridge at £640.

112. *Mr. Hanna.*] Speaking as County Engineer, do you recommend the cut at Pereniki's Bend?—After all is said and done it is a matter of ways and means.

113. In what respect is it a matter of ways and means? Have you calculated what this proposed cut is going to cost?—Yes; it appears to me the cut would cost between £30,000 and £40,000.

114. *The Chairman.*] Have you checked the figures?—No.

115. What width?—A hundred and ten feet at the bottom.

116. Mean depth?—I really forget.

117. What depth below water-line?—Three feet below water-line—that is, at the lower end. It is only graded out to a foot below the water-line at the upper end.

118. You think it will cut out itself?—I think it will be very nearly sure to do so.

COPY OF LETTER RECEIVED FROM WITNESS.

SIR,— Ohinemuri County Council Chambers, Paeroa, 9th May, 1910.

I have the honour to forward an estimate of the cost of making the proposed deviation of the Ohinemuri River at the place known as Pereniki's Bend.

The estimated cubic yards in the cut is about 160,000. I think the cost of shifting should not exceed 1s. per cubic yard, making a total cost of £8,000 for the cut. If it should be found necessary to line the cut with timber, it would cost an additional £9,000.

When referring to the cost before the Commission here, I based my figures on the cubic contents being 394,000 yards, which I now find is entirely wrong. The 160,000 yards on which the estimate is now based is the full cubic contents of the cut as shown on the plan.

The samples of river-sands and silt have been forwarded.

I have, &c.,

The Secretary, Royal Commission, Auckland. CHARLES BRAY, County Engineer.

119. *Mr. Hanna.*] You said you had conferred with Mr. Adams on this cut question: did you go into this question of cost with him?—No; that was as to the lower cut.

120. Does it follow that if the Pereniki Cut is put in, the lower cut must be put in too—that is, the cut suggested by Mr. Metcalfe?—The cut I was alluding to was the cut in the Waihou below the Junction.

121. You estimate that there would be 400,000 cubic yards in the cut?—Yes.

122. What do you propose to do with that 400,000 cubic yards?—They would have to buy sufficient width of land, and stack it on the sides of the cut.

123. Or make a stop-bank down the river?—That might be so.

124. Do you propose to line the cut?—I hardly think it is necessary to line it right through. I should think that if it were lined at the intake and at the outfall that would be sufficient. I might add this: that it is a very difficult matter, without having the proper data, to give a definite answer in regard to a cut like this. My experience is this: that along the banks of the river there is apparently good strong clay, but after a certain distance you get sand. Although we have gone down 7 ft. of strong clay, we do not know what there is below that—that is, 7 ft. below the surface of the ground, midway in the cut. The assumption is that it is clay right through.

125. If I were to tell you, in connection with the works of the extraction company on the river, that they found drainage sand in 4 ft. of clay, would that surprise you—that under 4 ft. of clay they found drainage sand?—That would not surprise me.

126. Supposing that cut were put in, would that not of necessity reduce the depth of water to such an extent—in that case could we work our dredges up there and convey the stuff back again to our works?—I understand that in working these dredges they would create their own water.

127. *Mr. Mueller.*] Was not a bridge at Mackaytown washed away previous to the last flood, or was it damaged?—It was damaged very materially. I believe the first bridge that was erected was washed away.

128. Was the last bridge that was erected erected at a higher level than the previous bridge that had been there?—Yes.

129. Can you give us any idea as to the difference in the level of the last one and its predecessor?—I could not do so accurately, but I should think it was from four to five feet higher.

130. *The Chairman.*] You have taken some eleven samples from the bed of the river, in the channel?—Yes, I got the County Foreman to go down and take them. They were taken from the bed of the river as shown in the list produced.

131. You have shown the samples to the Commission this morning, and you are having small samples taken out of the bulk samples, and you are going to send them to us in Auckland?—Yes. [Exhibit No. 65.]

132. You were asked this question: "When we examined it we found traces of silt in Nos. 6 and 7"?—Yes.

133. And, "We found No. 11 to be composed—almost wholly composed—of silt"?—Yes.

EDWARD ALEXANDER BROWN examined. (No. 75.)

1. *Mr. Mueller.*] You are chairman of the Matatoki branch of the New Zealand Farmers' Union?—Yes.

2. How many members are there in that branch?—About forty.

3. Have you been instructed by your branch to speak on behalf of the branch?—I represent the branch.

4. Your members are suppliers to the Matatoki creamery?—Yes.

5. Have you noticed the waters of the Waihou back up over your properties?—Yes, at high spring tide—that is, once a month—the river-waters back up, and it has done that over the low-lying ground for years. We have had the ground for sixteen years, and there are portions that have always had a little flood over them, but never to do us any damage. In fact, it has always been a benefit until the last year or so. During the last year or so—within the last twelve months we have noticed it more than at any other time—there has been a deposit of slimes put on the ground that has killed everything in the shape of vegetation. It seems to be a fine slime that settles out of the river-water.

6. Have you noticed whether the water extends or has extended further back in recent years?—It is going further back. There is water coming now where it never went before on such occasions.

7. How much of your land is affected by this deposit?—A hundred and fifty acres is affected completely—upon it everything is killed.

8. How many head of cattle did you carry, and how many do you carry now?—On this particular block we used to run up to fifty head continually, and at the present time it would not

carry ten head to do them justice. There is only a bit of scrub and rubbish for them to live on. There is nothing in the shape of grass.

9. Have you attempted to erect stop-banks to prevent flooding?—Yes, we are erecting stop-banks 5 ft. wide. We are putting them up ourselves inside the stop-bank we have there. We have drains, and then there is a fence to prevent the cattle getting there. The stop-banks cost about 30s. a chain. The 30s. is only for the building of the bank, without anything extra at all. All the settlers that are affected are not building banks at the present time.

10. As regards your river frontage, did you make use of that for your cattle?—At one time the cattle used to go to the river to drink out of it, but now we have to provide other means. We have to bore artesian wells to provide them with water. There is silt along the bank of the river—or, rather, it is not exactly silt, it is a sort of slime. It is raising the edge of the river. The deep-water channel is not being affected apparently, but there are banks forming all along in front of our property right in the centre of the river. They have risen 18 in. and 2 ft. in the centre of the river. Where there used to be soft mud-bank it is now quite hard.

11. Have you noticed anything in connection with the landing-stage of the Thames County Council?—Yes; there is a small landing-stage. The Council has repeatedly raised it. They keep it from 1 ft. to 18 in. above the mud. After a short time it keeps silting up until it gets covered. Then they lift it again. It has been elevated three times within the last three years. The Thames County Council have had samples taken of the stuff, and I believe you have had evidence from Mr. Baker, who made an analysis of the samples.

12. *The Chairman.*] Where is your place?—We are directly opposite the Turua Mill on the other side of the river. The Thames Harbour Board boundary is at our corner. It is called Te Kopua No. 2B Block.

JAMES MCCORMICK examined. (No. 76.)

1. *Mr. Mueller.*] You are a farmer residing at Matatoki?—Yes.

2. Your land joins that of the previous witness?—Yes.

3. You have heard Mr. Brown give his evidence?—Yes. I should like to mention that ever since these flood-waters have been coming over the property some disease seems to have been affecting the cattle. At the present time I have six head of cattle that seem to be scalded from the hoof up to the knee.

4. *Mr. Mitchelson.*] Is that in consequence of the mud?—No, there is no mud fever about it. Three out of the six I have had to take in, and I do not think they are worth the hides on them. I would like the Commission to see the cattle, because they have only been affected in the paddocks where the water came over. There is something injurious in the water, which is causing this trouble.

5. Have you had a veterinary surgeon examine them?—No, but we have written to Mr. Lyons to come up and examine them.

6. *The Chairman.*] You are getting over the difficulty now by putting stop-banks up?—We are trying to do so, but it is a difficult matter to keep out the river-water.

7. If it filters through, it will not be charged with silt?—That may be so.

8. You have met the matter very fairly?—We are trying to do so.

JOHN MCCOMBIE examined. (No. 77.)

1. *Mr. Myers.*] You are now underground manager of the Talisman Consolidated Mine?—Yes.

2. And have been for how long?—Nearly six years.

3. And your experience of mining in this district extends for how many years?—About thirty-five years.

4. I suppose you have also a knowledge of the surrounding district?—Yes.

5. Do you know the drain called Roache's Drain?—I have seen it. It is in the Shaftesbury district, beyond Te Aroha.

6. And that drains into the Waihou?—Yes.

7. Do you know what the depth and width of that drain was originally?—No.

8. You have seen it from time to time?—Yes.

9. Have you seen it getting larger and larger?—Yes; it is probably 100 ft. wide in places now.

10. By a depth of——?—Approximately, I should say, 20 ft.

11. For a length of——?—About a mile.

12. Is Roache's Drain on the same side as Waiorongomai?—Yes.

13. I think you know the same thing has happened to other drains that flow into the Waihou?—Yes.

14. Do you remember vessels going up the upper Waihou as far as Te Aroha?—Yes.

15. Drawing up to what depth of water?—From 4 ft. to 7 ft. when loaded.

16. How long ago is that?—Te Aroha was opened for gold-mining purposes in 1881, and these vessels would be trading in 1882-3-4.

18. I think you have not gone into the estimates yourself as to what might be the cost of dumping and transmitting tailings from the Talisman battery to some distance out?—No.

19. Can you tell us the nature of the ore that is worked in your mine—I mean in regard to grade?—We have some high-class ore, but it is not a drop in the ocean to the low-class ore.

20. You mean your quantities of low-grade ore are very large?—We are relying chiefly upon the treatment of our low-grade ore.

21. Do you think you could work the whole of your low-grade ore if, say, 2s. or upwards per ton were added to the working-cost?—No. We are running very close to the wind now with the low-grade ore, and I think it would have to remain in the mine if any further cost were put on it.

22. Do you think you would be able to transmit the tailings back into the mine at the Talisman?—No.

23. Have you any particular reason?—Our reefs are flat, and in consequence of that flatness we cannot use tailings for filling purposes. That is, they would not find their way into the stopes automatically.

24. Do you do any surface mining for the purpose of filling the stopes?—No. Owing to the flatness of the reefs we have to get our fillings out of the walls.

25. That is very expensive?—Very expensive.

26. You have had some experience of stacking slimes?—Stacking tailings, yes.

27. What kind of tailings?—Quartz tailings for treatment.

28. As fine as you are treating now?—No.

29. Anything like as fine?—No; I think the mesh we used was a 20-mesh.

30. How long ago?—Twenty-six or twenty-seven years ago.

31. That is when you were managing the Silverton Mine at Waihi?—Yes.

32. How many did you stack?—About 1,000 tons, as near as I can remember.

33. Was it satisfactory?—No.

34. Why not?—Because when we came to treat them five years afterwards there was not a third of that quantity there.

35. You do not suggest somebody came and ran away with them?—No; it was owing to the action of the wind and weather.

36. *Mr. Moresby.*] You have been up the Waihou to Te Aroha lately?—About six and a half years ago. I came down by launch.

37. I suppose you know Captain Adlam, of the Northern Steamship Company, who has been trading regularly to Te Aroha for thirty years?—Yes.

38. If he says that the Waihou River above the Junction has not shoaled up very much to what it has always been, or that the willows are no worse, would that alter your opinion at all?—No. I may say there were reaches in the river in those days of considerable length where the water was 10 ft., 15 ft., to 20 ft. in depth, and those reaches do not exist to-day.

39. How do you know that?—Because we stuck in the launch I came down in at several places where there was a great depth of water formerly.

40. But the river changes frequently?—I do not know about that.

41. But the channels change, do they not?—Yes, that may account for it.

42. *Mr. Mitchelson.*] Do you refer to the launch that used to take the barges up to Waiorongomai with flux for the smelting-works?—I am going back to the time when the river was navigable for a boat called the "Waitoa," and also the "Pearl" and "Vivid." They were three fair-sized boats.

43. And some steamer used to tow the material up to the smelting-works?—That was long afterwards. The "Kotuku" and "Patiki."

44. *Mr. Moresby.*] Do you not think the steamers could get up now?—The "Kotuku" and "Patiki" might, but not the "Vivid."

45. Do you think that is owing to the willows?—No; to the silt in the river.

46. You gave us reasons why you could not put the tailings into the mine; but would you be able to use the mullock to fill the stopes?—If you mean the mullock coming out of the mine as the result of the workings, we are doing that now.

47. You are not putting it into the river?—Some, but not all. We are using as much as we possibly can in the stopes to minimize the cost of filling.

EDWIN GRIPPER BANKS re-examined. (No. 78.)

1. *Mr. Tunks.*] You are chief metallurgist for the Waihi Company?—Yes.

2. Are you a member of any scientific society?—I am a member of the American Institute of Mining Engineers, the Institute of Mining and Metallurgy, London, and of the Chemical, Mining, and Metallurgist Society, South Africa.

3. How long have you been at Waihi?—About nineteen years.

4. All the time in the treatment-mills of the Waihi Company?—Yes.

5. And, of course, you are thoroughly conversant with the method used in all their mills?—Yes.

6. The mills have all been designed for the discharge of tailings into the Ohinemuri River?—Yes.

7. Have you made any attempt at any time to store any of your residues?—Yes; some years ago, before our treatment was as successful as it is now, we tried to store portions of the tailings and residues. We stored some at the Waihi Mill, amounting roughly to about 20,000 tons. That was put into a gully that existed between the mill and the river. We built an earth breastwork across this gully, and ran the tailings in across a portion of it.

8. How long ago?—This particular lot was from six to ten years back. We ran about 20,000 tons of our tailings into the gully wet. We aimed at saving the coarser portion of the tailings, which was the only portion worth retreating.

9. What was the result of that?—We have not started the retreatment of this stuff yet, but approximately I should say certainly a third of that stuff has gone. In that particular stack our chief trouble was owing to flood-waters carrying away the breastwork frequently in heavy rains. That would happen at night, and a large quantity of the tailings would be gone by the morning.

10. *The Chairman.*] That was the fault of the breastwork?—Yes, there. We made it as strong as we reasonably could, considering the value of the tailings. It did not pay to spend too much on it. We also stored more recently about 11,500 tons of the coarse portion of our sand tailings at the Union Mill. That was run into a paddock adjoining the mill, around which be built a wall from 4 ft. to 7 ft. high: there was a natural rise in the ground in places.

11. *Mr. Tunks.*] What was the result?—Within less than two years—that is, moving up to the present time—after we ceased to put tailings into that pit I made an estimate, three or four weeks ago, and found that fully 43 per cent. of those tailings have gone.

12. In what way?—Almost entirely owing to wind-action. The gully I have previously mentioned was more protected from the wind than this was. Waihi is pretty noted for its wind. Quite 43 per cent. of these tailings have gone from the paddock, and they travelled in the direction of the river, which was the direction of the prevailing wind.

13. What became of the fence?—We built a brush fence across to keep the tailings from travelling out of the pit. But the tailings simply banked up against the brush fence, and topped it, and buried the fence, and continued travelling.

14. Have you tried storing the concentrates?—Yes, at the Victoria Mill, at Waikino—with practically the same results, except there it was water-action instead of wind-action that carried them away.

15. And you practically lost them?—A great deal of them. Some of them cemented hard.

16. What quantity of ore do you crush per day?—1,450 tons at the three mills.

17. How many days a week?—Six full days, or twenty-four days a month.

18. Your residues go into the river?—Yes.

19. Have you considered the question of storing them at Waihi?—Yes.

20. What is the amount of your residues at the Waihi and Union Mills?—Approximately 500 to 550 tons a day. These are both in the Waihi Borough.

21. You treat a third of your output in the Waihi Borough?—Yes.

22. I think some suggestion has been made that they could be conveyed to a site somewhere near the Waihi Township?—We have looked into the question of storing it anywhere within a reasonable distance or possible reasonable distance of Waihi.

23. *The Chairman.*] What do you mean by "reasonable" or "possible reasonable" distance?—The question of cost. In fact, as far as the Waihi mills go, I consider there is no site on the plain, which is roughly a basin surrounded by hills which you can see from Waihi. A storage-site on which to put them should be a site on which you could be sure of keeping them.

24. *Mr. Tunks.*] There is not a site on the Waihi Plains?—I see absolutely none; and I have been over the whole district dozens and dozens of times.

25. And you have considered it definitely and carefully from this point of view?—Yes. It is interlaced with gullies and swamps, all having a fairly rapid fall to this main Ohinemuri River.

26. You think your experience with the Union and Waihi sands would be repeated, and that they would find their way to the river?—I am quite sure of it. It is only a question of a fairly short time.

27. Have you considered the question of storing the residues from the mill at Waikino, where you discharge about 1,000 tons per day?—Yes.

28. What methods have you considered?—The first consideration was, where were they to be put—what dumping-ground there was. I, and others with me, could see no site that could be at all suitable anywhere nearer in this direction than the Rotokohu Swamp. That position has been considered as a possible storage-site. Of course, the question of the best means of getting them there and the cost had to be considered.

29. I think you have collaborated with Mr. Fraser in the preparation of these figures?—Yes, and also with Mr. Hopkins and Mr. Govain.

30. Do you agree with the figures that have been put forward by Mr. Grace as Mr. Fraser's, showing the cost of this operation?—Yes. Mr. Grace studied these figures with Mr. Fraser. I quite agree with Mr. Fraser's estimates.

31. Have you made some experiments as to what minimum fall is required to gravitate your residues?—Yes. One of the schemes was a scheme for pumping or lifting the tailings by pumps or wheels into a launder. Well, in order to determine the minimum grade required to convey these residues out to the proposed site I made tests with our pulp at the Waihi Mill, which is representative of the pulp at the other mills. I put in a launder to start with with a fall of 2 per cent., taking an average of the battery pulp as it would be delivered in the form of residues. The amount of water varied from 10 to 12½, to 1 of dry ore.

32. What did you find to be the minimum safe grade?—The material in the pulp was the fine stuff from the tube mills. I found that with a 2-per-cent. fall it ran steadily without any choking in the launder. I started with 2 per cent. because we had had discussions as to the minimum fall at which the stuff would run. I then lowered the launder to find the minimum fall. At 1½ per cent. the stuff was inclined to block, and at 1 per cent. it blocked rapidly.

33. *The Chairman.*] That was a timber launder?—Yes.

34. *Mr. Tunks.*] What is your opinion as to the likely result if your residues were deposited on a storage-site?—I do not think it would be possible to keep it at Rotokohu. It would stay for a length of time, depending on weather-conditions, rainfall, and so on, but ultimately it would spread over the country if it got dried. If it could not get dried it would get back to the river or through the land between the site and the river. Certainly you could not keep it on the site without going to enormous expense to keep it there. This site is backed up by hills fairly steep, on which a heavy rainfall would send sufficient water to spread the stuff over the country.

35. You heard Mr. Grace's evidence, and you agree with him as to the unsatisfactory nature of the scheme?—Yes.

36. *The Chairman.*] I suppose it would be possible to put a bank round to keep the surface water off?—I think it would be difficult in that spot.

37. *Mr. Tunks.*] Looking at the whole scheme, do you consider it commercially impracticable?—No. We considered a scheme of fluming, we considered another scheme of carrying it by trucks on the Government railway to the same site, and another scheme of pumping in a continuous pipe, and all these schemes would certainly cost from 2s. to 3s. per ton; and the only one which we would say would be a practicable scheme, looking to the fact that you have to keep the batteries running steadily to do the work, was the trucking, and that scheme would cost a little over 3s. per ton. The other schemes I consider absolutely unworkable from our point of view.

38. You would agree, then, with what has been said, that to add that cost on to the cost of working would mean that a very large quantity of ore could not be touched at all?—Yes. I might say I know the mine thoroughly. I am frequently down it, and I also know the grades of ore all over the mine wherever we have opened up, and I know if an increased cost of 2s. or 3s. per ton was added to the working, we should have to leave many hundreds of thousands of tons of ore in the mine that would otherwise come out.

39. I think you have been in Kalgoorlie and Broken Hill?—Yes, as a visitor only—a few weeks in each place.

40. Did you experience a dust-storm?—Yes, unfortunately.

41. Was it ordinary dust?—By no means. The position at Kalgoorlie is that the dumps surrounded most of the mines. It is fairly flat land, and there is no watercourse, no sludge-channel. They build up the residue-dumps fairly close to the mills, and on a windy day the air is full of dust flying round—dust that is injurious to health and damaging to property and machinery.

42. Have you any idea as to the cost of stacking their residues?—Yes; I took out the average cost at six of the largest mines for stacking residues.

43. Where did you get your figures from?—From the Chamber of Mines publication, which gives all the details in connection with the cost of milling and mine operations. It varied from 4½d. to 9d. in the large mills, with an average of 6d. And I may say these reduction-works were built having in view the necessity of storing the residues.

44. What distance have they to take them?—A few hundred feet to a few hundred yards—practically at the mill-door.

45. Under any circumstances can you compare their stuff and treatment with what you do here?—Not as regards fineness. They do not crush, on the average, nearly so fine as we are now crushing. I do not know the actual percentage of the grades, but I heard Mr. Baker say he lived in Kalgoorlie, and that 35 per cent. of their residues went through a 200-mesh. That is very different from what we are doing here. He called that as fine as Waihi; but it is not, as I can show.

46. I think a suggestion has been made that some of the residues could be consolidated by adding some substance to the slimes?—Yes, hydraulic lime was suggested as a method by which the slimes might be dumped and consolidated cheaply. We tried with from 2 per cent. to 10 per cent. of lime, and the stuff would not bind. I have a sample of it here. It had practically no binding effect at all. And every 1 per cent. of lime added would mean to us a cost of over 5d. per ton; but even up to 10 per cent. of lime did no good: so it would be useless.

47. Would that represent a cost of 5d. per ton without the cost of mixing?—Yes. The cost would be prohibitive. I also tried 5 per cent. Portland cement. Even that did not bind it in such a way that it would remain consistent if water got to it.

48. You have examined the mining-silt in the river near here and below Paeroa: what do you say that consists of?—The bulk of the stuff in the river here is, I feel sure, the result of our operations at the time when we were doing what we now call coarse crushing.

49. Coarser than anything now put into the river?—It is coarser than anything we are now putting in, with the exception of a very few tons. Some of it is coarser than of the stuff we are now putting in.

50. I understand that in Waihi you have been crushing finer and finer from year to year: what are the proportions?—There is only a percentage of 8·92 that will remain on a 120-mesh screen—that is, 14,400 holes to the square inch; and at least 75 per cent.—it varies from 75 to 80 per cent.—will pass a 200-mesh screen—that is, 40,000 holes to the square inch. And we are aiming at still finer crushing. Our ore contains a great deal of silver, and to get a very high extraction we have to grind fine. Also our gold is very fine at Waihi.

51. Have you any samples of the screens you are crushing through?—Yes, samples of the screens we are crushing through at present, and samples of the screens we were crushing through—30-, 40-, 150-, and 200-mesh. These screens are used to give sizing tests, but we are crushing that size all the same. [Exhibit No. 66.]

52. I think you have a sample of your present-day residue, graded?—Yes. That is, I took an equal proportion from each mill according to the tonnage we were crushing, and combined these. It amounts to 40 tons a day out of the total output on the 80-mesh screen.

53. What is the amount per day that would pass an 80-mesh screen and remain on a 120-mesh screen?—7·82 per cent., amounting to 105·56 tons per day; and passing 120-mesh and remaining on a 200-mesh represents 15·57 per cent., and amounts to 225·76 tons per day; and No. 4 sample, that would pass a 200-mesh screen, represents 75·51 per cent., and amounts to 1,094·9 tons per day of our total output of 1,450 tons; and the latter is the material we treat and speak of as slimes.

54. What will be the result of these fine particles discharged into the river? How will the river deal with them?—I consider a river the size of the Waihou and with the quantity of water that is in the Waihou will have absolutely no trouble in carrying that matter out to sea.

55. The whole matter out of what mesh?—I consider it will handle the whole matter we crush quite comfortably—even the quite coarse stuff. I think the 75 per cent. would hardly get a chance to settle. The other grades would travel down also, but not quite so well.

56. You heard Mr. Grace's evidence as to the current-velocity that would move this stuff along—½ ft. per second: Do you agree with that?—Yes, not only from what I have read in standard works, but from my own observation. We are continually running our own sands through launders and pumps, and I know that is quite true. Certainly a current-velocity of 1 ft. per second would shift anything we put into the river.

57. What velocity is there in a 2-per-cent. straight launder?—Four feet to the second.

58. *The Chairman.*] You think this would be sufficient in the river, which has a rough surface, instead of the smooth timber surface of the launder?—Yes, but the body of water is different. When the launder chokes in our operations we can frequently overcome it by adding a larger amount of water.

59. *Mr. Tunks.*] What is the chief cause of the floods becoming higher and more frequent of late?—For one thing our rainfall of the last few years has been exceptionally heavy. That I know from Mr. Devereux's evidence. I know it has been unusual of late years. I also know that in our own district we have cleared a very large area of bush for firewood when we were dry-crushing. We used hundreds of thousands of tons of timber as firewood, and we find the effect on our water-power is this: A good rainfall in the old days would give us several weeks with plenty of water for our power; now it dies out in less than a week.

60. *The Chairman.*] Have you done anything towards reafforestation?—No.

61. Why not?—We never went into the question, so far as I know. We do not require firewood now. I suppose it was considered cheaper to put in steam-power to make up for the loss of water rather than get the benefit of the water by replanting.

62. *Mr. Tunks.*] Have you any other item bearing on this matter?—I can give you a few figures showing the progress made in fine grinding as compared with coarse crushing. In 1902, before we had tube mills, 0·03 per cent. remained on a 40-mesh screen; on a 60-mesh, 3·13 per cent.; on an 80-mesh, 11·93 per cent.; on a 120-mesh, 44·53 per cent.; on a 150-mesh, 61·53 per cent.; and only 38·47 per cent. passed a 150-mesh screen.

63. I think you have a list of these samples you put in this morning?—Yes.

64. They were taken on the 24th May last?—Yes.

65. What was the result of these samples?—Perhaps I had better state where they came from, as follows:—Alexander's Wharf: No. 1, 25 ft. from edge of low water, right bank, 5 ft. of water; No. 2, three-fifths of the way from right bank, 4 ft. 9 in. of water; No. 3, three-fourths of the way from right bank, 4 ft. of water. Next wharf below Alexander's: No. 4, 100 ft. from right bank, 3 ft. 6 in. of water; No. 5, 100 ft. from right bank, 4 ft. of water; No. 6, 80 ft. from right bank, between the two wharves, 3 ft. 6 in. of water. Waimarie Bend: No. 7, 33 ft. from water's edge (inland), bottom of hole, 2 ft. deep. No. 8* (no sample kept—all mining-silt), 20 ft. from left bank, 3 ft. of water; No. 8, 40 ft. from left bank, 4 ft. of water; No. 9, 45 ft. from right bank, 11 ft. 6 in. of water. Just above Gillard's house (at place mentioned by Wight): No. 10, 35 ft. from left bank, 6 ft. of water; No. 11, centre of river, 5 ft. 6 in. of water; No. 12, 30 ft. from right bank, 4 ft. 6 in. of water. The tide was very nearly low at the time we took all these samples: it had possibly half an hour to fall. I consider that Nos. 1, 4, 6, 11, 12 show what might be a very small percentage of mining-silt. In regard to No. 8* I may explain we took thirteen samples and had only twelve bottles. No. 8* was simply practically all mining-silt taken from the Waimarie Bend. No. 7 contained a good deal of fine silt that looked like mining-silt, clayey material, and organic matter. We dug to a depth of 2 ft. to get it. All the samples excepting Nos. 7 and 8* consist almost entirely of ordinary coarse and fine river-sand and pumice. Some of the samples show blue clay from the river-bed, thus showing that in these particular spots there is not any mining-silt below the river-sand. From the blue clay I conclude there is no doubt we got right to the old river-bed. At the point opposite the Waimarie Bend where we got mining-silt 23 ft. from the water's edge, a sample taken 40 ft. out showed practically only a slight trace of mining-silt. We took a sample then from the other bank, I think 43 ft. or 45 ft. out from the edge of the bank, in 11 ft. 6 in. of water.

66. What did that give you?—Absolutely no mining-silt—not a trace.

67. *The Chairman.*] The general result of your observations is this: that in the bed of the river in the channel there is no trace of mining-silt, but on the banks on each side it varies from a trace up to all mining-silt?—That is correct. When I say "in the channel" I should say in pretty well three-fourths of the width of the river-bed there is at the most only a very small percentage of what might be mining-silt. It is a most difficult thing to say.

68. You do not mean slimes?—No. In taking these samples we went to one point mentioned by Mr. Wight where he said that the river had shoaled, and the bottom hardened, forming a bar which allowed his cattle to cross to the other side of the river. We got hold of Mr. Wight to point out the very spot he spoke of, so that there should be no mistake about it. The river-bottom there is just as we found it elsewhere—there was hardly a trace of mining-silt as soon as we got 25 ft. from each bank.

69. That is, within 25 ft. or thereabouts of which bank—the present bank or the old bank?—The present bank that is shown.

70. Do you mean, at low-water line or at the top of the slope?—About the centre of the slope, which I took as the average position.

71. What did you find there?—In drawing a sample there you would get a varying percentage of mining-silt. In some cases it might run up to 10 or 12 per cent., but you could see undoubted traces of it at these points.

72. And as you came further inshore?—Generally you could see more of what might be called mining-silt.

73. How do you arrive at the 25 ft., and three-fourths distance, and so forth?—We did not measure that; it was guesswork. Mr. Stewart is a civil engineer, and he agreed that these were about the distances.

74. *Mr. Tunks.*] I think Mr. Bray, the County Engineer, was with you, too?—Yes, and he agreed the distances were about right.

75. *The Chairman.*] How did you take the samples?—With an iron scoop at the end of a pole. The scoop was forced in, and then drawn slowly up.

76. Do I understand from your evidence that what Mr. Wight said about his cattle going across the river is untrue?—No. I do not say his cattle could not get across, but I say the river has not shoaled because of mining-silt.

77. You do not throw any doubt on his evidence that the cattle have got across?—No.

78. *Mr. Tunks.*] You pump slimes at Waikino?—Yes.

79. I think you have two sets of pumps working on slimes there?—Yes, we have a number, but we have two working side by side.

80. You and Mr. Fraser went into this matter of pumping slimes?—Yes. What we looked at was to find the extra pressure caused by pumping slimes, the increased height of one pump as compared with the other, and comparing it with water-pumping. These are a few of the figures relating to a scheme of pumping slimes through a continuous pipe. We had two pumps working side by side on slimes: No. A pump working 2 of water to 1 of slime, pumping to a height of 28 ft., with the total length of line 126 ft.

81. *The Chairman.*] How many bends in it?—I think there were four bends in that particular line. But I would rather Mr. Fraser gave this evidence, as he is familiar with these figures, which I checked with him.

82. *Mr. Tunks.*] Can you tell us anything about this colloidal action we heard about yesterday?—I have got a very good definition of it here which I should like to read. It is pretty brief, and is a good explanation of colloids and colloidal action. The book is "Cyaniding Gold and Silver Ore," by Julian and Smart It is dated 1904, and is a recognized work on cyaniding. This appears on page 203: "Since Graham's time it has been proved that colloids and fine sand or slime in water have many common properties, and in absence of proof that colloids are solutions, it is probably better to follow the more modern investigators and treat the so-called colloid solutions as simple suspensions of finely divided insoluble substances." He says in brief they are colloids. He gives a little further explanation: "Cases of slimes not settling: Fine solid particles suspended in water exhibit a number of properties which force us to recognize that the particles are charged electrostatically, and when small enough are capable of repelling each other to such an extent as to counterbalance the action of gravity, becoming uniformly distributed throughout the liquid, and thus are prevented from settling."

83. Can you tell us anything as to the effect of salt water on these slimes?—Yes: I made tests with actual sea-water. I took an average sample of our slimes and tested two portions of it as to settling. I mixed one portion with fresh water and the other with sea-water in large volume compared to the bulk of the slime. In the case of the salt water there was a more rapid settling effect than with the fresh water, but the ultimate result of settling was that in the case of the sea-water the slime did not set quite as closely as in fresh water—though there was not a great deal of difference—and in both cases the slightest disturbance of the water in the beaker brought the slimes up again; they did not set solid in any way.

84. *The Chairman.*] That is a case where it is in water: that is not the case on the banks of the river, where the water is decanted off and the slime settles in a thin layer and is exposed to the atmosphere and then after some hours is slowly lapped again by the water?—I have seen round our batteries where the slime has spilled over, and that is quite easily worked up if put in water at all. A small stream of water running over that rapidly brings it into a flocculent state again.

85. You take the case of a river such as the Ohinemuri River near Paeroa, where the water at the present time, in its normal state, runs very slowly. The water recedes slowly, and leaves little bays and back places where the slimy material is deposited on the bank, which has a low grade. It remains there exposed for some hours, and then the water gradually rises again, and practically flows over it instead of disturbing it. The next time the water goes down a little more material is deposited, and there appears to be a gradual deposition. We have been studying this in a rough-and-ready way, and the conclusion we have come to is that there is a deposition of slime on the bank, and that that slime is not taken forward again by the water. Now, what you have to prove to us is that we are wrong. A laboratory experiment in a beaker with the silt covered with water and shaken up is not the condition existing in nature?—No. I think I can say this definitely: I have taken our slime, and I have sun-baked it for a week in a cake of $\frac{1}{2}$ in. to $\frac{3}{4}$ in. thick. It appears quite hard to look at, and you can scratch it easily with the finger-nail; but stand it on a plate in a shower of rain, and it softens rapidly as soon as the water soaks in, and it quite easily breaks if you give it a slight disturbance. I have seen deposits on the bank here, too, and I feel sure the least fresh that passes over that place, or any rapid current—a current of anything like 3 ft. or 4 ft. per second—will carry the stuff away.

86. I am not denying that, but there are places where you get no current for weeks at a time, except in freshes, in the Ohinemuri River?—Well, I think it is quite possible, in a few places such as you speak of, where there is comparatively still water, that a little slime will settle.

87. We have been watching it below the Railway Wharf, and we have come to the conclusion that not only is there a little, but a good deal settling, and the bulk on the whole river must be a very large amount. The argument that the mills are grinding so fine now that the slime is naturally carried out to sea without settlement is true, no doubt, as regards the great bulk; but in a large portion of the waters which are close to the banks, where the current is small, there is a deposit?—I think that a small deposit would form in such places, but I feel absolutely sure that if

the current had a velocity of even anything like 2 ft. per second that slime would be worked up and carried away. The velocity has absolutely dropped where it is deposited.

88. *Mr. Tunks.*] What is the effect of a shower of rain on such a deposit?—A shower of rain would certainly wash most of it back into the river. That is my experience. I take it you are speaking of the sloping banks.

89. *The Chairman.*] We had a cut made, and in twenty-four hours or less we found the bottom of the cut full of slime. There is a case of still water. And the bed of that cut contained an appreciable amount of slime, the product of fifteen or sixteen hours?—Washed in from the river, which was running, into the canal: and that would be still water in the canal.

90. Yes?—I think I have said that in still water a slight amount will deposit.

91. You think there should be a velocity of 2 ft. per second to carry it downstream?—I think less than that, but certainly 2 ft. would do that. I have had a large experience with slime. We have great difficulty in settling our slimes. We have to use lime for this purpose, but I think there is very little of the effect of the lime left after it leaves our battery. I could practically prove that by test. I do not say that lime does not destroy to a certain extent some of the conditions that constitute colloids, but I do say, if you take our slime after treatment it is very difficult to get that slime to settle without the addition of more lime.

92. I suppose you know the watershed on the other side of Waihi towards the sea?—Yes.

93. Has your company ever considered the question of shifting your reduction-works to the other side of the watershed, so that your slimes could be discharged into the sea, where they would do no damage?—We have not considered it, because we think it is not commercially feasible. It is quite feasible so far as shifting the plant and works is concerned, but it is not commercially practicable.

94. And to that extent you consider there is nothing in the suggestion?—Absolutely. We have considered two schemes of fluming and pumping that were considered feasible.

95. You did not consider there was enough in the suggestion to warrant you going any further?—Certainly not.

96. *Mr. Cotter.*] You were with the Waihi Company some time before the Proclamation was issued?—Yes, four years.

97. Are you not now, and have you not been for some years past, since 1895, treating profitably a much lower grade of ore than you were at that period?—Yes; we have also reduced our working-costs.

98. You are able to treat by a better process of manipulation a larger quantity, but you are, and have been during late years, treating a much lower grade of ore than you were able to treat profitably at that time?—Yes, we are treating a lower grade of ore.

99. Can you give it to me approximately?—In those years we frequently had ore that might go over £3 per ton.

100. At that time about what grade of ore could you treat profitably, and what is it now? I do not want values if you can give percentages?—In those days we could only make an extraction of 66 per cent. of gold, and now we make an extraction of 99 per cent.

101. And what was the lowest grade you could treat profitably then and now?—I could not say. Now we can treat at a profit about twenty-shilling ore, or a little over; but I have not gone into it very closely. I could only take it on our working-costs, which could be given, but which I cannot give at that date. I think our working-costs then and now really govern the question.

102. You mean by "working-costs" improved method of treatment?—Exactly; that reduces our working-costs and increases our percentage. I can say that certainly twenty-three-shilling ore would pay for treatment now, and probably in those days it would be nearer thirty shillings or thirty-three shillings.

103. *Mr. Mueller.*] How long is it since your company discarded dry crushing and started wet crushing?—We altered it at different mills at different times. I think dry crushing was last done in some of the stamps at Waikino.

104. We will take the Waihi mills?—It is so many years ago. I cannot remember the exact year. I suppose it is quite ten years ago.

105. The cutting-out of the bush for your dry-crushing process had taken place prior to that time?—Yes.

106. So that for the last ten years practically you have not been cutting out the bush for dry crushing?—No, but we have been for our steam.

107. You stated that you had tried to consolidate these tailings with lime and cement and different things: do you know or have you seen any bricks which were made in Waihi out of this stuff?—Yes.

108. Do you know that those which were made in Waihi were made without any fire or roasting?—I believe so. I think they apply heat by steam under pressure.

109. You are not referring to the same bricks that I am?—I do not know of any other bricks then.

110. Do you know these bricks which were made in Waihi by Mr. Henry—not for commercial purposes?—I was shown a brick—I do not know if it was made by Mr. Henry—and when I asked about it I was told it was a State secret.

111. Have you ever been in South Africa?—No.

112. *Mr. Tunks.*] Since the days Mr. Cotter has referred to, when you had thirty stamps and crushed this thirty-shilling to thirty-three-shilling ore, I think the company has spent very large sums in improving its plant—the plant has practically been reconstructed?—We have spent hundreds of thousands of pounds in order to treat low-grade ore and reduce our costs.

EDWARD JOSEPH ADLAM examined. (No. 79.)

1. *Mr. Moresby.*] You are a master mariner at present in charge of the s.s. "Rotokohu," trading on the Waihou and Ohinemuri Rivers, in the employ of the Northern Steamship Company?—Yes.

2. You have been engaged on these rivers, how long?—Twenty years.

3. I think we may take it you know these rivers fairly well?—Yes.

4. I think in the old days you were mate on the "Ruby" when she traded between Auckland and Paeroa?—Yes.

5. What water did she draw?—Six feet.

6. What wharf did she go to?—The Town Wharf in Paeroa—that is, the Wharf Street Wharf.

7. What was the state of the Ohinemuri at that time?—It was good all the way—a deep river. You could leave at low water.

8. How long were you on this boat?—About eighteen months. That was 1890 to 1891.

9. Did you get stuck at all?—Never in the river.

10. Then you left that boat and took command of another boat?—Yes, the "Matuku."

11. I think she towed barges to Te Aroha?—Yes. She was a small launch.

12. How long did the Ohinemuri stay in a navigable state?—I should think somewhere up to about 1896 or 1897, when the boats shifted to the Junction.

13. *The Chairman.*] What was the reason for going to the Junction?—The river was getting shoal. We found in the small boats that the river was getting shoal.

14. *Mr. Moresby.*] Can you particularize any places?—Yes, Pereniki's Bend was shoaling up.

15. Then the bigger steamers traded to and from the Junction, and in going down the Waihou which bank did they go down?—The right-hand side, close in to Mr. Kenny's house.

16. What is the condition of that place at the present time?—The channel is all filled up there, and it is going across.

17. I think there is an island there by the Hape Creek?—Yes.

18. That island is above water in ordinary tides?—Yes.

19. I think you start from Te Puke to go to Te Aroha in your present boat?—Yes.

20. Do you have any difficulty in going up to the Junction?—Not before half-tide, but lower than half-tide I should be afraid of getting stuck.

21. Do you consider this part of the river between Te Puke and the Junction is shoaling up?—Yes.

22. Do you think it has done so in the last year?—Yes, the whole time; and the river is confining, too.

23. You mean by that the banks are pinching in?—Yes; you can see it.

24. Do you consider there is any danger to navigation in the immediate future?—It looks at present as though it would not be very long before it closed up altogether.

25. Do you know of any suitable place between Te Puke and Kopu where the boats could conveniently come to?—I do not know.

26. You know where the Puke ferry is now?—Yes.

27. Say, in that reach, 3 or 4 chains below the ferry, could the boats go there as conveniently as they do at Te Puke now if the wharf is shifted?—They could go there, but if the wharf was there it would really mean they would be stuck.

28. Cannot the wharf be extended out to keep them afloat?—No; it is all shoal water.

29. It is one of the worst places in the river?—Yes. You can get down on a certain time of the tide.

30. Is it possible to dredge it?—Yes.

31. If dredged, do you think it would be likely to hold its depth?—No; I think it is a sort of dumping-ground for the bend.

32. If the bend was abolished, and a straight cut put in above the present Junction, it would not be a dumping-place then?—No.

33. You find the bends are the deep spots and the straights are the shoals?—Yes.

34. I think the reach below that—below the Komata Stream—is also very shoal?—Yes, although not as shoal as the other place. You would find a vessel with any draught of water—6 ft. or 6 ft. 6 in. or 7 ft.—would drag very hard along there on an ordinary tide.

35. Do you know any place so suitable for a steamer to lie at along that reach as at the present Te Puke Wharf?—No.

36. I want to take you back again to the Junction. You have been trading up and down between the Junction and Te Aroha for a considerable time past?—Yes.

37. Leaving out of account the condition of the willows, do you think that the river itself has shoaled up in the last twenty years?—No. I think there is a little more water on account of the river being confined by the willow-trees.

38. I suppose, trading up and down as you do daily, you would have noticed if it had shoaled at all?—Yes. Of course, a little bank may form, but the next fresh washes it away.

39. Do I understand from you that the channel is constantly shifting in that portion of the river?—Yes.

40. The river has a movable bottom there?—Yes.

41. I think you made a declaration which was sent to the Mines Committee, and which was put in with the evidence given on that occasion?—Yes.

42. Are you prepared to confirm that statement?—Yes.

43. Have you noticed any silt up the Waihou at all?—From the backwash of the Ohinemuri.

44. What distance up?—About a couple of miles up.

45. *The Chairman.*] You say "backwash," but do you mean backwash?—No: it is where the Ohinemuri water, the thick water, has run up the Waihou.

46. You have seen what you believe to be the grey dirty water of the Ohinemuri River running a couple of miles up the Waihou River?—Yes, I met it when coming down.

47. Was that at flood-time?—Yes.

48. It was not water which had come overland?—No, it was running up the river.

49. *Mr. Mitchelson.*] How long after the flood was that?—The flood was on.

50. Was the water overflowing either one or other of the Waihou banks?—Yes, next day.

51. In what part of the Waihou River?—Right up to about a couple of miles.

52. No further than that?—I did not notice any further than that. Of course, on the upper Waihou on the left side it had overflowed for nearly seven or eight miles, up to very near the high ridge of land there.

53. You have seen water running over there?—Yes.

54. Was it overflowing at that point in the flood of 1910?—Yes.

55. *Mr. Moresby.*] I think the willows on the Waihou have got worse?—Very much.

56. And are in rather a bad condition at the present time?—Yes, very bad.

57. You live in Paeroa?—Yes, in Corbett Street, at the back of the Domain.

58. Have you seen water in Paeroa at all?—Yes.

59. Anywhere near your house?—The water has been twice round my house to my knowledge in the last ten years. The last flood was the worst yet.

60. When was the water twice round your house?—In the last flood, in March, 1910, and again about three or four years before that. I think it would be in January, 1907.

61. In your opinion, are the floods getting any worse in Paeroa?—Yes. The water was between 14 in. and 18 in. high at my place.

62. What, in your opinion, is going to happen to Paeroa if this goes on?—We must get out of it.

63. *The Chairman.*] You told us that at the time of this big flood in 1910 the Ohinemuri waters backed up the Waihou waters: was the Waihou low then, or in its normal state, or in flood?—It was at its normal state.

64. Then you told us that the next day it was overflowing?—Yes.

65. Had the flood risen in the Waihou in the meantime?—Yes. For instance, if it is raining hard to-day the water is not down to the mouth of the river for a day and a half, but it is down at this end and showing at this end.

66. You say the Waihou was in flood then?—Yes, at this end, and it was overflowing at Kerepehi.

67. Have you ever seen the water overflowing from the upper Waihou where the banks are low, nine or ten miles up, when the Waihou alone was in flood, and not the Ohinemuri?—Yes, I have seen that too.

68. In fact, you constantly see it overflowing there?—Yes; the banks are very low. Again, when you get to the other side of the range of hills the banks are very low there, and the water overflows and goes towards Piako.

69. How many days in the year do you think it is likely to overflow there?—I should say it might do so five or six times in the year.

70. Then you said you thought the river was deeper because the willows have so constricted the sides?—Yes.

71. Therefore, the willows have done you good?—To a certain extent.

72. And you would be sorry to see them taken away?—Not at all.

73. If they were taken away the river might shoal again?—I would sooner put up with that, and see how it goes.

74. What would you do—merely take the branches off or cut them down?—I think I would take the branches off that are lying in the river. Those that are leaning in towards the land do no harm to us.

75. You would leave the roots and vertical growth, but would cut anything that fell into the river?—Yes. The barges go under the willows, which drag the cargo off.

76. You break many twigs off, and they float down and grow again?—They do. In the case of the weeping-willow, where it touches the water it turns round and comes back and roots there, and gets covered by the sediment, and by-and-by a great big limb will be growing from nothing.

Mr. Cotter: We had intended to call Mr. Penman, the agent for the Northern Steamship Company here: but to save time he has prepared a list of the tonnage of goods carried between here and Auckland for the six months ending the 31st May last, and I propose to put it in now. [Exhibit No. 68.]

SAMUEL DOUGLAS MCMIKEN examined. (No. 80.)

1. *Mr. Myers.*] You are manager of the Komata Reefs Gold-mining Company?—Yes.

2. And of the company's mine at Komata?—Yes, about three miles up the creek.

3. And your battery is there also?—Yes.

4. How long have you been engaged in mining pursuits?—Eighteen years.

5. And what portion of that period have you been employed at the Komata works?—Thirteen years.

6. I think you discharge tailings into the Komata Creek, which runs into the Waihou?—Yes.

7. To what degree of fineness do you crush your ore?—A proportion of 54 per cent. passes the 200-mesh. There is nothing left on a 60-mesh, and the greater part of the balance is between 90-mesh and 200-mesh—very fine. I have here a table showing the tons crushed and the grade. [Exhibit No. 69.]

8. Is there any level ground near your battery-site where you could stack tailings even if it were otherwise possible?—Very little indeed—practically none.

9. Do you know of any flat ground in the neighbourhood to which you could take your tailings in such a way as to be commercially possible?—No. There is no land near enough to make it commercially possible for us.

10. What grade of ore do you mill—high or low?—Very low grade.

11. Supposing 2s. a ton were added, without any corresponding benefit in consequence of any new process, to your working-cost, what do you think would happen?—It would have the result of closing down milling operations.

12. How many men are employed at the present time by your company?—About seventy.

13. At times I think you employ more?—Yes, it rises and falls.

14. Up to——?—We have had as many as 170, a little over two years ago.

15. How long has your company been operating in this district?—About fifteen years.

16. And do you know what amount of money has been expended?—A sum of £350,000, not including the amount paid for the purchase of the property. I do not know what that was.

17. How much has been returned to shareholders?—Thirty-three thousand pounds has been paid in dividends. That has been the only return.

18. *The Chairman.*] For how many years' working?—Thirteen years' milling.

19. Has that capital been in operation the whole period?—Yes, practically. The bullion that we have won from the mine has nearly all gone back into it.

20. Therefore, the cost of the property is not £350,000, but a very much larger sum?—That is so.

21. You have had to pay working and developing expenses out of what would otherwise be profits?—That is so.

22. You cannot tell us, I suppose, the amount of bullion that has gone into the works?—The amount we have won from the mine is £350,000-odd.

23. *Mr. Myers.*] I think the £350,000 you have spoken of as being expended includes the bullion that has gone back into the mine?—Yes.

24. *The Chairman.*] What is the present capital, or what was the original capital—because this £33,000 may represent a very large percentage on the original capital. What is the capital of your company?—It has been reconstructed twice. You can get that information in Auckland from Mr. Rhodes.

25. *Mr. Mueller.*] Mr. Myers has asked you a question as regards the extra cost of treatment, putting it at a suppositious 2s. per ton?—Yes.

26. What would be your answer if I put the same question to you, substituting a smaller sum instead of the 2s.—say, 6d. or 3d., or even 1d.?—I do not suppose 6d. would absolutely close the mill down, but it would make a big inroad in our small profit.

AUCKLAND, SATURDAY, 4TH JUNE, 1910.

Mr. Myers: I have here a general set of screens ranging from 10-mesh up to 200-mesh. Would the Commission like to have them?

The Chairman: I think so.

Mr. Myers: I may be permitted to put them in. They were handed to the Chairman by Mr. Grace, manager of the Waihi Junction Company. [Sample screens put in.] I have also here a set of samples taken by Mr. Grace in the test-tubes product of their batteries, showing the stuff that passes through the mesh.

The Chairman: The only point is this: Only certain samples are taken and tested through a test screen. There is a certain amount of doubt as to whether the bulk is equal to the sample. I realize that commercially it is no doubt to your advantage to work the bulk equal to the sample, but in practice there may be variations. I should like to know what system each mine adopts in order to make sure that the stuff is really fine.

Mr. Myers: Very well; I will call Mr. Grace first on that point.

WILLIAM FRANK GRACE further examined. (No. 81.)

1. *Mr. Myers.*] You heard the question asked me by the Chairman just now. Would you kindly state what the method of sampling is?—We, of course, discharge only fresh cakes off the vacuum filters—that is, the whole of our residue—and from such cakes a man goes along and takes a sample of each one of those leaves.

2. *The Chairman.*] There may be left, possibly, coarse stuff in the tanks?—Yes, a very small amount. The tanks are cleaned up periodically. The quantity left in them is so small—less than 1 per cent. of the total bulk, very much less. I do not know whether I have the sizing test of that.

3. *Mr. Myers.*] And what is the volume from which the samples are taken?—From the whole of the stuff. And it is taken for two purposes—not only for sizing, but also to get an assay value of the residue.

4. *Mr. Mitchelson.*] The bulk does not pass through the meshes?—No, it never has been done; it is too delicate a screen altogether.

5. *The Chairman.*] Exactly. It is like a cement-mill, in which the material is graded to a certain fineness, but only a small portion is tested. That applies to your mill: does it apply to all the others?—I may say that they have to take a sample very accurately, otherwise they would not get a fair proportion of the gold contents. In the case of our own process, we take duplicate samples in order to see that both agree—both in respect to the assay value, and as to the sizing test.

HARRY STANSFIELD examined. (No. 82.)

1. *Mr. Myers.*] You are a mining engineer, and you are engineer and manager of the Talisman Consolidated (Limited)?—I am.

2. How long have you held that position?—Six years and a half.

3. How many men are employed by your company?—At the present time, 380.

4. Have you employed that number of men for long, or has the number been gradually increasing until it has reached the present number?—I think there were employed 270 at the time I came here, and we have reached the present number gradually.

5. Do you know when your company commenced operations at Karangahake?—July, 1896.

6. Was that before or after the Proclamation that was issued proclaiming the Ohinemuri and the Waihou Rivers to be sludge-channels?—I could not say.

7. *The Chairman.*] Were those the first operations in that mine, or were there previous works?—There were previous workings to a small extent.

8. *Mr. Myers.*] And has the company worked continuously since 1896?—Yes, as far as I know.

9. What is the share capital of your company?—Three hundred thousand pounds.

10. All paid up?—No; 2s. liability. I may say it was reconstructed in 1904 with 3s. liability: 1s. of that has been called up.

11. You are now in the fortunate position of paying dividends?—Yes.

12. When did you commence paying dividends?—1905.

13. That was shortly after your management commenced?—Two years after.

14. Are you able to say what is the total amount expended by your company in connection with the development of the property?—I have a memorandum here.

15. First of all will you give me this information if you can: what amount was expended up to 1905, when the dividend-paying stage commenced?—Prior to 1905, £75,000 16s. 3d. was expended on machinery, plant, and buildings.

16. *The Chairman.*] Did that include the purchase of the original company's interests?—We know nothing about that. I think that is the actual amount expended according to our books.

17. And what was the amount expended on development-work up to that time—mining, treatment, and general work?—£348,607 15s. 7d.

18. What is the total amount expended in mining and treatment of ore up to the 1st May, 1910?—£747,382 19s. 11d.

19. That is since you commenced operations in 1895?—Yes.

20. In addition to that £747,000 there is the amount expended on machinery, plant, and buildings?—£147,507 2s. 11d. That is also up to the 1st May, 1910.

21. In addition to this amount that you have given us I think you are able to say the amount that has been actually paid out in wages up to the 1st May, 1910?—£447,445.

22. I presume you had up to 1905 been recovering gold?—Yes.

23. But that was going back into development-work?—Yes.

24. Can you give me the value of the bullion won up to the 1st May, 1910, by your company?—£1,277,530 14s. 5d.

25. What was the total number of tons crushed up to the same date?—383,582 long tons.

26. Up to the present time your dividends have amounted to what?—£401,250.

27. You are a long way short of having recovered the value put into the mine?—More money has been spent on the mine and plant than we have paid in dividends.

28. How much do you pay in wages alone at the present time per month?—£5,712 a calendar month.

29. What grade of ore, speaking generally, do you treat at your battery?—Judging from the evidence it is fairly high grade.

30. That is to say, it has been fairly high in that place?—Yes.

31. *Mr. Myers.*] I suppose it differs in grade?—Very much.

32. Have you much low-grade ore?—Yes, a great deal—hundreds of thousands of tons that are now blocked out because they are unpayable. They have been left in the mine.

33. In the event of the working-cost being increased by, say, a couple of shillings per ton, would that have any effect in increasing the quantity of ore which you would be unable to work?—Yes, it would increase the amount that would be unpayable.

34. To any substantial extent?—I think so.

35. It is impossible, I suppose, to answer a question of that kind in anything but a general way?—It is only an estimate.

36. Could you answer it in any other way by giving an estimate of the percentage?—No, it is only an estimate.

37. I want to know if you are able to give any indication as to the percentage of ore which you now work, and which you would be unable to work if the cost of working was increased by, say, 2s. per ton?—We do not know anything about the blocks that have not been developed, or are only in process of development. I may add that I could not give the proportion, but it is a considerable proportion. I cannot, however, even estimate it.

38. Supposing that in 1896, when your company started its work, and during the intervening years, you had not had the right to deposit your tailings in the river, would it have been possible to do anything like the work that has been done at your mine?—The same amount of ore would never have been extracted under the circumstances you have laid down.

39. *The Chairman.*] Could you say what would have been extracted?—No, I could not, but anything that would show a profit under the conditions under which we were working.

40. *Mr. Myers.*] Do you think you would have been able to mill it at all in that neighbourhood, or what would you have done with the whole of the payable ore?—It would have had to be transported to some other place where batteries could be erected, or other treatment plants—that is, if the ore would stand it.

41. And if not?—It would remain in the mine: we would not take it out.

42. *The Chairman.*] It is not essential that the place of treatment should be at the mine—it is merely a question of expense?—Yes.

43. *Mr. Myers.*] Could the ore be removed from the mine by railway-trucks?—No.

44. Why not?—I do not think the railway-line could be laid into the mine.

45. Or up the gorge in such a way as to be able to take away the ore?—It is a matter of cost.

46. Supposing, if you can suppose such a set of circumstances, that the mine were being opened without the knowledge you now possess of the value of the mine, and that it were impossible for you to deposit your tailings in the river, do you think that you, as a mining engineer of experience, would have advised the expending of all the great sums of money that were expended on the mine?—In opening up a mine it is really a process of evolution; you know very little about it.

47. At all events we may take it that the fact that you were able to deposit your tailings in the river was of the greatest possible advantage to the company?—A very important factor undoubtedly.

48. Up to the time when you took over the management, to what degree of fineness was the ore being crushed at your mill?—When I came there they were crushing through the 24-mesh screen. Since I came there we have crushed to the 30-mesh screen.

49. And I think you are still crushing to the 30-mesh?—Yes. I mean, they actually crushed through the 24-mesh and now we actually crush through the 30-mesh.

50. You have tube mills actually in position?—Yes, they will be landing within the next six weeks.

51. I think you have done that quite irrespective of any question of the setting-up of the Commission?—We have done it for commercial purposes.

52. And when you start with your tube mill to what degree of fineness will you be grinding?—Everything will pass through the 100-mesh.

53. That means, of course, that a certain percentage would pass through a very much smaller mesh?—Undoubtedly.

54. Up to 200—any portion of it?—Yes, a large part of it.

55. Are you able to give the Commission any particulars as to the percentages of different fineness at the present time?—Yes. Remaining on the 30-mesh, 0·08 per cent.; remaining on the 40-mesh, 3·24 per cent.; remaining on the 50-mesh, 12·374 per cent.; remaining on the 60-mesh, 6·63 per cent.; remaining on the 80-mesh, 14·76 per cent.; remaining on the 90-mesh, 9·68 per cent.; remaining on the 100-mesh, 0·672 per cent. Passing 100-mesh, 52·56 per cent. This is as far as we grade up to.

56. *The Chairman.*] Are those figures the results of samples taken over long periods?—We have made innumerable tests, but this was a test made some six weeks ago. Our general tests corroborate those figures very closely. This is an average test.

57. *Mr. Myers.*] You heard Mr. Grace tell the Commission how he took his samples: do you take yours in the same way?—No; we are not using the vacuum-filter process, but we are installing it now with the tube mills. We shall sample in the same way when we get into working-order.

58. May we take it that the crushing as you have done it through a 30-mesh—that a certain amount of stuff is going down the stream, and would be deposited, as a great deal has been deposited, on the banks of the river?—Yes, some of that sand will undoubtedly lodge when it gets into slow curves and eddies.

59. Do you think that the position will be different in that respect when you start crushing with your tube mills in such a way as that all your product will pass the 100-mesh?—I think it will.

60. In what way?—I think the stuff will be more easily transported in the river or sludge-channel.

61. Would you expect that any substantial deposits of this finer material would be left by the river upon the banks—I mean the material that would pass through 100-mesh screens?—Certainly nothing like the present condition of affairs.

62. I want you to assume, if you please, that the river will be cleared of willows and other obstructions?—I think if the river is cleared of willows and other obstructions, and the channel is confined, it will all go down the river.

63. *Mr. Mitchelson.*] We have been told that while the current is fairly strong the material will be held in suspension and will go right out to sea, but where the water is still a certain proportion will sink, and also that the inflowing tide will disturb the particles in suspension?—Yes; that will be so, I think, with regard to the slimes.

64. Only with regard to the slimes?—The slimes—only the fine sand.

65. *Mr. Myers.*] I want you, as a result of your long experience, to say whether or not you think that if the river is cleared of willows and other obstructions no appreciable damage will be caused by depositing in the river the material that will pass through, say, the 100-mesh?—I think that in this state of the banks a certain proportion of the residue being carried by the floods must necessarily lodge or be deposited in some places.

66. *Mr. Mitchelson.*] Including slimes?—Everything that is carried. Even when the tube mills are introduced there will still be a certain percentage of sand, but the amount of sand put out will be very small indeed.

67. *Mr. Myers.*] Assuming that stop-banks are erected where necessary, do you think then that any damage will arise?—If the stop-banks are maintained it would improve matters.

68. *Mr. Mitchelson.*] You must assume that if you get a local authority elected to deal with the river they would necessarily see to the sluice-gates on all the drains?—Yes.

69. *Mr. Myers.*] In referring to the erection of stop-banks where necessary, what do you mean by the term "when necessary"? Do you mean all along the river?—I should say, where required.

70. I suppose you do not pretend to be able to say to what extent they are required?—No.

71. Leaving slimes out of the question for a moment, and devoting your attention simply to the question of mining *débris* other than slimes, would the closing of the rivers as sludge-channels affect your work?—Very seriously.

72. In what way?—We are arranging to develop the mine in depth through the Woodstock shaft. A large part of the opening necessary in connection therewith will be either through country rock or unpayable ore, probably. There is no other place to deposit that material except in the river.

73. *The Chairman.*] In the main river or in the creek?—In the creek that runs into the Ohinemuri River.

74. *Mr. Myers.*] Could you not return that material to the mine for the purpose of stope-filling?—Not at present. We could do so when the connections are made with the other portions of the mine.

75. Do you think it would be possible to return the slimes to the mine?——

76. *The Chairman.*] I do not think you need go on with that. Without expressing any opinion I may say that I think we have had sufficient evidence on that point. (To the witness:) I understand you could not at present return the stope-fillings, but that as soon as you made certain underground arrangements you could return the stuff. You are going to tip it into the bed of the stream?—Yes.

77. You would wish to do so at once. The next fresh would probably take them away: it is fairly large stuff?—From 6 in. to 8 in. in diameter probably.

78. It really means that the stuff has to go down the stream?—It has to go down for some distance.

79. What bulk of stuff do you consider the present operations have in view—that is, of stuff that may be thrown into the stream?—The sinking or driving in connection with the working of the Talisman Mine would probably result in 7,000 or 8,000 tons being deposited in the river.

80. And after that is done, as far as you can foresee, is there any other development-work which would involve similar operations?—Not in my mine.

The Chairman: I would like evidence upon that point as regards the Crown Mine.

81. *Mr. Myers* (to witness).] You know the Crown Mine workings, do you not?—I know where their tunnel goes into the mountain.

82. Suppose they want to do any further driving from the hillside, do you think they can do so without tipping a certain amount of stuff into the stream?—They would have to adopt the same process we are adopting.

83. *The Chairman.*] You cannot say whether they have any scheme in view of development-work?—No, I cannot say.

84. *Mr. Myers.*] You were in the Court-room at Paeroa, and you have heard the evidence given with regard to the other suggestions that have been made of removing the tailings by pipe or flume?—Yes.

85. Have you personally made any estimate of the cost of the adoption of such a scheme?—No.

86. Why not?—Because I understood that the witnesses on behalf of the Waihi Company were going into that question, and would cover the ground.

87. Can you say anything with regard to the proposed schemes?—I think that tailings or slimes wherever they may be deposited will be very difficult to hold there. I think it will entail very great expense to retain the tailings on any of the sites that have been mentioned, even if it were possible to dump them, or flume them, or get them there in any way.

88. *The Chairman.*] The present suggestion, I take it, is that this stuff could be ground so fine that 95 per cent. would flow out into the Hauraki Gulf: have you considered any other means of taking this stuff away except that of it going into the Ohinemuri and Waihou Rivers, and thence to the Hauraki Gulf?—I have not.

89. I understand your evidence to be that you do not consider that scheme to be possible practically or commercially, or without causing a nuisance by retaining the tailings until they are dry?—It would be very difficult.

90. *Mr. Cotter.*] Mr. Myers said supposing an additional cost of 2s. per ton was put on to the expense of the treatment of your ore, it would mean the retention in the mine of a large body of ore which you at present treat?—Yes.

91. Supposing that the amount were reduced to, say, 2d. or 3d., would that make any material difference in the treatment of the ore in either your mine or any other mine, to your knowledge?—It would make 2d. or 3d. difference.

92. But would it mean the retention of any appreciable body of ore in the mine that is now treated?—It is just like this: If we had a block of ore worth, say, £1 10s., and you tack 3d. on to it, that block will stay in.

93. With a difference of 3d., can you give us any percentage at all as to what effect that would have on the retention of ore in the mine, or can you give us any idea at all on that point?—No.

94. Would it mean the retention in your mine of 1 per cent. of the output?—I could not say.

95. In your opinion, would not the companies be very willing to contribute an amount, say, not exceeding 3d. per ton, the present condition of matters to continue, so as to put the tailings into the river, and allow somebody to take all proper measures to prevent the tailings doing further damage?—I could not express an opinion on that; that would rest entirely with the directors.

96. In your opinion as mining engineer can you not say?—No; that would be a business proposition, and rests purely with the directors, and not with me.

97. Supposing you were advising the directors, what would you say as their engineer?—I would consider the local circumstances, and advise them accordingly.

98. You know all the circumstances?—I would wait until the condition arises.

99. The condition has arisen?—I would advise the directors if they asked me.

Mr. Cotter: Mr. Myers has kept the price at 2s.; I am going down to 3d., and I am coming down even lower than that. If the witness refuses to give any answer, even after I put it at ½d., there is no use my wasting time.

The Chairman: The impression in my mind is that he could not publicly state what his advice to his directors would be.

100. *Mr. Mueller* (to witness).] When was the Talisman Company last reconstructed?—1904.

101. What had the previous company paid out in the way of dividends?—I could not say. The Talisman and the Talisman Consolidated were amalgamated, and I think the previous company had some assets to distribute. I have no means of knowing what they paid.

102. I notice that your dividends paid amounted to £401,250 since the reconstruction?—Yes.

103. What were the dividends prior to reconstruction?—The company paid no dividends prior to reconstruction.

104. We are taking the whole expenditure since 1896, and you gave us the dividends at £401,000?—Yes.

105. Those dividends have only been paid since the reconstruction?—Yes. There was a New Zealand company operating this mine prior to the London company, and what their shareholders may have received in dividends I do not know.

106. Does your company not at the present time send ore over to Australia or elsewhere for treatment?—It sends concentrates away for treatment.

107. Has that practice been in vogue for some years?—Yes.

108. What number of stampers are running at the present time?—Fifty.

109. Do you intend to increase the number when your reduction plant is completed?—It is not the present intention to increase the number.

110. You intend to erect tube mills?—Yes.

111. How many?—Three.

112. *The Chairman.*] Does that mean an increased output?—Not necessarily.

Samuel Edger Fraser examined. (No. 83.)

1. *Mr. Myers.*] You are a member of the Institute of Mechanical Engineers, London?—Yes.

2. And you are the superintending engineer and manager of the Waihi Company's works at Waikino?—Yes.

3. Before I go any further I want you to tell us what, if anything, happened to the Waihi Company's dam through the flood in March last?—The flood tore away the soil on the right side of the wing wall.

4. *The Chairman.*] Have you made any calculation as to the volume of water which passes over that dam at time of flood? Had you any means of ascertaining the antecedent velocity?—I could not say really what did pass over it as a matter of fact. I could only give it as Mr. Adams took it in the gorge on the day of the flood.

5. *Mr. Myers.*] You have had some twenty-four years' practical engineering experience?—Yes.

6. How long have you been employed by the Waihi Company?—Fourteen years and a half. I came here in 1896.

7. You designed their mill at Waikino?—Yes.

8. Did you have to advise upon or determine the location of that mill?—No, I had nothing to do with settling the site of the mill. That was done by the superintendent.

9. After discussion with you?—Yes.

10. Then you will probably be able to tell the Commission what the factors were which determined the company to erect the mill there?—One was the available water, and the other was the disposal of the residues into the river. I understand that at that time the river was gazetted a sludge-channel.

11. How long is it since the mill was erected?—We started to crush in March, 1898.

12. Has that mill been extended from time to time?—Yes, practically the whole time. In designing the mill we took into consideration the partial extension, but we started with dry crushings. We designed the mill with outfalls 2 ft. above the bottom of the river, with 1 in 30 gradient.

13. That gradient would be flooded on some occasions?—Yes.

14. That does not worry you?—No; we have water coming in that accelerates the flow.

15. Have large extensions from time to time been erected in view of any other possible scheme in regard to the deposit of tailings other than in the river?—No, I do not think it entered into consideration at all.

16. Do you happen to be able to say what amount of money has been expended on the mill at Waikino?—Up to December of last year it was something like £353,000—that is, the capital expenditure—that is, the expenditure in plant proper for running conditions.

17. The whole capital expenditure on experiments is included?—Yes; there was a large amount of experimental work.

18. If you were to start work again at the present moment they would not cost the same amount?—We have had to pay for our experience.

19. What would it cost you to erect a plant at Waikino?—Very much the same.

20. *The Chairman.*] With the experience you have got it might be possible to erect more suitable works at less cost?—That is so.

21. The amount mentioned includes a railway, and everything?—Yes.

22. *Mr. Myers.*] You have not really considered that?—Yes. The whole system has changed; we have gone in for tube mills.

23. *The Chairman.*] Some things may have developed so as to put a completely different aspect on the matter?—Yes.

24. *Mr. Myers.*] Have you considered any alternative scheme to that of depositing tailings in the river?—When the matter first came under my notice I was asked to draw out a scheme with the possibility of the stuff not going into the river.

25. I think you based that scheme on the transmission of slimes from Waikino?—Yes.

26. And the scheme you considered, I think, first of all was that of transferring the tailings direct from Waihi to Paeroa by means of elevators, wheels, and launders—somewhere in the neighbourhood of Paeroa?—At that time I did not really know the locality of the Rotokohu Swamp.

27. You assumed for the purposes of your calculation that that area could be obtained?—Yes.

28. You also considered the possibility of removing the material by means of railway-trucks?—Yes.

29. And also the possibility of removing it by means of a pipe?—By fluming.

30. And your various estimates have already, I think, been put in by Mr. Grace when giving his evidence?—Yes.

31. Are these figures the result of careful calculation?—Yes.

32. Are there in connection with any of those schemes what you might call unknown factors which you have been unable to take into consideration?—Yes, in the third scheme—the pumping scheme.

33. What are those unknown factors?—What we considered the most serious was the effect of the slimes on the pumps themselves and on the pipes in transmission.

34. These slimes, I understand, have a cutting-action?—Yes, we have had experience of that.

35. And I think before the members of the Commission left Paeroa you showed them a number of tubes bearing the effects of that cutting-action?—Yes.

36. *The Chairman.*] Those were iron or steel pipes: have you not considered wooden flumes?—Yes, our experiments with slimes included the cutting effect on wood. Our experience in the case of wooden launders has not been favourable.

37. You have not had experience of pumping sludge through wooden pipes?—We are returning the slimes through wooden pipes now, but it is not going through with any degree of velocity.

38. *Mr. Myers.*] Are there any unknown factors in connection with that pipe scheme?—There is the question of the settlement of the sand at the bends; there may be a certain amount of settlement going on there.

39. Would that same difficulty not arise, or arise to the same extent, if the scheme were adopted of forcing these slimes through pipes?—The third scheme—the pumping scheme—was really more suggested with the idea of reducing the height and the liability to break down. There is a liability to break down.

40. Do you think you would like to undertake either scheme?—No, I should not if there was to be continuous running; I would not recommend it.

41. You have heard reference made to the possibility of taking the material by rail to the beach, or to some point overlooking the beach?—Yes.

42. You have not given that matter serious consideration, have you?—No. It certainly entered my mind when considering the transporting scheme; but as far as I could see it meant a tremendous expenditure on the railway. As far as the company is concerned, its railway-line could not be utilized.

43. Have you any idea what the distance would be from Waikino?—I think, about twelve miles. The distance from Waihi to the sea would be about nine miles in one way, and about seven if you go straight out towards the beach.

44. Would such a scheme cost more or less than a railway discharging at, say, Rotokohu?—Yes, I think it would cost more, because the haulage would be on the up grade.

45. *The Chairman.*] Yes, from Waikino, but from your mine it would not be so?—It would be practically level, I think.

46. What is the lowest estimate for the carriage of quartz and tailings?—I think 1s. 9d. per ton, and that is limited to twelve miles; that is for transport only.

47. There is no traffic now?—No, we fixed this calculation at the lowest possible rate.

48. *Mr. Myers.*] I suppose we may assume that a great deal of the expenditure of your company during the last fifteen years has been with a view to reduce the cost of working, so as to enable the working of ore which otherwise could not be worked?—Yes.

49. So that, if you put up the cost of working, a very large amount of the value of your expenditure will be lost or neutralized?—Yes; our object is to get the working-cost down to the lowest possible rate.

50. Apart from the question of expense—I am referring now only to the question of the removal of the slimes by pumping or by flume—would you personally consider either scheme a practicable one?—There is always a liability of breakdowns interrupting the continuous working.

51. I suppose you do not know anything as to the capacity of water to take away slimes?—No, I have never given very serious thought to that, except in the way of the experiments we have made from time to time.

52. You have made experiments in connection with pumping?—One of the factors in connection with pumping is the extra amount of resistance there would be in the pipes, especially in the case of thick slimes. As a result of experiments made, the deduction is that it takes additional power to pump slimes through a pipe.

53. You heard the evidence given by Mr. Grace?—Yes.

54. Do you agree generally with what he has said?—Yes, in the main.

55. Is there anything you can add which you think may assist the Commission in any way?—In reference to the question of impounding the slimes at Rotokohu Swamp, I think that to retain

them there would be a most difficult problem. They would also take an enormously long time to dry; there are certain absorbing qualities in them.

56. Have you given any serious consideration to the question of effecting improvements in the river, and as to whether that would meet the difficulty?—I suppose it is the same old story. It is the willow business and probably shortening the course of the river at Pereniki's Bend; that is about the only thing that can be done.

57. You think that if river-improvements were made, that would overcome the difficulty?—I have no doubt in my own mind that the sectional area of the river is being decreased by the willows, and as an engineer I am of opinion that it is not sufficient only to remove the willows, but also that the present accumulations must be removed—that is, the tailings.

58. You think that suitable cuts should be made, that the tailings and willows should be removed—that is, the present tailings?—Yes, and I think it is essential that some dredging should be done.

59. *The Chairman.*] Do you think it is essential that some remedy should be found which will prevent the slimes getting on the land in time of floods?—Certainly.

60. What remedy can you suggest?—I can only take it from a lay point of view, but I think the course of the river might require altering in certain places. If the alterations I have indicated are made, even when a flood comes down you will only have to deal, in the way of tailings, with the product of a few hours. In regard to stop-banks, that would be all a question of cost.

61. Do you recommend stop-banks as one of your expedients?—Yes; it is a question of expenditure.

62. *Mr. Cotter.*] You have told us that you are practically in charge of the crushing at Waikino battery, and that you have nothing to do with the production of the ore at the mine?—That is so.

63. Do you in any way classify the ore, or do you crush everything that is sent down?—Everything that comes down.

64. You have told us that you have had some consultation with Mr. Barry as to where the battery was to be placed?—Mr. Barry settled that point himself; I came in after.

65. You do not know the reasons which actuated him in putting it where it is?—Yes, I am satisfied it was the question of the cheapness of treatment of the ore, and the water-power.

66. *The Chairman.*] Possibly if he were redesigning that work he might have selected another place?—Yes.

67. *Mr. Mueller.*] You say that the figures which Mr. Grace gave us the other day as regards stacking the quartz were practically your figures?—Yes.

68. There is one item of £12,000 put down as the cost of a square mile of country at £20 an acre?—Yes.

69. Do you know that there is some land in the neighbourhood of Paeroa that has been advertised at £6 an acre, not far from the place we have been referring to?—I assume £20 an acre, and I think the estimate is a fair one.

AUCKLAND, MONDAY, 6TH JUNE, 1910.

ERNEST OSWALD CLAYTON examined. (No. 84.)

1. *Mr. Moresby.*] I think at the present time you are Engineer to the Devonport Borough Council?—That is so.

2. You lived in Paeroa from the year 1896 to the end of September, 1902?—That is so.

3. And you were Foreman for the Ohinemuri County Council from the 6th November, 1897, to the 30th September, 1902?—Yes.

4. And during that time Mr. Armstrong was County Engineer and afterwards Mr. McArthur for a second time?—Yes.

5. You are thoroughly acquainted with both rivers?—Yes.

6. I think you had a small steam-launch of your own which you used on the rivers?—Yes, I was always going up and down.

7. Taking the Ohinemuri River, how far could you go up in your boat in 1896?—Up to Mr. Cock's place.

8. What was the nature of the river: was it a clear river?—Yes, you could see the bottom of the river at the Paeroa Traffic Bridge.

9. Was it a deep river or a shallow river?—It was very deep there, especially just below the bridge.

10. What would you say the river averaged in depth at that time up to Cock's place at low water?—At Mr. Cock's there was 4 ft. or 5 ft. at low water.

11. I think there were several large pools in the river?—Yes, very big pools, from 20 ft. to 25 ft. deep.

12. Do you know whether there was a very large hole near the site of the present butter-factory?—Yes, a deep hole where we used to swim.

13. What was the state of the willows at that time?—They were pretty bad, but much the same as they are now.

14. *The Chairman.*] How long is it since you have been in the district?—I was there last Easter. I left Paeroa the day before the last big flood.

15. *Mr. Moresby.*] When you came to Paeroa in 1896, to what wharf did you come?—The Town Wharf at the end of Wharf Street, in the s.s. "Paeroa."

16. The steamers came to that wharf then?—Yes.

17. Subsequently a wharf was built at the Junction, lower down, and the traffic went down there?—Yes.

18. When did you first notice mining-silt make its appearance in the river?—About 1898.

19. In what portion of the river did you first notice it?—The first place where we noticed it was on the bank near the butter-factory. It began to bank up there first. These aggregations of silt on the banks increased rapidly.

20. Did they have any effect on the river traffic to Paeroa?—Yes, it began to be difficult to get past the Town Wharf with a launch. A large bank began between the traffic-bridge and the Railway Wharf next.

21. And the steamers gradually got down the river?—Yes, they ceased to come to Paeroa, and did not come above the Junction.

22. That is on account of the increase in the mining-silt?—Yes, I presume that would be the reason.

23. I think you know the Waihou down for some distance?—Yes, I am well acquainted with the river right from the mouth to Te Aroha.

24. How far up the Waihou have you been in your boat?—To the Gordon Settlement.

25. What was the condition of that river?—Very much overgrown with willows—nearly closed up in places.

26. So you know the Waihou from the Gordon Settlement to the county-boundary?—Yes.

27. What was the condition of the junction of the two rivers when you first knew it?—There was never any signs of tailings or slimes of any kind.

28. Just up the Waihou, I think, there is an island?—Yes, I remember it.

29. What was the condition of the river at that place when you first knew it?—There was a deep channel on one side, and a groin across on the other side to divert the current to the one side.

30. What was the length of that groin at that time?—It would not be a chain long.

31. Captain Sullivan told us he put in that groin?—I did not know that.

32. Was the island there then further down opposite the Hape Creek?—No.

33. There were no accumulations of mining or other silt there?—Nothing at all at that time.

34. When the steamers left the Junction Wharf to go to Auckland, where was the channel in the river?—On the same side as Kenny's—the eastern side.

35. Close in?—Yes.

36. Have you been to the Junction lately?—Yes.

37. Have you seen the bank that has formed there off the Hape Creek?—Yes.

38. Is that bank in what was the old channel?—Yes, I should say so.

39. Can you remember the first time the water came over the banks into Paeroa near the traffic-bridge?—Yes, I was there. I think that would be in 1898. A very big flood occurred in that year.

40. *The Chairman.*] Can you tell us whether that was an Ohinemuri flood or a Waihou flood?—I do not think there was any flood in the Waihou that day.

41. *Mr. Moresby.*] Where did the water come over?—Between the traffic-bridge and the present butter-factory.

42. Did that flood do any damage to the township?—Yes, a great deal.

43. Did you have any more floods during the period you were there?—Yes, two or three more, but not as big as that. They did not come over there.

44. When was the first time you visited the Ohinemuri after you left the district for good?—In May, 1908. I was away over six years.

45. Did you notice any difference in the Ohinemuri River?—I was scarcely able to recognize it.

46. *The Chairman.*] Were you all the way along the Ohinemuri then?—I had a good look at it from Thorp's Bend to the butter-factory, and then I went along in the train.

47. *Mr. Moresby.*] Had the banks altered at all?—Yes, the old banks were quite obliterated in many places.

48. Did you visit it again just before the last flood?—Yes.

49. Had it got any worse?—Yes; I could even notice a considerable difference in the two years.

50. Did you inspect the river at all on that occasion?—Yes, I went more for that purpose—to have a look at it. I went along it right to Owharoa.

51. All the way along the river, say, from Thorp's?—Not round all the different bends. I generally followed it between these two points.

52. What did you find as the result of your inspection?—I saw that the river had contracted very much in width, and the original banks as I first knew the river were hardly to be seen anywhere. Then I found between Mackaytown and Owharoa that a great deal of damage had been done to the river-banks, especially about Karangahake. The banks had been washed away.

53. *The Chairman.*] Were there deposits in one place and wash-outs at another closely adjacent?—I could see that the damage done at Karangahake and the place above Mackaytown was not caused by tailings.

54. That is, not directly by tailings, but it may have been indirectly caused by tailings owing to the river-level having been raised below?—No. I attribute the damage up there to the heavy material—mullock and rock—put into the river from the mines and railway.

55. *Mr. Moresby.*] I think the whole of the Talisman cutting went in there—a huge excavation?—Yes, and the stuff from the railway tunnel, and a lot of stuff from the county roads.

56. Is there anything further you wish to tell us about the river at that time?—No, nothing of importance.

57. *The Chairman.*] I should like to ask whether you know in the Ohinemuri any sandbeds which might be washed out by scour and resemble tailings. A statement was made by one witness or counsel that there was a place on the banks of the Ohinemuri where there was a large deposit of fine sand: have you any knowledge of such a place?—No.

58. *Mr. Moresby.*] The present County Engineer has referred to a certain cross-section put in in 1901: you might know something about it?—I put in the posts with a man under the supervision of the County Engineer, Mr. Armstrong. They were to be used as bench-marks. They were put in from three-quarters of a mile to a mile apart between Paeroa and the Junction.

59. How many cross-sections were put in?—I think, ten, speaking from memory.

60. There has been a big hunt to find these old marks, and in many instances they have not been able to find them: what sort of posts did you put in?—Split totara posts about 7 ft. long—ordinary fencing-posts, ranging from 6 in. by 6 in. at one end to 5 in. by 5 in. at the small end.

61. And standing how much above ground?—3 ft. 6 in. to 4 ft.

62. They cannot find any sign of several of them at the present time: are you surprised at that?—Not at all.

63. Did you take any observations?—Yes; these bench-marks were put in at each side of the river opposite each other, and a cable was stretched across, with tags every 10 ft. apart, to get the true cross-section of the floor of the river. It was to act as a record, so that we could tell if the floor of the river was rising.

64. What did you find from these observations? Was the bed rising?—The first time we took these observations we found in the upper part of the river that the bed of the river was hard and level, and the depths every 10 ft. across were carefully noted and recorded.

65. How often were these cross-sections taken?—I believe the next one was taken twelve months afterwards.

66. *The Chairman.*] Is that only a question of belief: you have no personal knowledge?—Yes, I was there.

67. *Mr. Moresby.*] What difference was noted?—We found the river had shoaled at these places 12 in. or 18 in.

68. Do you mean the floor of the river had risen?—Yes.

69. Would you recognize the plans of these cross-sections?—Yes, these are the plans. [Exhibit No. 63 produced, and inspected by witness.]

70. These plans would show the results?—Yes.

71. There is nothing further you can tell us about the Ohinemuri or Waihou Rivers?—No, excepting that I believe this mining-stuff travels along the bed of the river as it goes down. I do not think the sand is held in suspension.

72. I suppose you have heard that the treatment of recent years has been towards very fine grinding?—Yes.

73. Do you know what mining-slimes are?—Yes, I have read of it, and I saw it when I was last down there; but in my time it was rather coarse—it was sand that came into the river.

74. Are you speaking of the time you were there—that stuff was not held in suspension?—I do not think so. If the battery stopped crushing for a day or two the river was quite clear again.

75. *The Chairman.*] But if the sand travelled along the bottom and was not held in suspension, would not the water have been clear at the top?—The water was quite different when I was there from what it is now.

76. *Mr. Moresby.*] You are speaking as you saw it the other month?—Yes.

77. What does that difference consist of?—It had not that thick slimy look which it has now.

78. I believe you went to the Hutt after leaving the Ohinemuri district?—Yes, I was at the Hutt for close on five years.

79. I think you were in charge of the Hutt River works from the 12th September, 1905, to the 1st May, 1908?—That is so.

80. And for two years before that you were Foreman to the Hutt Borough Council?—Yes.

81. Will you kindly tell us the conditions of the Hutt Township and Valley in respect to the river?—The Hutt in many ways is situated very like Paeroa. It has a river running right through it, and it has a range of hills very close to it—just like Paeroa.

82. Is the Hutt a fast-flowing river?—Yes, very fast in flood-time.

83. What would you say is the fall in the river?—The fall from the mouth of the river to the Upper Hutt would be over 12 ft. to the mile; but it is made up with rapids at intervals—it is not a continuous fall.

84. Is there a valley there at all?—Yes, and the river runs through it on one side, like the Ohinemuri, close to the range of hills on the western side.

85. I suppose there are no mining tailings in that river?—No, but the silt, and *débris*, and sand are much the same.

86. *Mr. Mitchelson.*] You have shingle, which you have not in the Ohinemuri?—Yes, shingle and sand and alluvial deposit.

87. Is it a tortuous river?—Nothing like the Ohinemuri. The reaches are longer.

88. *Mr. Moresby.*] In a time of extreme rainfall was the river subject to flooding?—Yes; I have a note here that the river is subject to sudden and violent floods.

89. *Mr. Vickerman.*] It is these floods, with the very strong fast-running water, that straightened the river?—Yes.

90. *Mr. Moresby.*] I believe stop-banks have been erected along that river?—Yes. Before anything was done the bed of the Hutt River was as high in most places as the surrounding country—I refer to the shingle-banks—and the whole valley has been under water on many occasions.

91. What about the Hutt Township?—It is right on the banks of the river, and has been under water several times.

92. Since these protective works have been there have the valley and township been flooded?—No. They have never had a flood which has topped the banks in the Hutt Valley since the stop-banks have been erected

93. You have a plan of the Hutt River showing the protective works, and the stop-banks, and the cross-sections?—Yes.

94. *The Chairman.*] Can you give us this information: Taking the maximum flood section—that is to say, when the flood-waters are flowing level with the top of the banks—what is the ratio then to the ordinary cross-section of the river?—At the Hutt Bridge, right in the centre of the town, the Hutt River is contracted in width between the stop-banks and walls to a width of 366 ft., and I have seen the river rise there, in the highest flood I have seen there, 8 ft. 6 in. above summer level. It was running at the rate of twelve miles an hour.

95. How did you arrive at the twelve miles an hour?—We tried it with a log.

96. That is, the surface, mid-channel velocity?—Yes.

97. *Mr. Moresby.*] What length of stop-banks have been erected?—Taking both sides of the river I should say between eight and nine miles. This plan I have referred to shows the nature of the stop-banks and how constructed.

98. How far back from the river were they put?—We used to try and keep them as far back as we could, but sometimes on account of buildings we had to come closer, but generally we put them 5 to 6 chains back. These were put in by the River Board.

99. *The Chairman.*] Can you give us the highest flood-level you have known, say, above summer level?—Eight feet six inches was the highest fresh I have seen at the Hutt Bridge.

100. That was since the execution of the work: what I want to know is, at what level the engineers determined to put in these stop-banks above the previously highest-known flood?—Four feet.

101. What was the highest-known flood above summer level prior to the stop-banks being erected?—I do not think you could ever find that out properly, because the river used to spread all over the country.

102. If the engineer put in the stop-banks 4 ft. above the highest-known previous flood, he must have known what the highest-known flood-level was, and I want to know its relation to the summer level?—I think it would be about the same.

103. So the effect of putting in the stop-banks has not increased the flood-level?—Very little, if any. It has increased the velocity of the stream.

104. *Mr. Moresby.*] What were these banks constructed of?—Absolutely of shingle and sand out of the river.

105. Were they covered at all on the side facing the river?—They were fascined up to about a foot above flood-level with tea-tree, and that facing was covered with very stout wire netting the whole distance of the stop-banking. The wire-netting was tagged down with iron pegs into the bank, and there was a fence on the river side of the stop-bank about 15 ft. off the toe of the bank, wire-netted, and the space between the toe of the bank and the fence was planted with poplar and willow stakes. They were never allowed to grow more than a few feet in height.

106. How were the willows and poplars secured?—The stakes were driven in with a maul. The object was to protect the bank against any scour, and to form a maze of vegetable matter to collect silt and so on.

107. After the floods would this place be cleaned out?—No; it was never injured in any shape or form. The fine silt used to be deposited, but the willows grew into a regular maxe and effectually prevented any scouring.

108. *The Chairman.*] How many feet back from the edge of the stream were these stop-banks put?—Varying distances from a chain to 4 to 5 chains.

109. Do I understand they absolutely followed the banks of the river?—No, we took short cuts.

110. Where is the smallest cross-section at the most restricted part?—At the Hutt Bridge. I have not the cross-sections of that part.

111. *Mr. Moresby.*] I suppose these banks were fenced to keep the cattle off?—Yes, on both sides.

112. How did you manage with regard to drains?—Every drain or creek was provided with a culvert of the size necessary, and on the river side the culvert was provided with a flood-gate which worked automatically.

113. Were these drains put in at any angle, or at a particular angle?—If a drain or creek came in close to the river we used to give it an angle, but if the stop-bank was a good way from the river we used to put it square across at right angles.

114. Could you give us some idea of the cost of these works per mile, say?—The material in one stop-back alone cost £1,056 per mile; the fencing would cost about £50; the wire netting would cost £61 15s.; and the iron pegs cost about £20. Fencing both sides of the stop-banks with totara posts and barbed wire cost £100 per mile on both sides.

115. I suppose it is of the utmost importance that cattle should be kept off these banks?—Yes; that is the most important thing. They must be securely fenced. That gives a total cost of £1,287 15s. per mile.

116. *The Chairman.*] You have not included the cost of putting in the poplars and willows?—No; but that was a very small item. Two or three men would plant some thousands every day. That does not include culverts in the stop-banks, because they would be put in as they were required. That would be extra. It does not include the value of the land taken to build the stop-bank on. That all had to be taken under the Public Works Act for nearly the whole length, excepting where the river ran along the borough road.

117. *Mr. Moresby.*] You say this was done by the River Board?—Yes.

118. Can you tell us the area of the river district?—I could not give the exact acreage. It includes part of the Borough of Petone, the whole of the Hutt Borough, and a portion of the Hutt County. It was a special-rating district.

119. What was the amount of the rate?—In this new river district the rate is divided into three classes—first, second, and third.

120. How would the lands on the banks of the river and directly affected be rated?—They would come in the first class. I cannot remember what the rate is. The lands in the second class, which were not so much affected by floods, pay a smaller rate, and those in the third class pay just a nominal rate.

121. And they made a mistake in not going high enough up-stream with their drainage area?—Yes; they are agitating now, and I believe a special Act is to be put through to give the Board control higher up the river. It is very necessary they should have the whole of the river under their control. The majority of the people out of the river district are anxious to come in.

122. *Mr. Flatman.*] Has any part of the work been washed away since its erection?—Not the slightest damage has been done to the stop-banks since they were built.

123. *Mr. Vickerman.*] What is the average size of the gravel in the stop-banks?—It is just as it comes out of the river, from the very finest sand to gravel the size of your fist. It is ordinary concrete gravel, the same as is used in Wellington for concrete-work.

124. *The Chairman.*] Have you any data as to the ordinary cross-section of the river and the velocity under ordinary summer flow?—I have not got that, but it can be got in Wellington from Mr. Meason. It is very important in building these banks to use tip-drays, because the drays in travelling over the banks during erection help to consolidate them.

125. *Mr. Moresby.*] You say the effect of these stop-banks has been beneficial in that district?—Very. The value of property has quadrupled itself in a couple of years, and the population has increased fourfold. Previously, the most of this land was of no use for agriculture, and was very dangerous for grazing.

126. You do not anticipate that if a similar work were done at Paeroa the population there would increase in four years?—I have often wondered why they have allowed the trouble to go on as they have when they could so easily stop it—it is so very disastrous to the district. I could show you silt in the Hutt River that used to destroy pastures in the Hutt Valley until the flooding was prevented. The cattle were drowned in the floods, and for three months afterwards the pastures were useless for grazing.

127. *Mr. Flatman.*] Were there many cases of land being swept away?—I know one man who lost 70 acres out of 77 in a very short time.

128. *Mr. Vickerman.*] Are you sure that the velocity is twelve miles per hour?—I am certain of it. I have seen it run in other parts of the river as fast as a horse could trot. I judge that by the logs going down the river. I think that at the Hutt Bridge is the swiftest part, because the river is confined to a very narrow stretch.

129. *The Chairman.*] Were you there when the new bridge was being built?—Yes.

130. They had a difficulty in driving the piles?—Yes.

131. What was that due to?—The floods, principally.

132. Was it not due to the size of the boulders at the bridge? What was the size of the boulders at the bottom of the river at that spot?—About the size of a man's head.

133. You think all the boulders at the site of the new bridge are the size of a man's head, and not smaller?—Not many smaller. I have seen any amount of boulders the size of a man's head brought down by the floods.

134. *Mr. Moresby.*] You know the Ohinemuri district, and the circumstances in that district: do you think these stop-banks would be beneficial if erected along the Ohinemuri River?—I think it is the only thing that can be done to make that land suitable for grazing and agriculture.

135. *The Chairman.*] Do you include the Waihou in that?—Yes, both rivers, including the upper and lower Waihou.

136. *Mr. Moresby.*] Where do you consider the stop-banks should commence on the Ohinemuri River?—I think the stop-bank on the western side of the Ohinemuri River should commence at Moananui's Hill, just opposite Mackaytown.

137. How far down would you carry these stop-banks on that side of the Ohinemuri?—Right down to the junction with the Waihou.

138. What distance would that be?—I should say between five and six miles, following generally the course of the river.

139. Would you generally follow the course of the river where there is a meander of three miles or so?—If the land was worth protecting.

140. *Mr. Flatman.*] Could the protection-work in the Waihou and Ohinemuri be done at a cheaper rate than at the Hutt?—I do not think it could be done cheaper—about the same.

141. *Mr. Moresby.*] Now, taking the other bank of the river, where would you propose to start the stop-banks?—If the land is considered worth protecting, I should protect it between Turner's Hill and Tarariki Creek.

142. But there is very little land on that side between the river and the road?—Very little, and I do not think it would be worth protecting. The same applies between Paeroa and Doherty's Creek—if that flat land is worth protecting it should be protected. I refer to the Chinamen's gardens and Bertelsen's land.

143. We may say that the stop-banks all the way along would depend on whether the land was worth protecting?—Yes.

144. Then, coming to the Township of Paeroa, at Mr. Coutts's house there is a high bank?—Yes.

145. Where would you start your stop-bank there?—Where that high land ends, at the butter-factory.

146. But if you put in your bank 4 or 5 chains back from the bank you would take in the whole of the Township of Paeroa there?—I would run a concrete wall 50 ft. or 60 ft. above the top of the bank, and continue it to below the Railway Wharf. Of course, if it was necessary to put it near the bank it would have to go, but it is always advisable to get it as far back as you can. I think it would go along the road that runs there.

147. That would be about a mile?—I do not think so.

148. What do you propose to do from the railway-bridge down?—After it gets past the Railway Wharf I should put the ordinary stop-bank again.

149. *Mr. Vickerman.*] What are you going to do where it crosses the railway? Do you know whether the river has come over at that particular part?—I have seen it come over. The railway-bridge would have to be raised, and you would have to carry the stop-bank under. The only other way would be to have gates to be shut at very high floods.

150. *The Chairman.*] Then the result of your operations would be to restrict the water, which, if stopped at that point, would then go over the town on one side and over the country on the other?—It would not do to have an opening there on any account. It would be worse to have an opening there than to have no stop-bank. The bridge would have to be raised.

151. *Mr. Moresby.*] That presents a difficulty to you?—I think it could be got over. I think the stop-bank from Moananui's Hill to the railway could have been built with the money lost by the Government in the lines washed away. I think the cost of damage and loss of time and repairs would have been sufficient to build that stop-bank.

152. Would you carry your stop-banks down the Waihou?—Yes, right down.

153. How far down?—I would carry the stop-banks right down to the Hikutaia River.

154. Where necessary?—No, it would have to be continuous. There must be a maximum height maintained above flood-level.

155. *Mr. Mitchelson.*] The settlers are complaining at Matatoki, which is a long way below Hikutaia?—It is only a question of extending it.

156. *The Chairman.*] Therefore, in your opinion, the banks could be extended pretty well the whole length of the rivers, and the Drainage Board should control from the Port of Thames, if not below it, right up to the source of the Ohinemuri?—Yes.

157. And on the Waihou?—Up to Te Aroha.

158. Then, you would include the Waihi Borough Council in your drainage district?—I think so; they ought to be. There should not be two authorities in control of the river.

159. Would you consider it necessary to do anything with the willows at present in the Ohinemuri and Waihou?—Yes, I think all the willows on the Ohinemuri ought to be cut down—not grubbed out; leave the roots—and I think great care should be taken that none of the limbs and branches fall into the river. I think the river ought to be thoroughly snagged.

160. Would you keep these willows alive or destroy them?—No, I would not destroy the roots, but I would never let the young shoots grow up.

161. Up to what size would you restrict them?—Not more than 4 ft. or 5 ft. altogether in height.

162. They would be cut down annually?—Yes.

163. *Mr. Moresby.*] That would be an annual cost for maintenance?—Yes. I think the cut that I see is proposed to be made at Pereniki's Bend would be very unwise.

164. What are your reasons for thinking that?—I think the first effect would be that it would set up a scour, and shift all the sediment and stuff in the Ohinemuri at once.

165. Where to?—To the mouth of the upper Waihou at the Junction. It would deposit it there between Thorp's Bend and the mouth of the new cut. It might actually block the mouth of the Waihou up. I reckon it would ruin the Ohinemuri between Paeroa and the Junction as a settling-basin for tailings.

166. Would that cut be necessary having in view the stop-banks you propose to erect?—No, I do not think so, with the stop-banks, and the willows cut down.

167. And you do not think any other cut would be necessary?—No. The one at Thorp's Bend which has been suggested might be beneficial. The circumstances are totally different. But I do not believe in cuts in these rivers. They have never been a success where I have seen them tried. They cause mischief in unexpected places.

168. It is a dangerous thing to interfere with nature?—Yes. I believe the cuts would scour out, and there would be no end to the width and depth, and the stuff scoured out would be a big trouble to know what to do with, and would cost an awful lot of money.

169. *Mr. Flatman.*] What, in your opinion, would be the difference in cost of making a cut or putting an embankment around the present river?—I think stop-banks could be put up at the cost of the cut.

170. Have you thought it out?—Yes. Another grave objection to the cut is that it would render the Ohinemuri a back water there, and it would be useless for navigation or anything else, and would deprive people of riparian rights.

171. *The Chairman.*] You said you had seen cuts made elsewhere which were not a success: can you give us an example?—Yes. We put in two or three in the Hutt River. While the flood was on the water went through them, and when the water was falling they would silt up at the entrance.

172. *Mr. Moresby.*] In this scheme you propose, do you think a dredge will be necessary?—Yes. In building these banks I would suggest that the material in the river should be used—that is, the coarse sand and stuff in the river now.

173. *Mr. Mitchelson.*] Do you think there are any kahikatea logs sunk in that river?—Yes, I think both rivers are full of logs.

174. Do you think it is at the places where these logs have sunk that the banks have formed?—Very likely.

175. I have had a good deal of experience with that class of river. There are thousands of logs in the bottom of the Northern Wairoa River; they have disappeared right in the mud, and have caused banks to be formed?—Yes. I think the Ohinemuri and Waihou are full of logs.

176. *The Chairman.*] How would you get the stuff up from the bottom of the river?—I know the Ohinemuri River is a difficult river to get at on account of the high banks. You cannot get drays into it as you can in other rivers. It would have to be elevated so that the drays could receive the stuff on the banks, and it would have to be carted to where the stop-banks were being built.

177. *Mr. Moresby.*] Do you think it will be necessary to have a dredge at the Junction to dredge there?—Between the Junction and Paeroa. I reckon that is the place where the mining-silt and everything will settle up to a certain limit before it will move on.

178. What class of dredge would you employ?—For that river I think a suction dredge would be the best. I do not think a bucket dredge could work.

179. *The Chairman.*] You have said that this cut would render the Ohinemuri useless as a settling-basin for tailings. We are told by the miners—and we have every reason to believe them—that in the course of a few months there will be no tailings, but only slimes, discharged into the river, and that the slimes do not settle, and therefore there will be no need for a settling-basin for tailings—the tailings, in your opinion, being sands?—Yes; but there is a lot of stuff comes into the river apart from the mines.

180. Why do you want to make a settling-basin?—If you make a settling-basin the effect must be to raise the bottom, and therefore it only becomes a question of time when the floods will top your stop-banks and you will have to raise them?—I presume the *débris* and mining tailings that are allowed to go into the river will come down there and will be removed from there.

181. Then you would have a permanent dredge there?—Yes, if necessary.

182. *Mr. Mitchelson.*] Where would you put the tailings—deposit them on the banks?—I would put them in some of these ancient river-beds that exist in that locality. There is an example of one on the western bank of the Ohinemuri at the Junction—a big depression; and there are several others in that locality which would hold an enormous amount of tailings or anything else.

183. We have been told by several witnesses that the slimes will not settle, but will be carried out to sea; you say you have had a good deal of experience on the river: can you give us any idea as to what distance the slimes would have to travel past the Junction before they met the flowing tide coming up from the Thames?—I could only give a rough idea. I should say, about the Netherton Reach.

184. *Mr. Moresby.*] Have you any further proposals to make in regard to the river?—The only way I can see to deal with the thing is to let the material come down into the Ohinemuri there, and then remove it—I mean the coarse sands.

185. *Mr. Vickerman.*] The coarse sands only represent 5 per cent. of the stuff put in?—I think they would take many, many years before they caused any trouble.

186. *Mr. Moresby.*] Is there any chance of the big deposit at Mackaytown coming down the river?—Yes, I think it would be shifted and brought down in every flood. The whole of it will come down in the course of time unless it gets covered with vegetation; and I do not think that is likely.

187. Are there any other proposals in regard to the river you would like to make?—I believe, myself, that the upper Waihou should have a stop-bank on it between Awaiti and Mangaiti.

188. On one side or both?—I know that in a big flood in the Waihou a lot of water goes over the Hauraki Plains. I have seen it going right across the Awaiti Road towards Waitoa. I was there when that road was being constructed, and in a big flood in the Waihou an enormous lot of water goes in there. There is high land between that cutting and the Awaiti Settlement down towards the Junction.

189. You think a stop-bank should be put on the western bank from that point to Mangaiti?—Yes; but that does not affect Paeroa—only the settlers on the Hauraki Plains and at Netherton.

190. How far up from the Junction is that?—Fifteen or sixteen miles, following the river. And there is no doubt the Waihou overflows towards Netherton between the Junction and the Awaiti Native settlement. It goes down through the kahikatea.

191. You know where the Awaiti Native settlement is, and you say the water goes over between there and the Junction to Netherton?—Yes.

192. *Mr. Mitchelson.*] Do you think the water from there goes over to the Awaiti Stream?—I cannot say whether it does or not.

193. Have you ever seen the Waihou in flood and the Ohinemuri not in flood?—Yes.

194. Was it on these particular occasions that you saw the water overflowing there?—Yes. It very often happens that the Waihou River is in flood and the other is not.

195. *Mr. Moresby.*] Do you wish to say anything in connection with the cost of your scheme?—No. I think that is the only feasible way, apart from the tailings altogether. I think it is the only way to stop that country being inundated frequently, and if the tailings were not in the river the settlers would find their pastures damaged by the silt from the river. The latter might not be permanently injurious, but it would cause great inconvenience and damage, and cattle would be drowned, and agriculture would be out of the question.

196. You consider that a comprehensive river district should be constituted for these two rivers?—I do not think there is any other way to grapple with the difficulty.

197. And you would go up to the source in both rivers?—To the source of the Ohinemuri and up to Te Aroha in the Waihou.

198. *Mr. Mitchelson.*] The trouble exists in some places above Te Aroha?—I think if you go above there the district would be too unwieldy. I think the only trouble you would suffer from there would be the erosion of the banks. I do not think any mining *débris* is likely to be put into the river.

199. *The Chairman.*] Do you think that in the Ohinemuri district, where you have not such a swift-flowing river as the Hutt, you would require a width of 6 ft. at the top of your banks?—Yes, I think that width is necessary.

200. *Mr. McVeagh.*] Do you know of drains up Te Aroha which are carrying a large amount of *débris* into the Waihou?—Yes, any amount of them.

201. These drains widen out considerably?—Yes, I have seen that.

202. I suppose that tends to silt up the river?—Yes, but that sand is very light, and it travels.

203. You do not include that district within your proposed River Board?—No.

204. We have had some evidence that there are very large drains in the country above Te Aroha which have become extremely wide as the result of erosion caused by the flood-water?—I have seen these drains, and there is no doubt they bring an enormous amount of stuff into the river.

205. Would you not include that country in your estimate?—It could be included, but it would make the district very big.

PETER EDWARD CHEAL examined. (No. 85.)

1. *The Chairman.*] You are an authorized surveyor?—Yes, and mining engineer.

2. You have come before us to tender a plan you have prepared?—Yes. I may say I represent no one, but I thought from my wide knowledge of the district I could help the Commission.

3. And you have a scheme?—Yes.

4. To do what?—It is to get rid of the silt in connection with the Ohinemuri River as economically as possible.

5. Will you describe what your scheme is?—I may say I went up the Ohinemuri in 1868, so I have known that district for a long time. I was District Surveyor there for years. I have walked across from the Waihi Beach to the Ohinemuri, and I have been along the hills and through the country on both sides of the river.

6. Is there any possible gully on the Waihi Beach side to which the slimes could be taken by railway and tipped in?—I do not know of any, but I am sure the expense would be too high. Mr. Vickerman has stated you could estimate the cost at £10,000 a mile, and it is twelve miles in a straight line from Waikino to the beach, and fifteen or twenty miles to bring the stuff from Karangahake. If the Government are going to make the railway and carry the stuff free I see no objection to it. They have done a great deal more for the farmers than for the mining interests.

7. What is your own proposal?—My idea would be to use a steam-launch and an iron rake to start the present tailings. Of course the whole trouble, I take it, is due to this not having been looked to ten or fifteen years sooner. This is not a sudden thing.

8. *Mr. Mitchelson.*] By "rake," I suppose you mean an implement something like the one Captain Fairchild used to employ to remove the shoals in the Manukau Harbour?—Yes; and I would propose at the large bend just below Mackaytown they should erect a timber trip dam. Mr. Mitchelson will understand what a timber dam is. They are very simply made. This would cause the water to rush suddenly. My idea is to get the tailings started, and every now and then trip the dam to sweep them down the river. At this bend known as Pereniki's Bend I would put a cut through, not from the top, but as a drive, closely timbered, so as to catch the silt. I think it could be tunnelled easily.

9. *The Chairman.*] Do you mean you would carry the whole cross-section of the river through the tunnel?—Yes. I would put a dam there to catch the silt.

10. You would stop all navigation?—No; I would not put a dam high enough to stop navigation. I would then let it run down the river to the bottom of Thorp's Bend in the Waihou River. From that point I would take a 20 ft. drain with a flood-gate to it—or else you would let the whole river into the Hauraki Plains—and either bring it down to Bagnall's Mill, where the river is wide, or preferably right down to the Hauraki Gulf.

11. Where would you discharge it into the gulf?—Just about half-way between the Waihou and Piako Rivers. Of course you would go through kahikatea bush pretty well the whole way. It would travel through a lot of Native blocks, some of which have been acquired by Europeans. It is all swamp land. My proposal is to bring that drain in half a mile at the back of Netherton.

12. Do I understand your proposal is this: You would construct a new drain from Thorp's Bend down to an outlet on the beach between the mouths of the Thames and Piako Rivers, and also continue the upper end to intersect the upper Waihou where it now overflows into the Awaiti Stream. By this means the flood-waters of both rivers would find a fresh exit to the sea, and the lands on each side of the new cuts would be drained?—That is the position exactly.

13. You have mentioned some report to the Government: has that been published?—I do not think so. It was in connection with the drainage of the Piako, and I then suggested that the water of the Waihou could be run back into the river at Bagnall's.

14. *Mr. Flatman.*] You said the Government have done more for the farmers than for the mining industry: I should like some information about that?—They have carried lime free for 100 miles on the railway, and if they would carry tailings free for that distance it would be a great benefit to the mining industry. It might be some information to the Commission to know that at the Thames there is not 10 ft. of water at low tide from Tararu Point right across the gulf, and my idea is that some day, when this land is worth £40 per acre, it will be looked upon as worth reclaiming, as they have reclaimed the fen country in England. I think it would be advisable, therefore, to put hurdles in different parts of the outlets of these streams to deflect the *débris*, and also to put hurdles right across this shallow stretch to catch the *débris*.

SAMUEL EDGER FRASER further examined. (No. 86.)

1. *Mr. Myers.*] Have you considered the scheme that was suggested on Saturday of running the slimes by railway to Waihi and discharging them there?—Of course, I have considered it in this way—as far as the time would allow me to do so. I can only consider it really from my past experience of that portion of the country, and I ran it out as nearly as I could. I should say it is approximately right.

2. Are you basing your costs as far as applicable upon the information you got from Mr. Vickerman—namely, the cost per mile to construct the open line, and the cost per chain to construct the tunnel?—I took Mr. Vickerman's figures, so far as the open line is concerned, at £10,000, and the tunnel I ran out myself. I can give the details.

3. I propose to put in the details. I think you estimate that the capital expenditure required would be £166,820?—Yes.

4. Then you say, interest at 6 per cent., £10,009; and depreciation at 15 per cent., £25,053?—Yes.

5. You make labour charges per annum, repairs and maintenance, and interest and depreciation—that is, including the items just given—total, £73,443, which on a basis of 600,000 tons per annum would be 2s. 5·3d. per ton, and you put in details showing how your estimate is arrived at?—Yes. [Exhibit No. 70.]

6. *The Chairman.*] Of course, it is a mere guess at it, and as good a guess as you can make?—Yes.

7. *Mr. Myers.*] I think your estimate refers only to the removal of the tailings from Waihi and Waikino, and does not include Karangahake?—That is so.

8. Apart from any question of practicability, the cost would very much exceed the cost of any proposed Rotokohu scheme?—Yes; it is prohibitive in the same light.

9. Can you express any opinion as to the practicability of this suggestion to remove the tailings and discharge them upon Waihi Beach?—There are three objections: If you discharge the tailings on the beach at all you first of all come up against the public pleasure resort of the people of Waihi: I understand it is the only outlet they have. Then you come in contact with the Waihi Beach Mining Claim.

10. In what way?—You are practically encroaching on their ground in the disposition of the tailings, and to put the line on the beach higher up you would have to go in for a pretty considerable gradient to get it over the hill.

11. You do not suggest that the adoption of the scheme is impossible mechanically?—No; it is a question of the capital cost.

12. And all these other objections you have just raised?—Yes.

The Chairman: We are quite satisfied in regard to the question of a railway to Waihi Beach.

13. *Mr. Myers.*] Something has been said during the course of this inquiry about fluming your slimes in a wooden flume, and I think you or some other witness spoke of the wear-and-tear upon these wooden pipes. Do you happen to have any portion of a wooden pipe here that you can show the Commission?—Yes. These are samples of the erosion that has taken place. [Exhibit No. 71.] Of course, that is not dealing with pure slime, but sands and slime, but that is in a comparatively light fall. When the sand starts to get through a crack, that is what happens. That occurred inside a month.

14. How long did it take to wear that hole?—Between three and four weeks. It only wants a start. That is brought up to show what the wear is likely to be on a wooden pipe-line.

WILLIAM FRANK GRACE further examined. (No. 87.)

1. *Mr. Myers.*] I think you have considered the railway scheme to Waihi Beach which was suggested on Saturday?—Yes.

2. Would there be any special difficulties in adopting that scheme so far as your company is concerned, in addition to the difficulties that Mr. Fraser has already referred to in respect of his company?—It would mean, I suppose, another mile or a mile and a half of railway, and it would be a very difficult line to construct, because it is practically running ground there.

3. So we may assume that in place of adding 2s. 5d. per ton to the cost it would probably be a larger sum in your case?—Yes, and it would also necessitate the taking-away of the lower part of the mill. We should have to take away the flat agitators and two or three pumps, or, alternatively, remove the filter plant.

4. *The Chairman.*] We should like some information as to the proportion of sands and slimes you are discharging at the present time?—Will you define to me what you call sands or slimes?

5. The sands now visible in the river at the present time?—At present we are practically making no sands at all. I consider anything that will pass 100-mesh screens is slimes. We are making nothing now coarser than 100-mesh.

ARTHUR JARMAN examined. (No. 88.)

1. *Mr. Myers.*] You are an associate of the School of Mines, London, and a professor of the Auckland University College?—Yes, of mining engineering.

2. And you are Director of the School of Mines at Auckland?—Yes.

3. A report of yours has been put in—it is Exhibit No. 53: would you mind just explaining to the Commission what is meant by these respective columns of your report, particularly the last two columns?—Yes.

4. *The Chairman.*] Can you explain the letter that accompanies your report more clearly: what is "possible, not probable"?—As soon as I had got together the material which would pass through an 80-mesh screen I examined that under the microscope. That enabled me to determine the percentage of clean quartz in it. I might explain that there is in these samples some material that I had to deduct as not being quartz—it was just fine pumice and also other silicates, the nature of which was not quite clear. Having made these deductions, I estimated really the percentage which was quartz. That is what you have in the last column but one in this table.

5. *Mr. Myers.*] Do you mean the possible percentage of tailings of that which passed through the 80-mesh?—Yes.

6. *The Chairman.*] That is to say, you examined it microscopically. You eliminated other material, and that gave you a certain percentage of quartz, and you said this is of such a character that it might be quartz tailings?—That is the position.

7. And that varied?—From 10 to 95 per cent.

8. What does "in this" mean?—"This" refers to the material mentioned in column No. 6.

9. *Mr. Myers.*] What is meant by the "eighth column"?—Now, supposing you take as an example the first sample there: 30 per cent. of the 0·18 gives you 0·5, so that the eighth column is the actual percentage of tailings possible in the whole sample I started off with.

10. That is to say, you get 0·18 per cent. of the whole as possible tailings; you found 30 per cent. of that, which is equal to 0·5, and that is the percentage shown in columns Nos. 6 and 7?—Yes. Column No. 8 shows the percentage of column No. 6 multiplied by column No. 7.

11. *The Chairman.*] Are you prepared to express any personal opinion?—I do not know where the samples came from—they were sent to me by Mr. E. F. Adams by direction of Mr. Rhodes—except that I understood from Mr. Rhodes afterwards that they did not come from the Ohinemuri River. I believe the great bulk of them came from the bed of the river, and these very high percentages were from the banks.

12. Is it possible that this stuff could come from any other source than tailings?—Of course, the quartz might come from anywhere, but from these samples it would seem that there is not a very great deal of quartz in these river-sands.

13. But will you find quartz and the ordinary siliceous sands having the same physical characteristics when microscopically compared?—Oh, yes! except where it is released from some crystalline rock, and then you can detect the crystal-faces, and that is deducted as not being tailings from a mill.

14. Is it not possible to have the same crystalline faces in the tailings?—You very, very seldom get them. In the samples I have had I have detected very few.

15. I asked one of the earlier witnesses almost that very question—whether after crushing it would not be possible to see crystalline faces; and the answer was Yes; and I went on further to ask whether any attempt had been made to examine these crystalline faces: you do not think so?—You get very few; you do get some.

16. Would you be prepared to throw out the whole of them?—In this I have thrown them out.

17. You may have thrown out as being a natural product something which may be tailings?—Well, I have been careful to underestimate rather than to overestimate: that is to say, I think I have included the maximum amount of quartz as being possible tailings—in one case I think up to 95 per cent. I have been careful not to underestimate the possible tailings in the quartz.

18. Of course, in all probability that case is the undoubted sands taken from the bank of the river?—Yes. Of course, if these measurements were objected to in any way, I would point out that the percentage of stuff which could by any possibility come from a mill is still very low in column 6. I have these samples if any member of the Commission would like to see them.

19. These were single tests under the microscope?—No; I had from about three to five examinations in each case, and took the average. I may say I got somebody else to do two of them, and I did three of them.

20. What objective did you use?—Sometimes ½ in. and sometimes 1½ in.

21. How many particles did you take?—That is one objection to this system of examination, that of course you cannot examine any large number of particles at one time. The only thing to do was to mix up the sample thoroughly well, and take a little from here and there.

22. Practically, the whole quantity you are dealing with is so very little that it is largely a matter of chance?—No; I do not know that I would say that, because you do not get very large variations. The largest variations in the measurement were something like from 15 per cent. from the mean. Well, where the variation was great we would make a fresh examination, and we would also be very careful not to underestimate the possible percentage.

23. *Mr. Myers.*] Can you tell the Commission what is the effect of the addition of lime or lime-water upon the slimes during treatment?—It causes the slime to settle more readily than it otherwise does—in fact, it causes it to settle when otherwise you could not get it to settle.

24. Can you say whether or not this difficulty in getting the slimes to settle without the addition of lime is due to what is sometimes called colloidal action? I only want to answer one point made by Mr. Baker, because I do not know how far it may have affected the minds of the Commissioners.

The Chairman: I think the article read by Mr. Banks made it clear that this is all a question of unexplained theory as yet, and therefore we do not want to add another theory to the matter. It is similar to the action of colloids; but to say it is colloidal in this case is stretching our knowledge, and even if we knew what it was it would not affect the Commission very much. What we want to get at is, what is the action of salt water.

25. *Mr. Myers.*] Whatever the condition that difficulty in getting the slimes to settle may be due to, can you say whether that condition, once destroyed, can be restored?—I should say not.

26. *The Chairman.*] Do you say it never can be restored, or cannot be restored under ordinary circumstances?—You mean the so-called colloidal action. When this stuff is slimed a second time by shaking the mixture up, the addition, say, of lime-water to that slime will not cause it to settle a second time; so the condition is obviously different from what it was in the beginning.

27. *Mr. Myers.*] Assuming that these slimes then go down the river, can you conceive that there is any possibility of the former condition being restored during their progress down the river?—In what you call the colloid condition you would get the slimy condition partially restored.

28. In what way?—By the shaking-up and the turmoil destroying the flocculent precipitate that forms when you have added the lime-water.

29. To such an extent that it becomes slime, which will settle and adhere, and be difficult to move?—I have not tried to see whether it does adhere particularly. I am only speaking of my experiments with cyanide-solutions of very finely crushed ore.

30. You know it has been suggested that these Ohinemuri and Waihou Rivers should be cleared of willows and other obstructions?—Yes.

31. I want you to assume first of all that the rivers have been so cleared, and I want you also to assume that for the future no material excepting a very negligible percentage will be discharged into the river from the batteries excepting slimes that will pass through 100-mesh: what, in your opinion, would become of these slimes if discharged into the Ohinemuri?—In my opinion they would be carried very much farther down the river than the old sands were. They would move very much more quickly.

32. Can you say what velocity of current would be required to move them?—When you are constructing ditches from sandy material, the velocity which is necessary to cause the sand on the bed of the ditch to move is given as 1·3 ft. per second. That is the mean velocity. The safe bottom velocity is given as 1 ft. per second in this pocket-book. Above that you may expect to find some movement taking place.

33. *The Chairman.*] There are sands and sands: what is your definition of "sand"?—The sand that is meant by that is not defined in this pocket-book. I take it it would mean ordinary river-sand; but, whatever it is, it must be particles very much larger than anything that is being thrown into the river now in the form of slimes.

34. *Mr. Myers.*] What velocity of current would be required to move slimes?—I cannot tell you that except that I presume it would be materially less than a foot per second.

35. You said before that you would expect these slimes to go very much farther down: can you amplify that?—Well, with the normal flow of the river I should expect the bulk to go right out to sea.

36. *Mr. Mitchelson.*] That is, presumably, that the outgoing tide will take it right out to the estuary in one flow?—I think so.

37. But we are told that the outgoing tide only goes as far as Netherton, and that it is then met by the incoming tide?—The material already treated by the mines must have gone somewhere, and one of the witnesses will be giving evidence this afternoon to the effect that if the material that has been treated in the Waihi Mine had stayed in the river it would have blocked it up for a distance of twenty-five miles. Well, of course the river has not been filled up, and it is obvious that the great bulk of this stuff has gone down into the estuary of the river and into the Thames Harbour.

38. *Mr. Moresby.*] A lot has gone on the settlers' land?—You have not got 15,000,000 tons of stuff on the settlers' land.

39. *Mr. Myers.*] We understand these slimes go down in suspension?—Yes, partly in suspension and partly, I think, moving slowly on the bottom of the river.

40. *The Chairman.*] Supposing you started to clear the river, the stuff would go down and a large quantity would be carried away. A portion of that moving on the clear bottom of the river would become adherent to the clean bottom of the river, and it would then have a tendency to form a skin where the velocity was so low that it did not tear the new material from that to which it was adhering. Is there not a tendency for all material of a similar character to congregate together?—Provided you allow the velocity to fall, of course.

41. Therefore, in all backwaters and in all portions of the banks where the velocity has fallen, in your opinion there is likely to be a deposit?—There is bound to be some deposition.

42. And that deposition is bound to increase and become thicker?—It will increase, I should say, until a reduction of the cross-section of the river would give you the necessary velocity to cause a balance of the two conditions.

43. Then what would happen? We have been told it would ball off: in your opinion, would this slime ball off?—No, it would just scour like any other sand. I am referring to that which is underneath water-level. I am not supposing you had a bank on the side of the river which got undercut: then large lumps would fall in, no doubt. But under the water it would not ball off; it is not like clay.

44. Do you not think that, once the material became adherent in that manner to a considerable thickness under a low velocity, it would afterwards remain adherent even under a much higher velocity?—I do not think so. I do not think it acts like putty, because of the very large percentage of pure quartz in it. It is almost all pure quartz; there is nothing to bind it together. Anything that would bind it together would have to come from some other place than the mines.

45. But it is quartz in this peculiar condition—do you call it colloidal—which makes it deposit together?—But that colloidal stuff would not be at the bottom of the river. That would be in suspension in the water. I took it you were speaking of that quartz which would settle either on the banks or bottom of the river. That is not in the same state as the true slime, which we cannot settle at any of the mines. It is very fine sand, but quite pulverulent. If you have it dry it runs like so much water; it does not remain caked.

46. Once we have a clean river, and there comes a flood, the water will contain a large quantity of slime in suspension: what, in your opinion, will the effect be on vegetation of this pulverulent matter in suspension in time of flood?—You will not have very much more slime in suspension in a flood than at any ordinary time.

47. Assuming there is slime deposited on the banks in such a position that in a flood it overflows the surrounding land, and the water going down at once deposits the slimes upon the vegetation: is that going to have a beneficial or deleterious effect?—I should say it depends on how much is deposited entirely. If you succeed in covering up a sufficient portion of the plant, of course you will kill it; but a light deposit on a plant would not kill it.

48. It is not so much on the ground as on the leaves?—The difficulty is that I have not had submitted to me any samples of stuff taken from the leaves of plants immediately after a flood.

49. One witness described it to us that the surface was whitewashed; another one said that if you took a wisp of the dried dead stuff, and shook it, a cloud of dust came from it: surely that must be injurious to life, both animal and vegetable?—Yes; if you had something sufficiently fine to close the pores of the skin of the plant it would be injurious.

50. Do you know the diameter of the pores of a blade of grass?—I do not.

51. *Mr. Myers.*] What the Chairman says with regard to the evidence given applies to the river practically in its present state?—Yes.

52. What I want to ask is this: whether, if the river were once cleared, you would expect to find the same results to follow from the slimes which would then be in suspension in the river or in such deposits as you might expect to find on the banks, if any?—Yes; but you would get less of that occurring, because it would be easier for the slime to get away when the flood-waters first came down. I think that a clean river would mitigate the nuisance a very great deal.

53. *The Chairman.*] Have you any practical scheme to submit, or can you as a theoretical man explain how to clean the river—how is it going to be scrubbed?—You would have to remove the snags, of course, and you would have to remove the growing willows from the lower parts of the banks.

54. And you have to cleanse the whole of the banks until you reach the original clays, and you have to excavate the bed of the river until you get down to the original sands?—You will have a difficulty, of course, in getting that material out. The actual raising is not very expensive; but the difficulty is in transporting it somewhere and keeping it from getting back into the river. If you get rid of the coarse stuff there you will have very much less difficulty with the finer slimes now going in.

55. *Mr. Myers.*] What you say is this: that, no matter what you do, you will not prevent a certain amount of this slimy material from being deposited upon the neighbouring lands in times of severe floods?—You are bound to get a slight deposit, whatever you do.

56. But I am bound to ask you to assume that the river is cleared, and that the material that is cast into the river will consist of slimes that will pass through 100-mesh: would you then expect that any serious damage would result even in times of severe flood from such portion of this slimy material as would be deposited on the neighbouring land?—You would get very much less damage than you get now. I do not think it would be possible to say what damage you would get, but you would get very much less damage than you are getting now.

57. Did you not go into some calculation with Mr. Hopkins as to the utmost amount of stuff that could be deposited?—He has got those figures.

58. Would you expect that this material, all of which goes through 100-mesh, would be any danger to navigation in the Waihou?—That all depends, I think, on the current which you can maintain in the lower reaches of the river. I take it the depth of water would improve.

The Chairman: You see, one of the difficulties appears to be that the material cannot get out of the river in one or in more than one tide—that there is in each tide two periods of slack water, when there is a tendency to deposit. It is not like running in a regular channel. The evidence of one's eyes leads one to believe that there is a deposit at the present time, that it is adherent, and that it is not moved again with the increased velocity due to the change of tide. How that is to be got over is one of the greatest difficulties.

Mr. Myers: You are speaking of the present conditions.

The Chairman: I cannot speak of any other conditions. These are the conditions which it appears to me must remain, because there are vested interests against removing the large banks of sands at the present time. Even apart from that large vested interest, we have large deposits on the banks and we have slime deposits, and, assuming that the whole of the sand-deposits are removed, these slime-deposits will remain. They are forming daily, as we have seen during the last week, and therefore these assumptions that if the river is cleaned something must happen do not appear to be based on facts.

Mr. Myers: Excepting this: that every practical witness who has been called has recommended the cleaning of the river.

The Chairman: We do not deny that clearing the river is a wise thing; but is it going to prevent slimes depositing? Your witnesses say that theoretically they ought to be carried right to sea: Professor Jarman supposes they would be to a limited extent.

Mr. Myers: We all admit that wherever there is any dead water you will have temporary deposits.

The Chairman: That is not disputed, but the question is the meaning of the word "deposit." Is that to be a permanent temporariness or a temporary permanence?

Mr. Myers: Of course, you must remember that if a River Board is formed and properly constituted——

The Chairman: But the River Board cannot go along with a brush and brush the slimes off the banks.

Mr. Myers: No, but the servants of the Board would certainly be on the lookout for anything like a dangerous deposit.

The Chairman: There might be a deposit not worth any work to deal with it, but yet sufficient, on your assumption, to be raised by the next flood and swept over the land, and to seriously damage vegetation.

Mr. Myers: My assumption is that the next flood will not carry that over the land at all, but would carry it down the river. I do not know what Professor Jarman says to that.

The Chairman: Why should the river have a greater attraction for the stuff than the flooded land on each side?

Mr. Myers: Because you do not get a flood in a few minutes, and if you have got your stop-banks——

The Chairman: If stop-banks are to be erected, there will be no flooding of the banks, and we need not spend our time over this question.

59. *Mr. Myers* (to witness).] Have you made any experiments personally with regard to the action of salt and fresh water respectively upon slimes?—No.

60. You are aware of the result of the experiments made by Mr. Grace?—Yes.

61. In order that there may be no misunderstanding, will you just say what is your understanding of the result of these experiments?—First of all, when salt water is added to the slimy material, and when in a parallel experiment you have just fresh water added, the settlement is not quite equal. If I remember rightly, Mr. Grace said that the settlement was fastest in the salt water, but not so close.

62. What do you deduce from that?—I do not think you can deduce a very great deal, excepting that the salt water coming up the river is not going to affect your slimes very much. Of course, in connection with that one must remember that the slimes have been settled in the first instance with the aid of lime, and the addition of the salt sea water to the stuff after it has been reslimed would not help it to settle any more quickly—as it would have done in the first instance.

63. *The Chairman.*] Then, we may assume that so long as it keeps in the Firth of Thames, the water having a velocity of something between 1 ft. and 1½ ft. per second, it will never settle?—No, it will keep in suspension. Of course, that is the very fine slime—not the fine sand that has been referred to so often.

64. Let us come down to the actual stuff which has gone through a 100-mesh, and which has been treated with lime, and washed, and discharged into the Ohinemuri, and there mixed with a very much larger bulk of water. It runs a great many miles down the river and passes from fresh water into brackish water, and finally into the Firth of Thames and into salt water. What becomes of it then?—It will go to sea, just as the stuff has gone from the Firth of Thames at Home.

65. What becomes of it?—Eventually it goes to the bottom; but it is very difficult to say—it is getting dispersed.

66. It becomes more and more diluted in the water until it becomes negligible?—Yes.

67. It is only a question of degree between that and the river-bed. According to your own assumption it may gradually settle in the river?—But the river is moving. At some distance from the surface of the sea you have quietness. The effect on the surface does not extend to a very great depth, and therefore when it has managed to get dispersed down below it can gradually settle.

68. *Mr. Myers.*] Then, to sum it up, do you say that the bulk of this stuff goes out to sea, or what?—The excessively fine stuff which one has had so much difficulty in settling must go out to sea. The bulk of the other will also go out. When I say "the bulk of the material will go out to sea" I include in that statement the whole of the material that is being put into the river. I say the bulk of that will infallibly go out to sea.

69. I suppose you would not be frightened of it doing damage, once it got out to sea?—No.

70. I want to ask you a question about Dr. Maclaurin's report which has been put in, and which you have seen?—Yes.

71. I want to ask you whether the results shown by Dr. Maclaurin are a true guide to the percentage of mining quartz present in the samples he examined?—I should say not.

72. Why?—Apparently he has determined chemically the percentage of silica in the samples. A good deal of that silica would be combined as silicates, and therefore not free quartz from the battery. I might mention that the percentage of silica actually present in granite and pumice is generally taken as being something like 75 per cent.

73. We have heard a good deal of evidence from persons who have come forward and said they saw a white deposit on their land which was mining tailings: would you be satisfied, if in that Ohinemuri district you saw a white deposit on the land, that it was mining tailings?—The strong assumption is that some of it would be, but I should want to examine it by microscope to be certain.

74. Why would you need that microscopical examination? What else could this stuff be?—It might be pumice.

75. Anything else?—There are a lot of white minerals it might be. It might be kaolin, for instance, brought down by the natural watershed.

76. *The Chairman.*] What is the internal evidence in Dr. Maclaurin's report that makes you think he estimated the silica chemically?—It is in one of these tables.

77. The first table shows the result of sifting through the meshes, the next the construction of sand, and the third the percentage of silica, which you think is the result of chemical analysis?—Yes. There is another open column with no figures, and headed "Undetermined." That means clearly that he has chemically determined the silica, and not the other things like iron and alumina. No examination is any good, I think, except that done by microscope.

78. That is only approximate?—Yes.

79. And very approximate?—Ten per cent. either way.

The Chairman: Does not Dr. Maclaurin merely use this by way of analogy? He takes undoubted mining tailings, and he ascertains there is a certain proportion of silica in them. Is it not a reasonable assumption for him to deduct 61 per cent. silica as representing river-sands and to take the rest as representing slimes? No doubt, it would have been better if the two methods, microscopical and chemical, had gone on side by side, but it is rather sweeping to condemn the chemical analysis because he is merely using it as an analogy.

Mr. Myers: Professor Jarman only said it is not a true guide.

80. *The Chairman.*] I am merely trying to arrive at what your view is in throwing this on one side as being comparatively valueless?—Of course, it is a comparison undoubtedly—it gives you a means of comparing the two things.

81. *Mr. Cotter.*] I should like to know whether, in speaking about the carrying-capacity of these slimes down to the sea, and about the clearing of the river, you are leaving out altogether the actual facts of a river such as the Ohinemuri, which is carrying an amount of alumina down with it, and the possibility of the conjunction of these slimes with that material in the formation of these deposits. The alumina at present is clay brought down in the rain?—No; that would rather tend to keep the channel clear by assisting the flow of the sand. The only proof I could show you bearing on that is an account of some experiments on the flow of sand in launders.

82. *The Chairman.*] We are not working in launders, but in the natural river, which is sluggish in ordinary times and becomes torrential in times of flood, carrying large quantities of alumina. Has that alumina any chemical or mechanical effect in depositing these slimes? We know that in drainage schemes alumina in the shape of alum is largely used for this purpose?—It would have no effect, unless you had very extensive alum-beds up somewhere on one of these rivers. I was going to read this one sentence from the account of these experiments: it shows that the presence of a small proportion of clay slimes produces a very marked reduction in the fluid frictional resistance occurring in the launder. Of course, that alumina is in solution—it is fine clay slime in suspension, and quite different from the alumina Mr. Cotter meant.

83. *Mr. Cotter.*] Whatever the effect in a launder with a practically flat surface might be, would the effect be the same in the river? I am not talking about the actual bed-centre of the river, but of the shelving banks, say, 25 ft. from the centre of the bed. Is it not possible that the presence of vegetable matter and earthy peaty matter mixing with the slimes has a tendency to cause them to entrain together and deposit on the banks?—If you have actual fibre I should say it would.

84. Would it not be very advisable, in your opinion, to have some mechanical means, such as a dredge, to counteract any liability of this stuff depositing?—I think the best you could do in that direction is to clean the bed of the river, and then confine it, if possible, by a few stop-banks. It is a difficult thing to clean it up.

85. Do you know the condition of the rivers at all?—Not particularly. I have been up to Paeroa by steamer.

86. The reason I am asking these questions is that my clients desire particularly to keep open the navigability of that river from Kopu to Te Puke. Therefore would it not be advisable, in your opinion, to have some mechanical means, such as a dredge, so as to relieve any probability of the navigability of that river being prejudically affected?—It might be; but, on the other hand, when once you remove the snags you might find no need for a dredge.

87. But, on the other hand, you might find a deposit that would affect the navigation?—That, of course, you could only say by trying it.

88. Then it is better to have a dredge there to be quite certain?—I can only give you my opinion.

89. *Mr. Mueller.*] You state that this white deposit which has been mentioned as on the vegetation you would presume to be tailings?—I should presume a good proportion of it to be tailings.

90. If you were informed that that deposit has occurred to a much greater extent in recent years, when the fine crushing at the mines has become more pronounced, would not that increase the presumption in your mind?—Not necessarily. You find, for instance, in rivers like the Murrumbidgee, in New South Wales, that the river is silting up, and that the silt is going higher and higher up the river, and that the floods are increasing in frequency. That is due purely to the deforestation of the lands higher up allowing the rains to wash down a very much greater amount of silt. That difficulty is being felt in other rivers. The removal of trees from a portion of the watershed invariably causes you to have more frequent floods than in the past.

91. I am talking about the Ohinemuri River, and the fact that this deposit of a whitey-blue character on the vegetation has become more pronounced in the last few years. You have said that if there is pipeclay present it might be pipeclay, and we have found, I think, that there is no pumice in the watershed of the Ohinemuri River, and apparently no pipeclay. I ask you, therefore, if you know that that peculiar whitey-blue deposit has increased considerably during the last few years—in fact, it was hardly noticeable a few years ago—would that not increase the presumption that it consists of slimes?—Yes, certainly.

92. Is there not a possibility of some other chemical or physical change, or both, taking place in these slimes in their passage down the river, so that by the time they reach the salt water it may act again in a settling manner?—No.

93. You do not think there is the possibility of some change?—No; the reason being, of course, that you have already settled the slimes to the best of your ability, and destroyed what might be termed the colloidal condition.

HERBERT WILLIAM HOPKINS examined. (No. 89.)

1. *Mr. Myers.*] You are a metallurgist, and an associate of the Royal School of Mines, London?—Yes.

2. You are employed by the Waihi Company?—Yes, at Waikino.

3. And you have been so employed for how many years?—Approximately twelve years.

4. We have been told that tube mills first came into operation in 1905–6?—Yes; we have got nine mills running now. I do not think we shall put any more in. There is 80 per cent. of our products which passes the 200-mesh.

5. *The Chairman.*] How much per cent. will not go through the 100-mesh?—You might say 2 per cent.

6. *Mr. Myers.*] And even of that, nothing will remain on the 60- or 80-mesh?—Practically nothing; two or three tons a day, or something of that sort.

7. *The Chairman.*] Would not that be an appreciable percentage?—I think not, sir.

8. *Mr. Myers.*] How many tons a day are you putting out?—A thousand tons a day.

9. What percentage will pass through the 150-mesh—I am speaking of Waikino?—I do not think we have got those figures.

10. What has been the output from 1905?—1905, 181,236 tons; 1906, 189,327 tons; 1907, 211,062 tons; 1908, 249,293 tons; 1909, 273,917 tons. This year we have averaged 960 tons a day. Our standard is 1,000 tons a day.

11. That is for about 300 working-days?—Yes, for 305 days.

12. I understand that your percentage of slimes has been gradually increasing until now you have obtained the results you have stated?—Yes.

13. You have considered, have you not, the suggestions of either pumping or fluming your slimes to Rotokohu, or of railing them to the same place?—Yes.

14. Do you agree with the conclusions at which the other witnesses have arrived who have been called on behalf of the mining companies?—Yes; I collaborated with two of them about these schemes.

15. Did you before doing so prepare any estimates yourself?—Yes, I estimated the cost of the stuff being taken to the Rotokohu Swamp by rail.

16. Did you also prepare estimates of the cost of fluming or piping—independently, I mean?—Yes. The position was this: Just at the time the Commission started we considered the various schemes, and we decided that trucking was the most reliable; but since the Commission has been sitting the question of pumping along pipes was considered, and we tried to make up our minds on that point.

17. Was it only the cost of one scheme—trucking—that you estimated first of all independently?—Yes.

18. Did your independent estimate agree substantially with the estimates prepared by the other gentlemen?—Yes, 3s. per ton for trucking. I would like to say in connection with that that if the treatment is to be left in the same position as we are at present, any plant to handle 1,000 tons a day must have a capacity of 1,200 tons. We get a good deal of advantage from Sunday. Our vats get an extra day's treatment.

19. That is in order to work to the same advantage as at present?—If we do not do that we stand a chance of losing 6d. per ton in extraction.

20. The question has arisen as to whether the slimes that you now put into the river will travel down to the sea. You have given that subject, I think, a great deal of careful consideration?—Yes.

21. Will you give the Commission the result of your consideration?—Yes. With reference to any scheme for stacking tailings a plant to deal with 1,000 tons per day must have a capacity, as I have said, of at least 1,200 tons per day, in order to enable us to take full advantage of the extra time of treatment allowed us by Sunday. At present, in order to get this advantage, in the early part of the week we treat the stuff as fast as possible, and ease off during the latter part of the week. Tailings as now put out by batteries will travel down to sea. The following figures show that a large proportion of the output in the past must have passed out of the river, or the block would have been much greater. Assume total solids during the last fifteen years to be 5,000,000 tons, including river-sand, 5,000,000 tons at 27 cub. ft. equals 135,000,000 cub. ft. Assume section 120 ft. by 8 ft., or, say, 1,000 sq. ft., the 5,000,000 tons are sufficient to fill up the river for 135,000 running-feet, or 25½ miles. As a matter of fact, about seven miles only above the Junction are partially silted up, and patches only along the banks below the Junction. No evidence has been brought forward that any floods have occurred through the blocking of the lower Waihou below Te Puke Bend. I suggest that at least three-fifths of the total output has gone, and that this portion that has gone approximates to the nature of the produce we are now putting in the river. A second very significant fact is that the deposits of mining-silt above the Junction which the tailings company propose to treat contain from 2 to 5 per cent. only of sand passing a 200-mesh. Practically all the sand passing the 200-mesh has passed on. These figures are taken from a large number of samples, taken by the extraction company by boring with a special implement, both from the bottom and also from the sides of the river. Any slimes which the Commission has observed in this part of the river can therefore be only of very limited extent. If these fine sands and slimes are not able to settle in Pereniki's Bend, where the conditions are all in favour of settlement, and the slimes have a special chance of being entangled and held by coarser sand, I suggest that it is very unlikely that they will settle in the greater flow of the lower Waihou. A fourth factor helping to keep these slimes in suspension and carry them out to sea is that the coagulating effect of lime dies out under dilution with large quantities of water and mechanical rubbing, and cannot be restored. This is confirmed by Mr. Grace's evidence. From the above considerations I am of the opinion that the lower Waihou, with the help of the ordinary freshes, and perhaps judicious dredging near the mouth of the river, will keep itself clear. I would like also to say this with regard to the effect of fine-silt suspension: During the sitting of the Commission at Paeroa I understood the Chairman to say that he was afraid that the fineness to which we are grinding would increase the damage due to fine silt being deposited on the land. Assume the river to be clear of accumulated tailings, I have made a calculation to show the maximum amount of current mining-silt that could be in suspension during a heavy flood. I understand Mr. Adams to state that during the flood of March, 1910, 12,000 cub. ft. per second was passing down the Ohinemuri River. Now, 12,000 cub. ft. equals 1,350,000 short tons per hour. Taking the output from the Ohinemuri mines as 2,000 short tons per twenty-four hours, or, roughly, 100 tons per hour, ratio water to solids equals 13,500 to 1. Assume 1 acre covered with flood-water to a depth of 1 ft.: total water on 1 acre equals 1,361 short tons, or 200 lb. solids, or, say, one barrow-load. It may be objected to this that the flood-water might flow over the land a foot deep for some time, depositing silt; but, on the other hand, the bulk of the solids would be moving down the main channel. During our visit to the Rotokohu Swamp we noticed a very large area of land over which the

flood-water had been, but there were only two small patches of silt. This is confirmed by Mr. McArthur's evidence. As a general rule, except along drains and other channels, the flood-water would not flow continuously over the land at any distance from the river, but would remain almost stationary till the flood started to abate. As regards accumulated sands, we have evidence that these are entirely caught, and would not do the particular damage of which you are afraid. Besides which, if the accumulated sand at Pereniki's Bend were removed by the operations of the extraction company, and the conditions at the bend were put right, the fall from Waihi to Paeroa is so great that any fresh accumulated sand would not amount to anything serious, and would be moved on in the early stage of the flood. During the March, 1910, flood a good deal of very fine slime such as that referred to was deposited on the papers and walls in our offices. This slime was not a white deposit, but a dirty light-brown colour, more resembling clay. On drying it had a most offensive smell of decaying vegetation. We have never noticed any such smell about our slimes.

22. *Mr. Vickerman.*] You say there will be very little accumulations between Pereniki's Bend and the Junction in the future, and those that do come will be removed by the early stages of the freshes?—Yes; we rely on the volume of the Waihou River coming in.

23. The deposits will be between Paeroa and the Junction, if there are any?—Yes.

24. What did you mean when you said there would be no sand in the future?—There will be very little. The position is this: Not only have we reduced the percentage of sand from 75 to 25 per cent., but the sand that remains is very much finer than what it was formerly.

25. *Mr. Hanna.*] You say that, according to experiments which have been made, at the very outside there cannot be more than 5 per cent. of residuum from your mill?—No; I said your material that has actually been caught contains only from 2 to 5 per cent. that passes the 200-mesh.

26. Supposing the operations of the extraction company to relieve the bend to some extent and the meanders, what is there to prevent this 2 to 5 per cent. being carried away? Supposing this stuff at the bend is all treated to the degree of fineness to which we treat our stuff, is there anything to prevent the whole of the stuff going right out?—My opinion on that point is not worth very much. I say that Pereniki's Bend is a point that requires special attention. I think the operations of a dredge there would be most efficient, and I think you ought to have a small royalty for every ton you lift out.

27. *Mr. Mueller.*] Do not the deposits extend for considerably more than seven miles above the Junction?—I think not.

28. Have not the extraction company got nine miles of claims?—Yes.

29. Instead of there being seven miles then there are nine miles?—There are nine miles of claim, but I do not think the deposits extend along the whole length of the claim.

WILLIAM PERCIVAL GAUVAIN examined. (No. 90.)

1. *Mr. Myers.*] You have heard the evidence given by Messrs. Fraser and Grace: you went over the calculations with Mr. Fraser. Do you corroborate the evidence given by Messrs. Fraser and Grace?—Yes.

2. You are the Waihi Company's engineer at the Waihi Mine?—Yes.

3. And you are a mechanical and civil engineer?—Yes. Speaking generally, I confirm the evidence given by Messrs. Fraser, Grace, Banks, and Hopkins.

Mr. Hanna: In opening the case for the extraction company, I may say that at the outset I want to submit to the Commission the titles of my client company. This is a matter which certainly during these proceedings has been more honoured in the breach than in the observance. I make this remark advisedly. The titles to the land are most essential matters in connection with operations of the nature of this and other companies, inasmuch as all properties situated within a mining district after a certain year are held to be subject entirely to the operations of the Mining Act. The section of the Mining Act bearing upon that point is section 132. That section provides, "Notwithstanding anything hereinbefore contained, the following special provisions shall apply in the case of land heretofore or hereafter alienated from the Crown, whether by way of absolute sale or for any lesser estate or interest: (*a.*) In the case of land so alienated on or at any time after the twenty-first day of October, one thousand eight hundred and seventy-five, no person shall be deemed to have any right or title to the flow of any watercourse constituted and set apart as aforesaid by Proclamation under this Act or any former Mining Act which would interfere with or prejudice the right of the holder of any mining privilege to discharge into such watercourse any tailings, mining *débris*, or waste water produced or used in or upon such mining privilege." Therefore, any person whose title was subsequent in date to the 21st October, 1875, cannot under any circumstances have any shadow of claim for compensation or otherwise in consequence of mining operations. Subsection (*b*) says, "In the case of land so alienated on or at any time after the twenty-third day of December, one thousand eight hundred and eighty-seven, such alienation shall be deemed to be and to have been made subject to the full and free right of any person lawfully engaged in mining operations under this Act or any former Mining Act to discharge into any watercourse existing on or running through or past such land, whilst and whenever such land is situate in a district, any tailings, mining *débris*, or waste water produced by or resulting from such mining operations." Up to the present, throughout the whole of this inquiry I have never heard a question asked of any one of the persons who came before the Commission, or of counsel who has appeared for the mining companies or otherwise, to produce or show what title they have for appearing or calling evidence before the Commission. I want to put in my titles, comprising nine river claims granted by the Warden. They are not all of the same date. The dates are: Ohinemuri River No. 8, special river claim, 6th September, 1906; Ohinemuri River No. 9, special

claim, 23rd January, 1908. There are seven—Nos. 1–7—dated 18th March, 1910. I must point out that these latter titles were only granted by the Warden after a great deal of opposition by several local bodies. Those titles to claims were granted by the Warden, and were substituted for other licenses bearing approximately the same date as the other ones I have mentioned. The reason for the substitution for the original title is contained in the addition of the words that all the material treated by my client company should not be returned into the river. Nos. 8 and 9 contain that condition. I might say, further, that these claims, or the bulk of them, were acquired by my company by purchase in the ordinary way from the original licensees, and approximately these nine licenses for about nine miles of river-bed reach from a little above the Junction up to Mackaytown. There are also four more licenses. We were operating upon these. These were absolutely without any conditions. Unfortunately during the last fresh a good portion of the material was washed down, and it was lodged, we hoped, in the meanders somewhere about Pereniki's Bend. That makes thirteen licenses altogether. In dealing with this matter I desire to point out that for a great number of years many people have taken up these claims and attempted to treat these tailings, but until the present company has taken the matter up, and actually demonstrated that the tailings can be treated profitably—and 33,000 tons has been so treated profitably—no one has ever succeeded in getting the wealth out of these tailings. I am now referring to the four upper claims. We have treated nothing in the lower claims.

The Chairman: I see that the words are used, and it is a condition, "twenty-one days after the date of claim."

Mr. Hanna: Yes, but we have received protection. We have at least six months' protection. Besides, we are erecting our new plant, and we are acting in accordance with the Act in what we are doing. We started operations at Waihi with a very considerable expenditure. It took us, roughly speaking, about eighteen months to demonstrate our method of treatment, and during the whole of that time the treatment was of a nature necessarily experimental.

The Chairman: What clause of the Mining Act is it that extends the twenty-one days to a longer period?

Mr. Hanna: We have already commenced operations.

The Chairman: You started by saying that you would show us that your titles were indefeasible.

Mr. Hanna: No one else who has appeared before the Commission has shown his titles. The Chairman asked certain questions that seemed to imply some doubt. He asked if it was not competent for the River Board to sell tailings to my company. That was a reflection, I think, on the titles which my company claims to hold. In addition to that the Chairman also made a remark in regard to the sand on the river-banks. I am not here to argue the legal position of my company, but I thought it necessary to submit to the Commission the titles which we hold. I assert that they are indefeasible titles, and if any question ever arises I have not the slightest doubt that I shall be able to support them. I shall support them not only with my own opinions, but also with the opinions of others probably much stronger than my own. I now put in the title to Hararahi No. 3 Block, 16 acres 1 rood 17 perches.

(At this stage Mr. H. H. Adams, who had sent a communication to the Commission in reference to his scheme for treating the tailings, entered the room, in response to a request of the Chairman.)

In reply to the Chairman, Mr. Adams said he was prepared to give a description of his scheme, but he would like to put it in writing, and it would take him about a week to do that. He added that he was confident his scheme would get over the difficulty.

1. *The Chairman.*] Can you give us any idea of the cost of removing the tailings from the stream?—Roughly, between £20,000 and £30,000.

2. *Mr. Mitchelson.*] That is for the plant?—Yes, that is for the plant.

3. *The Chairman.*] Do you mean the existing tailings?—I mean the coming tailings from now and onward.

4. And the working expenditure?—One penny per ton.

5. And does that mean the whole of the tailings, or does it mean an approximate amount?—I estimate the quantity coming into the river now to be about 3,000 tons per twenty-four hours.

6. They say about 2,000 tons?—There is the residue from the tips, and there is refuse from the townships—it all totals up. That is, 3,000 tons per day. The water from the scheme will go away discoloured, but there will be nothing in the water that will settle in the river, and when the present banks are cleaned out the river will confine everything. There will be a certain percentage of solids in the water, but a very small percentage—less than there is at present.

7. Materially less?—I should say from 2 to 3 per cent. of solids in the water, but it would be a material not affecting the river-banks. It would go right out to sea.

8. There cannot be from 2 to 3 per cent. of solids in the water at the present time?—I think so, if you work it out. I am taking all the water at Paeroa. I am not speaking of the water at the mouth of the river. I am referring to the water at Paeroa when the tide affects the river.

9. From 2 to 3 per cent. solids is a very large amount?—We do not consider it so. Then you have to take the season of the year into consideration. In the summer it is much thicker than in the winter.

10. Does that mean, it is from 1 in 30 to 1 in 50? If so, that is a large amount?—That is what I should estimate, taking the year right round. The water is very thick in the summer-time.

11. There would not be much saving if you left from 2 to 3 per cent.?—That 2 to 3 per cent. would not settle.

12. You are going to stop the 98 per cent.?—Yes, capture the 98 per cent.: that is what I mean, taking the year all round. I am going to catch 98 per cent. all the year round.

13. The volume in the stream is not near that now?—I take the year all round.

(At the request of the Chairman, Mr. H. H. Adams agreed to confer with Mr. W. H. Grace, and give to him some explanation of his scheme; the result to be subsequently reported to the Commission.)

Mr. Hanna (continuing his address) said: I produce the Land Transfer title of the land on which we are erecting our plant. We started operations to erect our plant some time ago. We are dismantling our plant at Waihi, and are removing the whole of it to this place. For the last three years Mr. Kingswell and his officers have been making experiments and taking soundings on the river from the Junction right up. I will call evidence to show the various soundings that were taken. I suppose forty or fifty soundings were taken in one part of the river, half a mile below Pereniki's Bend right down to the Junction. The whole of the bed of the river and the banks of the river have been sampled most carefully, and those samples have been meshed and assayed most carefully also. The result is that an estimate has been made, and evidence will be given both by Mr. Kingswell and Mr. Aitken that there are approximately 2,000,000 tons of tailings in this particular part of the river that I am referring to—that is, in the banks and in the bed. These tailings are in our nine miles of claims, and the approximate value of the tailings will be shown to be about 10s. per ton—that is, 10s. per ton extracted. That is the minimum wealth. Before paying cost of extraction the return will be about 10s. per ton gross value. Under those circumstances it means that there is lying in the bed of the river tailings that we propose to treat, and that there is about 1,000,000 pounds' worth of wealth in them—that is, on the bed and in the banks. Our present scheme embraces the fact that we shall be treating about 500 tons per day; and in view of the evidence that has already been given there will be no more accretions, or practically none; and it means that our operations will gradually clear the river right up.

The Chairman: How many years is that going to take you?

Mr. Hanna: About fourteen years. As to the depth of water in the river, evidence has already been adduced to show that from about half a mile below Pereniki's Bend there is a good substantial depth of water. The evidence of Mr. Aitken will confirm that, and will to some extent show that his soundings prove that the depth is even greater than that. Mr. Aitken's soundings were taken at half-tide, whereas the other soundings were taken at full tide. The position that I take up on behalf of my company is this: My company's position is somewhat unique in this respect: that it has not been in any shape or form a party to the deposit of those tailings in the river, and its operations must of necessity be beneficial rather than detrimental—beneficial, because it is assisting to remove obstructions in the river; and, secondly, it is conserving and utilizing a very large amount of mineral wealth which might otherwise go to waste; and, thirdly, by virtue of its operations it will be a large contributor to the local governing bodies by payment of gold duty; and, fourthly, there is the employment of a considerable number of men in its operations. On the detrimental side I do not think that I can even make a suggestion of anything at all by which the operations of my client company will increase the injury, if any, to what already exists. Evidence will be adduced to show—in fact, you have got Mr. Grace's evidence on that point—that this large body of tailings will be ground finer than even the mining company is grinding them. Evidence will be adduced to show that the residuum coming from our mill will be carried out to sea; and that, inasmuch as our operations will be carried on below those large deposits, it is clear that our residuum will go right down the river, and there will be nothing to stop or impede it. Some suggestions have been made with regard to shortening the length of the river by putting in cuts. The only cut, of course, which can possibly affect the operations of my company is the cut at Pereniki's Bend. The suggestion for that cut emanated from Mr. Metcalfe, whom we have not had the pleasure of seeing yet before the Commission. Whatever may be the value of Mr. Metcalfe's opinion, I submit that his estimate of the cost of the proposed cut is—according to the advice which has been given to me—so utterly inadequate that it is clear he cannot have given the matter the thorough consideration it deserved. I propose to read at this juncture a letter which I have received from Mr. E. F. Adams, dated 5th June, 1910 [Exhibit No. 72]. The effect of this cut, it is clear from the evidence which has already been adduced—irrespective of the evidence we shall submit—would be seriously detrimental to the operations of the company. In the first place I would point out that without exception it is rather remarkable that every qualified or expert witness with special qualifications in respect to engineering is opposed to this cut. There was not one witness called—and it must be remembered that not one of those witnesses was called by myself or by my company—and these facts all came out in cross-examination, and not one of those witnesses has been in favour of the proposed Pereniki cut. Irrespective of that I want to point out the huge injury and possible injustice that such a cut would do to my client's company. Mr. Adams stated that, in his opinion, these meanders near Pereniki's Bend are a sort of settling-bed for the river; also that, in his opinion, the effect of the cut would be to remove or cause to flow down a very large quantity of valuable tailings, and that in his opinion a backwater would be created in the meanders which would be seriously detrimental to our operations. Mr. Grace was also very clear and explicit that, in his opinion, the effect of the cut would be to leave us—"high and dry" I think were the words he used. In addition to that, we have the evidence of Mr. McArthur, County Engineer, who has known the river for a great number of years. We have also the evidence of Mr. Aitken, another engineer who has been connected with the river right down to its mouth, and also with the Thames. As I have said before, the whole of the witnesses who have given evidence, and who are competent to speak on this point, have had nothing good to say about the cut. But, irrespective of that, what is the position of my company? In good faith, and relying upon the present condition of matters existing, my company applied for and took up nine miles of river-bed. They have expended a very large sum of money in experimenting, sampling, assaying, &c., and large sums have been expended in proving the value of the tailings in the river, and also in erecting a suitable plant.

The Chairman: You did not practically work any of the claims except the four up above?

Mr. Hanna: But we had taken out all the necessary details in connection with the erection of another mill at Paeroa, and we were going to run the two mills; but the disastrous flood stopped that. Taking all these matters into consideration, I submit, with all deference, that any interference with the river-bed which would tend in any way whatever to deprive my company of these river-sands, or tailings, or whatever you like to call them—or which would materially interfere with the operations of the company, was never contemplated when this commission was issued. I will just refer very briefly to the heads of the commission. We do not come under the first head, because our operations cannot under any circumstances have the effect referred to there. And, so far as regards remedial measures, I submit that we are carrying out remedial measures, and that all our operations are of a remedial nature. I submit that our interests are absolutely vested interests. I repeat again that the titles of my company are indefeasible, and therefore anything that will interfere with the operations of the company will come within the scope of the words, "injury to any other person." It is within the power of the Commission to suggest a remedy, but if the remedy is of such a nature as to practically deprive any person, corporation, or company of the whole or practically the whole of its estates—because that is really what it comes to; it would be virtually depriving us of the whole of the subject-matter of our estates—I say that under clause 3 of the commission it is an injury of such a nature that it would not be practicable, nor do I think, with all deference to the Commission, that it will make a recommendation which would have that effect. I should like to ask if there is anything to report in regard to Mr. Adams's scheme.

The Chairman: I think I had better report that Mr. Adams explained his scheme to the Commissioners, and the position which the Commissioners take up is this: The scheme propounded by Mr. Adams is in direct opposition to the bulk of the evidence which has been given as to the rate of the deposition of the silt. The bulk of the evidence is to the effect that these very fine slimes are not going to deposit: Mr. Adams's scheme depends upon their deposition. That being so—the two matters being so much apart—we do not care to take the responsibility of saying we would delay the Commission for a week in order that the scheme should be prepared, because it would mean that when brought before you the cross-examination would simply destroy it. It would be one witness against a large number; and therefore we have taken the responsibility of saying we will not worry Mr. Adams any more.

ROBERT MARK AITKEN examined. (No. 91.)

1. *Mr. Hanna.*] You are at present in charge of the operations of the Waihi-Paeroa Gold-extraction Company (Limited)?—Yes.

2. What are your qualifications?—I am a mining engineer and metallurgist.

3. What positions have you held?—I was for eight years and a half Instructor at the School of Mines on the West Coast of the South Island. I was educated at the Thames School of Mines.

4. What experience have you had?—I was for eight years metallurgist to various companies on the West Coast—Keep-it-Dark, Alpine, Scotia, and other companies.

5. Have you had any special experience in the treatment of ores?—During those eight years, with Mr. Kingswell, we were buying, and treating by the cyanide process, the accumulations of tailings on the West Coast. In fact, we were the first to make the cyanide process a commercial success on the Coast.

6. Have you had any special experience in sampling?—Yes; in buying these tailings, of course, we had to carefully sample and assay them before purchasing, and in all cases the actual results we obtained corresponded with our tests.

7. You have taken a good many samples from the Ohinemuri?—Yes.

8. How did the treatment of your tailings then result in regard to your samples?—Before commencing our operations in Waihi we very carefully sampled and tested the tailings in the Ohinemuri at the Waihi plant; and the actual working results we have obtained since have corresponded with these tests.

The Chairman: Is the object of this to show that the bulk is very similar throughout, or the accuracy of the work.

Mr. Hanna: The accuracy of the work.

9. *Mr. Hanna* (to witness).] You have also had considerable experience in dredging?—Yes, with bucket dredges.

10. I think you have had a very considerable experience on the West Coast in all branches of metallurgical work—sampling and treating tailings generally?—Yes.

11. Can you tell the Commission some of your experiences in dredging?—I have been connected with the Pactolus, Callaghan's Creek, Buller, and various other dredging companies on the West Coast. I acted as director of a good many of them.

12. Since your experience on the West Coast you have come to Auckland: how long have you been in Auckland?—About two years and a half ago I came, under engagement from the Waihi-Paeroa Gold-extraction Company, to take charge of the Waihi plant.

13. Were you concerned in the erection of the plant?—Yes, I erected the whole of the plant at Waihi which we are now dismantling.

14. Can you tell the Commission approximately what was expended in connection with that plant?—About £16,000.

15. How long did it take to erect, approximately?—About nine months.

16. How long was the plant running?—About eighteen months we were actually working, but most of that time, I may say, we were experimenting to a certain extent with the fineness of the grinding and the treatment of the tailings, really to find out the economic limit to which we could

grind, and at the same time obtain data for our larger plant which we intend erecting at Paeroa. So that, owing to this experimental work, the plant was not running to its full capacity the whole time.

17. *The Chairman.*] Any of the time?—Oh, yes! a portion of the time it was.

18. *Mr. Hanna.*] How many tons of tailings did you treat?—32,800 tons of tailings, and obtained a little over 14,000 pounds' worth of bullion.

19. What was the approximate value per ton?—It works out at about 8s. 7d. per ton, actual extraction.

20. *The Chairman.*] Were the tons short or long tons?—Short.

21. *Mr. Hanna.*] Was that the average extraction?—Yes, throughout the whole time.

22. Did you get any higher extraction than that?—Yes, as high as 11s. 6d. and 12s. extraction from some portion of the sands; but these high results were considerably reduced on the average owing to the difficulties we had in the early part of the treatment, which we finally overcame.

23. Will you tell the Commission how finely you grind the tailings in that plant?—We grind everything to pass a 200-mesh screen. That really means that the greater portion was ground to pass a very much finer screen. I think I should be safe in saying that 50 per cent. would pass a 300-mesh screen.

24. Do you propose to grind finer in your Paeroa works?—Yes, we propose to grind everything to pass at least 250-mesh, because we find the finer we grind the better are our bullion returns—that is, up to a certain limit per ton.

25. Can you compare the tailings in the lower part of the river—that is, the nine-odd miles above Pereniki's Bend—to, say, Mackaytown, from a value point of view?—I think the tailings are very much the same as we had at Waihi. They are a little lower in value, but we shall obtain a better extraction from them.

26. Can you say what that extraction will be, in your opinion?—From the numerous tests we have made I should say we shall obtain at least 10s. per ton extraction.

27. What reasons have you for saying you will obtain a better extraction?—Well, I cannot say what the reason is, but the tests certainly show a better extraction. It may be owing to the tailings coming in from the Karangahake mines, or that a large portion of these tailings which have accumulated at Paeroa are from earlier crushings.

28. *Mr. Vickerman.*] The coarseness is the reason?—That is really the reason for them holding the gold.

29. *Mr. Hanna.*] The point has been raised as to whether it would not be just as well to take charge of the tailings immediately they are discharged from the works rather than to let them float on the river and settle, and then treat them. Is there any reason why it is better to allow them to flow into the river?—The effect, of course, is to carry them away. Small portions may lodge during a dry winter, but as soon as there is a slight fresh in the river they are gone. We discharged the whole of our tailings into the Waihi Company's dam, and that dam during dry weather will really not overflow, because the whole of the water in the dam went to Waikino and was utilized for power purposes. We discharged the whole of our slimes into that dam, and there was no doubt as to the tailings going away, because with a very small drop of water, away they went.

30. *Mr. Mitchelson.*] They did not settle in the dam at all?—They never hardened. They just lay there while there was no overflow, but immediately any overflow came at all, they went.

31. *Mr. Hanna.*] I think you had some members of the Ohinemuri County Council up to see that?—Yes; they came up to see whether there was any chance of the tailings stopping in the river, and I think they were perfectly satisfied after seeing our plant that they would not stay in the river.

32. Have you had any experience of the slimes settling on the banks of that Waitiki Stream?—No. The whole of our discharge went into the mouth of the Waititi and after that into the dam. There was only a small trickle of water there, and it carried the whole lot into the dam.

33. *The Chairman.*] And out of that dam the water went to Waikino?—Yes.

34. And, from what you tell us, if it does not settle at all, the whole of your slimes and tailings must have gone to Waikino?—Yes, a very large quantity went down through the tail-race.

35. We are told the slimes practically never settle; therefore the whole must have gone excepting that which went over the spillway?—A certain amount remained in the river. When a flood came, and the dam overflowed, the larger body of the slime remaining there went.

36. Then you disagree with all the previous witnesses who say that slimes will not deposit in the river?—There is no deposit here so far as I have seen.

37. All the previous witnesses have told us that these slimes, particularly the finely ground slimes, will not deposit?—I consider they will deposit in perfectly still water, but in nothing with a flow in it at all. With a movement of 6 in. a second they will go—half a foot per second is quite sufficient to shift any of that slime.

38. *Mr. Mitchelson.*] Have you seen any slimes at Pereniki's Bend, where there is practically no still water?—I have tested Pereniki's Bend, and bored there, and I cannot find any slime in it.

39. *Mr. Hanna.*] Can you give us any explanation about this whitewash they speak so much about?—No; I have noticed the whitewash on the grass, but I have never examined it.

40. What is the effect of a shower of rain on a deposit of slimes on the land?—I have noticed a good many places where the river has overflowed and has apparently carried over a certain amount of slimy material; but if you get a heavy rain afterwards the slime carries away. There are places where the water may lie and deposit that slime.

41. *The Chairman.*] Supposing you get no heavy rain after the flood goes down, but sunshine instead?—Well, the deposit remains.

42. And vegetation is killed?—Yes; I do not think it does vegetation any good.

43. *Mr. Hanna.*] When the river is cleared and there is a proper flow of water in the whole body of the river, would there be, in your opinion, any deposit of slimes at all?—No. From what I have seen of the river I should say that if the channel of the river was thoroughly well cleared the flood-waters would carry the whole of the slime away before the flood-level was raised to a sufficient height to overflow the banks.

44. That would apply below, but how would it apply above, where your sands are?—I mean, above and below. I should say the waters would take a considerable time to rise, and during the rising they would take up any slimes if the river was thoroughly cleared.

45. *Mr. Mitchelson.*] What do you mean by "thoroughly cleared"—because we know it is not cleared?—I quite agree that it is not cleared.

46. You suggest the slimes will not stick up there?—The slimes do not remain in that part of the river, as I can show by actual tests. In fact, they do not even remain in the lower portion of the Ohinemuri where there is very little flow; because I have tested the river, and I fail to find slimes to any great extent. In fact, on the bed of the Ohinemuri—that is, the lower mile and a half from our station-site to the Junction—there is deep water, and neither coarse sands nor slimes, and yet the flow in that river is only 6 in. per second.

47. *The Chairman.*] You think there is a deposit of slimes on the sides?—Yes, there is a deposit on the sides.

48. Then, as the river rises and floods will not the deposit of slimes be washed off?—The reason why they cannot wash off at the present time is because the willows retard the stream and prevent the swing of the current to carry off the slimes. But if the river is cleared I say the slimes will not remain, but will go.

49. That is your opinion: you have no facts to prove that?—I have. In those parts of the river where there are no willows little or no slimes have accumulated. Where the bank is fairly straight you will find a very, very small deposit of slime. But anywhere where the willows grow or the stream is retarded you will find a deposit.

50. *Mr. Mitchelson.*] That is the case at the Railway Wharf?—Yes, the willows.

51. *Mr. Hanna.*] You did a lot of boring on that river?—Yes.

52. In all the bores have you ever come across a layer of slimes?—Yes, thin layers of slime. They would run about an inch or a couple of inches in places.

53. Where would you get that?—In the bends mostly—not in the bed of the river, but on the banks.

54. But you have never discovered any in the bed of the river?—No. I have bored the whole of the bed and the whole of the banks.

55. *Mr. Mitchelson.*] There is very little ordinary tailings in the bed of the river?—It varies from about 4 ft. to over 12 ft. in depth in the Ohinemuri.

56. Below the Junction?—I am not speaking of the Waihou.

57. *Mr. Hanna.*] We will take the section of the river from Mackaytown to your plant-site below Pereniki's Bend: will you describe the sands and the samples you have taken and the bores you put down?—I may say that right from Mackaytown down to our present plant-site we have bored the river on two or three different occasions, and also sampled by boring the banks. I have taken an average of the whole of the tests made over three different sections of the river. Starting from the abattoirs just below Mackaytown to a point below Tarariki Creek, the average grade shows 66 per cent. remaining on a 60-mesh screen, 29 per cent. remaining on a 100-mesh screen, and 5 per cent. that will pass 100-mesh. The amount that would pass 120- or 200-mesh was not worth estimating. These were taken on the bed of the river.

58. *The Chairman.*] What do you define as the "bed of the river"?—From bank to bank at water's edge.

59. At low water or when?—Some of these samples were taken when there was a small flood in the river. We did not take particular notice of the tide when sampling.

60. *Mr. Hanna.*] How long did you take over this sampling?—For these particular samples we spent three weeks on the river with two men. Not only did we bore it over the whole depth, but we took samples every 2 ft. in depth, so as to ascertain whether the lower deposits were richer or poorer than the upper.

61. To what depth did you go?—On this particular section from the abattoirs to Tarariki Creek we went through from 3 ft. to 8 ft. of coarse sands in the bed of the river.

62. *The Chairman.*] You said you had taken the average of three different sections: how far apart on each section did you take borings?—I have divided the river into three different sections: first of all, from the abattoirs to Tarariki Creek: then from Tarariki Creek to Porritt's house; then from Porritt's house to the railway-bridge and right down to the present plant-site. I have taken a separate average sample of the whole of the samples taken from the banks of the river. They go a good deal finer than those from the bed, so I kept these separately. I have given you the grade of the sands in the first section. On the second section, from Tarariki Creek to Porritt's house, the depth of coarse sand is 6 ft. to 8 ft. in the bed. The average grade shows 59 per cent. remaining on a 60-mesh, 32 per cent. on a 100-mesh, and 9 per cent. will pass a 100-mesh. From Porritt's house down practically to half a chain below Pereniki's Bend the average grade shows 56 per cent. remaining on a 60-mesh, 35 per cent. on a 100-mesh, and 9 per cent. passes a 100-mesh. We sampled 12 ft. in depth, but could not obtain bottom to the tailings.

63. Do you mean that in the whole of that area you could not get bottom?—You could not get bottom over the whole of that area. The rod would only sample to a depth of 12 ft., and would not go beyond it.

64. And in each case you took a sample every 2 ft. down to 12 ft.?—Yes.

65. So there were five samples on each bore?—Yes. We varied it: sometimes it was every 2 ft. and sometimes every 3 ft. We were not particular. It was more to find out if the bottom sand was better or poorer than the top.

66. *Mr. Hanna.*] Did you sample the banks also?—Yes. The average grade of the banks showed 8 per cent. remaining on a 60-mesh, 44 per cent. on a 100-mesh, 18 per cent. on a 120-mesh, 9 per cent. on a 150-mesh, and 21 per cent. passed 150-mesh.

67. Is that all along the banks or in any particular section of the three sections?—These samples were taken on the banks from one end of the river to the other. We could only bore to a depth of 12 ft., although the banks were very much deeper.

68. Can you give us any idea or estimate of the slimes that were in these samples that you took?—Yes; but before doing that I would just like to mention that in all of these samples there was from 2 per cent. to 10 per cent. of coarse river-silt which was eliminated before grading.

69. Do you include the bank as well as the bottom?—There was little or no river-silt in the bank-material.

70. *The Chairman.*] Did you in no case in your borings get to the original bed of the river?—Yes; in the upper reaches of the river we got right down to the hard. The original bottom seems to be hard mud. You cannot bore through it.

71. What was the boring done with?—We bored with a long length of bicycle tubing. We had an iron rod with the end just large enough to fill the bottom of the tube, and we would force the tube down through, say, 2 ft. of sand to take the first 2 ft. Then we plugged up the end, raised it out, withdrew the plug, and discharged the sample into a bucket. Then we put the iron rod down through the tubing and forced the rod down 2 ft., and then withdrew the iron rod and forced the tube down another 2 ft., so that the second 2 ft. of material came up into the tube. We continued this method right down every 2 ft. to a depth of 12 ft. It is a very accurate method of sampling, and we proved it on the Waihi plant to be absolutely correct, because we afterwards worked the sands we had sampled, and they panned out according to the assays we had made on the previous bores. I would also like to say that where these coarse sands tailed off—that is, half a mile below Pereniki's Bend—at the time we took these present samples, I went a few chains further down the river, and took a sample right from the bottom. The sample showed 45 per cent. of coarse river-sand, and the remainder of the fine material was at least half river-sand. I think that shows there is a very fair deposit of river-sand on the bottom of the Ohinemuri River.

72. *Mr. Mueller.*] What depth did you take that sample?—Through the river-sand about 3 ft.

73. *Mr. Hanna.*] So I take it that the tailings cease about your site?—They did at that particular time. That sample was taken on the 27th May, 1909; but since then the coarse sands have extended—well, at least another half-mile further down the river. I expect a portion of that was what came down from our Waihi plant.

74. Have you made an estimate of the quantity of tailings in the river on these claims of yours?—Yes. It is a very difficult matter to make an accurate estimate, but as near as we can judge we reckon there are two million tons of tailings at the plant-site.

75. And the average value of these two million tons is——?—I should say the average value is 12s. 6d. per ton. We had assays as high as 14s. on that river, but the average value is about 12s. 6d.

76. And in giving that average value you are going on assay values?—Yes, on a very large number of tests we have made.

77. Can you give the Commission some information about the position of the bend and banks of the river from your works-site down to the Junction? Have you taken any soundings or borings, and when did you take them?—Yes. I took these depths on the 21st May, 1910.

78. What was the state of the tide?—As near as I could judge, it was about half-tide; it may have been a little more. It was flowing.

79. You have prepared a plan showing these soundings and the results?—Yes; it is just a tracing and statement of the soundings on the Ohinemuri and lower Waihou Rivers. [Exhibit No. 73.] The soundings were all taken consecutively, and the tracing will show the depths as you go down the river. These depths were taken with a pole, iron-shod.

80. *The Chairman.*] You said you took these about half-tide flowing: you could not have taken all these on a half-tide flowing on one tide?—No. I think it took us about an hour to take these going down the river the distance I have shown.

81. You had a launch?—No, in a pulling-boat. We had a slight current with us all the time.

82. Are these all mid-stream?—No, we zigzagged across the stream; we did not take them in any particular place.

83. What was the length of your pole—because I see two places marked "No bottom"?—We had a 20 ft. pole.

84. So that it means, I suppose, the depth exceeded 18 ft.?—Yes.

85. *Mr. Hanna.*] What depths did you find?—I have them written out, and also the depth of tailings on the bottom.

86. *The Chairman.*] There is nothing here to show where the position is?—Only the position marked on the tracing.

87. It does not show whether it was in the centre of the river or on the side?—I do not show that. These soundings were just taken haphazard.

88. Of course, you took no samples of the sand; you only got one, because you say that where you have not called it "tailings" all the rest is either gravel, or coarse sand, or hard bottom?—I have felt them so often with a pole that I can tell pretty well by the feel. These soundings show that Nos. 1 to 25 are taken in the Ohinemuri River, and they all show a fair depth of water, from 10 ft. to 20 ft.; and immediately you go into the Waihou River the depths go down to 3 ft. or the bottom rises up to 3 ft., which shows that at the Junction the bed of the Ohinemuri is at least 12 ft. or 15 ft. lower than the bed of the Waihou. And, as there were practically no deposits of slime, or very little deposit of slime, in the Ohinemuri, notwithstanding that the stream is retarded by the raising of the bottom to that height, it shows that what we call the fine slime that is put into the river is really a very difficult material to settle, when it will not settle in the Ohinemuri.

89. You claim that is a big pool, and therefore if the slimes were going to settle they would settle there?—Certainly, I should say so.

90. *Mr. Hanna.*] I think you have actually bored there also?—Yes, I have bored the Waihou.

91. Have you done this boring by yourself, or have you always had assistance?—I have always had somebody with me.

92. Have you bored the Ohinemuri down there as well?—Not below the plant-site.

93. *The Chairman.*] I understand there are no borings on any part of this plan?—No.

94. Although your claim goes close down to the Junction?—That tracing was only drawn to show the position at which these soundings were taken. I had forgotten when I answered Mr. Hanna that I did take one sample in the Ohinemuri, right at the mouth of the Ohinemuri before it enters the junction. I will give you the grading of that: 4·5 per cent. remained on a 40-mesh—it was vegetable matter with just a tracing of sand, 2 per cent. remained on a 60-mesh, 29 per cent. remained on a 100-mesh, 35 per cent. remained on a 150-mesh, and 23 per cent. remained on a 200-mesh; the balance passed.

95. Can you fix on the tracing where this sample was taken?—I should say, just between 25 and 26. Most of that sample was river-sand; I should say, judging it, that the half was river-sand.

96. How do you judge it—by the microscope or your own sight?—By observation. I have a good deal to do with the mining tailings, and also a good deal to do with the Waihou silt.

97. You describe 25 as rough bottom and 26 as rough gravel; therefore, according to that, where you describe this as rough bottom or rough sand, in your opinion, half of it is tailings?—No; that sample of sand was taken from the Ohinemuri River. You see, the two rivers meet, and the Ohinemuri goes down-stream, and that sample was taken right in the Ohinemuri. In taking the depths, we took them more in the middle of the stream, and not alongside the bank. I may say that this sample was taken a good while before the soundings. I have other samples taken at the same time as I took this sample, but I am sorry to say I have not the results with me. These samples were taken for the purpose of trying to find out what the tailings are like there; and the reason for taking them was that Mr. Kingswell had written me asking whether it was worth while to take up further claims down there, so I was trying to find samples down there, and in taking the samples I happened to get that one. We were trying to see if we could find any more tailings down the river to justify us in taking up more claims. But we found it was not necessary to take up more claims, because the tailings have not got to the end of the boundary of our present claim. They are not there now.

98. *Mr. Mitchelson.*] There are a good few tailings at Thorp's?—Here are samples taken from the cut on the top of Thorp's orchard, to show that the sand is very fine there. Only 1 per cent. remains on 100-mesh, 22 per cent. remains on 150-mesh, 23 per cent. remains on 200-mesh, and 54 per cent. passes the 200-mesh. That is pretty fine sand on the average.

99. *The Chairman.*] Would you not call that slime?—It is practically slime. There is 54 per cent. of it slime.

100. What do you call "practically"?—Because there is a certain amount of coarse sand amongst it.

101. *Mr. Hanna.*] Mr. Grace said that everything that passes 100-mesh is slime: do you agree with that?—I have been grinding very fine, and I have always called "slime" anything that will pass a 200-mesh screen. I should say that sand that will only pass 150-mesh is very fine sand. We know that fine sand that will pass 100-mesh and remain on 150-mesh will pay working-expenses to regrind it, so we call it fine sand. We certainly are not trying to treat slimes, but we are treating fine sands.

102. I understand from what you say that you are keeping a pretty constant watch on the deposits in the river so far as your company's claims are concerned?—Yes, I have been taking special note of them.

103. Where were these samples taken from?—These samples were taken from the Waihou immediately after you go from the waters of the Ohinemuri into the Waihou, just at the Junction, and they show distinctly that the deposit there is river-silt, and not mining tailings at all.

104. *Mr. Mitchelson.*] In the middle of the river?—You can take a sample from bank to bank, and you can find but very little mining tailings.

105. Under water?—Yes, anywhere, any water. In grading, these grades distinctly show that the percentage of mining tailings is very, very small.

106. That is similar to what we saw in the County Council office?—Yes; I suppose very much the same.

107. *The Chairman.*] How can you tell by grading? Do you imply by that that nature cannot produce anything as fine as you can?—No: I mean that these sands that are blocking the river at the Junction are so coarse that it is impossible for them to be mining tailings. The batteries never crush to that grade.

108. *Mr. Hanna.*] Do you know where Mr. Moresby's boathouse is?—Yes.

109. Have you ever taken any borings on the river from there to your plant-site with Mr. Moresby and Mr. Kingswell?—Yes, I believe about eighteen months ago we did take a few samples up the river. I have not got the results, but I know they were useless from our point of view. They were no good as tailings.

110. Did you do any boring last Friday?—Yes, we bored the Waihou from Te Puke. We spent four hours on it from Te Puke to the Junction.

111. First of all, you took soundings from the Junction down to Te Puke, and you have put these in?—Yes.

112. And the class of material you have found in the bed—you say it is practically all river-sand?—Yes. There was a very small percentage of mining tailings amongst it, but not worth considering.

113. Will you explain where you did this boring in the Waihou last Friday, and what you found?—We started at Te Puke to find the depth of the river-silt in that portion of the river from there up to the Junction. We found about 7 ft. of water in most places, and from 5 ft. up to 10 ft. of this river-silt. That is as deep as we could bore with the rod. I believe there is a good deal more there.

114. Did you find bottom at all?—Only in two places did we get right through the river-sands on to the bottom. It is rather hard to bore through in places, and there were only two places where we appeared to get to the bottom, and we brought up a greenish sand, which appeared to be the original bottom of the river. We did not get through that sand; so, of course, we cannot tell what depth might be there.

115. Have you got that sample?—No; I gave these samples to Mr. Kingswell, and I have not got them here to-night. He will produce them to-morrow.

116. Then, I understand, according to your investigations on the Waihou, you found no slime in the river at all, except on the bank?—No.

117. Is there any extent of slime on the bank?—No, I would not say there was a very great extent of slime; it is just where the willows have grown or the stream has become impeded, and a settlement has taken place. There are just shelving ledges of slime.

118. You have been here while all the evidence has been given, and you have heard some of the schemes for ameliorating this river trouble. One of these proposes certain cuts in the river. You know Mr. Metcalfe proposes one cut at Pereniki's Bend and another lower down the river?—Yes.

119. We will start with Pereniki's Cut: what, in your opinion, would be the effect of that cut, first, on your company's river claims, and, second, on their operations?—I think if that cut is put there down to the bottom of river-level, it would carry at least a third of the tailings in the river above away through the cut, and probably fill it up to some extent, and block up the lower portion of the river at the end of the cut. I think they would form a bank.

120. You think that process would be repeated with every flood that came?—I think every flood would continue carrying more sands through.

121. *The Chairman.*] You have above that point how many millions of tons?—I suppose we must have a million and a half tons, or more.

122. Do you mean that, of the company's tailings, say, one-third of them is above the cut?—Yes. I should say half a million tons would go right away as soon as the cut is put in.

123. And form a bank at the end of the cut?—I certainly think so. I think they would block the river at that point.

124. *Mr. Vickerman.*] Would they stay in the bottom of the river down there?—Certainly they would

125. All the evidence we have got is against that. Suppose they stay in one bank in the bottom of the river, then your company could remove them from that site equally well?—No, we could not, because the cut would take away the greater portion of the water from the meander of the river, and we should have no water for floating purposes.

126. Can you explain how it could do such a thing?—By blocking up the mouth—because the mouth of the meander would then fill up with slimy material. As soon as we have the material passing straight through the cut, the mouth of the meander must fill up. All the water would be going through the cut. The mouth of the meander must fill up because it would be dead water, and the slimes must settle. In the first place the slimy tailings must block up the mouth of the meander, and in the second place we are discharging our tailings, and we should block up the other end.

127. *The Chairman.*] But your experience at Waihi was that the slimes when discharged into what was practically still water in the dam, with very little spill over it, did not deposit, and could not be found?—But they required a current of some sort to carry them away, and that current did come at times.

128. Would that current not come into the back-water in the meander?—I think there would be absolutely no current at all in the meander, once the cut is put through.

129. You are assuming the mouth would be blocked, which may or may not be correct?—That is the experience with drains.

130. Cooper's drain is running through it, and there is the drainage of the district for three miles, and all that would give you a volume of water through the meander?—There is only a speed of 6 in. per second in the Ohinemuri River now.

131. You still will have a sectional area sufficient to produce a velocity of at least 6 in. per second?—We should never have sufficient water to wash the slimes away. Then we should have to pump the water we are going to use on the plant-site.

132. You told us that the amount of water you had in the dam at Waihi was comparatively small—so much so that the whole of it went away in the flume to the mill-works, with very little spill-over in the case of freshes?—No, I hardly intended to convey that. What I thought I said in connection with the dam was that we discharged our slimes into the dam, that the water cut through these slimes and carried a portion down the Waihi Company's race, and that when the river rose and flood-water came the main body of the slimes was carried away.

133. Will you not have a body in the dead water of the meander to carry your slimes?—I do not think we should have a current at all, even in rainy weather. There is no watershed to that portion of the river.

134. A large number of drains run into it—Cooper's drain is a big one—and Kuaoiti Creek and all the railway drainage goes down into it: there is a very considerable amount of watershed in that meander which must give you the velocity?—Of course, that is my opinion. I have seen the ground a great deal, and I do not think there is sufficient water coming into the meander from the surrounding country to wash away our 500 tons of slimy material. I think that slimy material will deposit, and block the lower end.

135. Then the slime does deposit in water?—In absolutely still water.

136. Will that be absolutely still water?—Very nearly, I take it, if the cut is put through.

137. May I take this down as what you mean: that you think if the cut is made the meander will become absolutely still water, and that the slimes will deposit to such an extent as to stop navigation and current?—Yes, the slimes will deposit sufficient to stop navigation, but the slimes will not stop the current, if there is a current. I am assuming there is no current there. If a body of water was travelling around that meander sufficient to carry those 500 tons away, they would never form a bank even on that grade of the river at the present time; but if you take away that body of water and take it down through the cut, then there will not be sufficient body of water and velocity in the river to carry 500 tons of slimes away.

138. *Mr. Hanna.*] We will assume that you have dealt with the whole bed of that meander from end to end: what would the effect of this cut be on your operations at the beginning of the cut? Could you work from there or your present site, and work the upper reaches of the river?—Yes, I think we could work the upper reaches of the river if the meander does not block there; but I think the meander will block.

139. Which end are you speaking of?—The upper end.

140. In that case how would you get your dredges and pontoons up-stream?—We could not get them up-stream. I think it would cut off access to our rights.

141. We will take it that large quantities of these tailings are going to be carried away bodily by the putting-in of this cut: once these tailings get carried down below the bottom of the cut and mix with the sands of the Waihou, what would be the result?—I think they would form a bank, and if they mixed with the sands of the Waihou, being if anything a little lighter in grade, and the Waihou sands coarse, they would fill up the voids at present in the Waihou sands, and form hard, and block.

142. *Mr. Vickerman.*] Why cannot they get to the bottom of the Waihou, which is running over 2 ft. per second?—I think these coarse sands in the upper part of the Ohinemuri will never shift in a flow of 2 ft. per second or 3 ft. per second, because they have not shifted in the very largest floods, which have run considerably more than 3 ft. or 4 ft. per second.

143. Any fine sand will move in 2 ft. per second?—Fine river-sand will; but with the tailings they seem to lie so close that the water does not get at them, and it does not move them. I have seen banks of tailings form on our Waihi claims, and I have seen the river running at a tremendous speed, and these banks remained there the whole time. The river passed over them without shifting them, because they lie down solid in a bank, and so long as the bank is smooth and clean the flood-waters pass over them and do not shift them. We proved that in Waihi. Until we started to dredge the sand in the river, pot-holing it, as it were, these sands never shifted with any floods; but as soon as we started operations and the floods came the sands went.

144. *The Chairman.*] Is that not an argument which could be used in favour of the cut: when the cut is made these sands will not part—they have become so hard that the current if materially increased will not shift them, and therefore you will not lose your half-million tons?—I think the sands in the Ohinemuri will go through the cut.

145. Although your previous experience at Waihi shows they will not go?—My reason for thinking they will go is that the bank at Pereniki's Bend is built up 12 ft. If the cut is put down to river-level that bank of 12 ft. of tailings must level itself out, and once these sands start to move I think the floods will carry them away. Not only that, but as soon as we start dredging and pot-holing the river there we shall disturb the bottom, and the whole lot will go. That is what we are afraid of.

146. I presume you will work up?—Yes, as near as we can. Once you get a cut in the bank, it does not take long to shift them.

147. *Mr. Hanna.*] Suppose that in consequence of the cut the tailings come through and form a bank at the bottom of the cut, and that there is then an admixture between the tailings and the Waihou sands, what would the effect be on your treatment?—Well, of course, if the tailings from the Ohinemuri went down and mixed with the river-sands from the upper Waihou, they would be absolutely valueless to us, because it would never pay us to separate them again.

148. I believe you are erecting your mill upon the western side?—Yes.

149. Will you tell us the result of your sinking to put your foundations in?—We bored holes down, and there is about 18 in. to 2 ft. of subsoil, and then there is about 6 ft. of fairly soft clay material, and underneath that is a soft bog, not good enough to hold the foundations for the machinery.

150. You are manager of this Waihi-Paeroa Gold-extraction Company, and if, as such, you are called upon to advise the company supposing this cut is put in, what would your advice be?—I should certainly advise them not to go on with the present plant if the cut is put in, but simply to shift down that plant from Waihi and go on on a smaller scale.

151. *The Chairman.*] What proportion do the two plants bear to one another?—The Waihi plant deals with 100 tons a day, and the proposed plant at Paeroa will deal with 500 tons.

152. Do I understand this proposed plant has not been ordered or erected?—Yes, it is under way.

153. So it is an addition of a 400-ton plant to the existing 100-ton plant?—Yes. It will take about twenty to twenty-five more men than on the smaller plant. We employ fifteen men on the small plant.

154. *Mr. Hanna.*] In the formation of the banks in consequence of the cut, would the tide have any effect? Have you taken that into consideration in expressing your views?—Yes; I have noticed on the river from the Junction up to Pereniki's Bend, when the tide is flowing, that the water if anything is flowing up-stream in the Ohinemuri River; so that at a certain time of the tide that water is practically still, while the flow is upwards. When the cut was put in, the tide would cer-

tainly flow up it. I do not see, once you have a deposit of tailings in the lower part of that meander, how the tide could possibly come up against it, because it will bank up. It only flows for about two hours there. I think it is ebbing the balance of the time.

155. What is the rise and fall at your works?—About 3 ft.

156. And your works are how far from the Junction?—About a mile and a half.

157. You think no portion of that 3 ft. rise and fall would continue to operate at your works?—I do not know whether I have made it quite clear that this bank of slime will form in this lower meander.

158. I cannot see how a bank of slime will form if there is a rise and fall of 3 ft. That involves a certain velocity—it may not be as much as 3 ft., because it will then have two directions in which to go; but, assuming it is reduced to 2 ft. 6 in., what is to prevent that 2 ft. 6 in. still rising and falling?—If the tide is going to rise over that bank of slime then it is going to drive the slime back towards our works.

159. I cannot see how the bank of slime is to form in the first instance, because you will still get a 3 ft. rise and fall?—If the slime has no chance to go away I fancy it must form. If the cut is put in, and the cut is tidal, how can it possibly prevent the flooding of Paeroa, because if a flood occurs at high tide the waters must go over Paeroa as they do now.

160. Anyway, you would advise your company to erect that smaller plant?—Certainly.

161. And you estimate that a very considerable quantity of tailings would go away?—Yes.

162. What estimate do you put upon that loss?—They are all worth 10s. per ton extraction, or about 6s. 6d. per ton profit to the company.

AUCKLAND, TUESDAY, 7TH JUNE, 1910.

The Chairman: I have received a letter [Exhibit No. 74], which I will read so as to get it on the records:—

County Office, Ngaruawahia, 6th June, 1910.

DEAR SIR,— Re *Enforcement of Payment of Rates by Maoris.*

By last Friday night's *Star* I noticed that evidence was given before your Commission by the Engineer of the Ohinemuri County to the effect that that county was losing large sums yearly through being unable to collect rates from Natives, and that Mr. Cotter is reported as saying that, although there might be some doubt as to Natives being liable for general rates, yet there was no doubt they were liable for certain special rates.

At this stage I must say I think that Mr. Cotter must have been incorrectly reported, as at present local bodies have full power to rate Native lands for both general and special rates. It is the question of enforcing the payment of same which is the stumbling-block.

As I notice the Commission expressed itself as probably having something to say *re* the question of Native rating later on, and as this county was referred to, I should like to shortly place our experience before you, as it may assist the question.

By the passing of the Native Land Rating Act, 1904 (now incorporated in the Rating Act, 1908), full powers were given to local bodies to rate nearly all Native lands in full for both general, hospital, and special rates, and in case the Native owners did not pay, then the Act provided that after the local body concerned had obtained a judgment for the amount due it could send a memo. of such judgment to the Native Minister, who then *may* do three things to assist:—

First, authorize the Maori Land Board to deal with the land; second, pay the amount due out of Government funds, and charge against the land; third, authorize the local body to sell the land.

Immediately the Act became law this county placed Natives on its rate-book, and attempted to collect from them, with the following result: For the years 1906–7 and 1907–8 the amounts due by Natives for all rates were about £3,200, and out of this only £7 10s. was paid. We went further, as we took out a Supreme Court writ against certain Natives, obtained a judgment for a large amount, and sent a memo. of same to the Native Minister, who absolutely refused to assist us, although we had a judgment from the highest Court of the land. Since then we have left all Natives off our rate-book, and do not attempt to collect from them, as the present law will not assist us to enforce payment, as the Native Minister has refused not only us, but also the Taranaki and other County Councils. Last year we arranged a Conference of some twenty-one County Councils of the Auckland Province, at Auckland, in May, and a resolution asking for an amendment of the existing state of affairs was carried unanimously and duly sent to the Prime Minister. So far, however, nothing has been done to remedy matters. It is bad enough for our European ratepayers to have to lose some £1,800 a year which the Natives escape paying, but we are well off compared to some counties, as we collect a large revenue from our European settlers, who the last two years have paid up every penny of rates before the end of March. And, again, in our county the gradual opening-up of the Te Akau Block is relieving the position a little. It is not at all fair, however, to my mind, that the Natives should have full use of all roads, &c., and absolutely pay nothing and be under no penalty whatever if they do not pay; whilst, if the European does not pay, the local body quickly recovers against his land.

Tersely, the Native has all the advantages of the European ratepayer, but suffers none of the disadvantages.

I must apologize for troubling you with so long a letter, but a matter like this, which is of such vital importance to the Dominion at large, cannot be disposed of in a few lines.

Yours, &c.,

H. MARSLAND, County Clerk.

W. Ferguson, Esq., Chairman, Ohinemuri Silting Commission, Auckland.

ROBERT M. AITKEN further examined. (No. 92.)

1. *Mr. Hanna.*] I think you put down bores where the present site of the extraction company's works is?—Yes. Yesterday I said there were from 18 in. to 2 ft. of soil and about 6 ft. of clay, and underneath that a soft bog. Those bores were put down by Mr. Banks, engineer. I simply saw the material lying on the ground. The whole of that 6 ft. was not stiff clay—only the upper portion; the lower portion gradually merged into the bog. It was certainly clay, but it could not be called stiff clay by any means. It was a sort of gravelly clay.

2. How much of it would be of the stiffer nature?—I should say about 4 ft. would be of stiffish clay, and then there was about 2 ft. merging into the bog. We found it would be necessary to put down the foundations very flat, or else keep away from the boggy soil underneath.

3. *The Chairman.*] Using what is generally known as a floating foundation?—Yes. The water rises right up into this bog—in fact, two or three feet up into the clay.

4. What is the water-level?—In flood-time about 3 ft. below what it is at the highest part of the site where we are putting the machinery.

5. *Mr. Hanna.*] Yesterday you gave an estimate of the amount of tailings on the claims belonging to the extraction company: on what basis did you proceed in making your estimate?—There is a fair quantity of tailings outside my measurement which was not estimated. I consider that I gave a low estimate of the total quantity of tailings in the river.

6. You consider you have underestimated and not overestimated the quantity?—Yes. I made the estimate for the purpose of seeing how much tailings we had to treat.

7. *The Chairman.*] Did you include the stuff on the banks besides that in the river, and, if so, how much?—I estimated the amount in the bed of the river separately from the amount on the banks.

8. Can you give us the amount you estimated in the bed of the river?—1,727,000 short tons.

9. That was actually in the bed of the river to the water-line—high, or low, or mean?—We did not take very much notice of the tide. I should say it was just about the mean. That estimate is taken for about five miles of the river where the largest portion of the tailings is to be found.

10. I suppose you imply by that that there is very little in the lower portions of the river there?—There is a fair quantity, but I did not think it fair to bring it into the estimate.

11. Can you give us an estimate?—No, it would be difficult to do so. It would be difficult to give an accurate estimate of the quantity extending over such a long distance. I think there must be above high-water level in the five miles about 500,000 tons on the banks—that is, accretions to the banks.

12. *Mr. Hanna.*] I suppose you take the islands in with the bed?—The islands are outside the five miles: they are above it. I have not taken them into consideration.

13. You made those estimates as a matter of duty for the purpose of your directors?—Yes.

14. You made those estimates long before this Commission was thought of?—Yes, eight or nine months ago.

15. *Mr. Flatman.*] Do you think the tailings have increased since that date along the river-banks?—They have not increased very much during the last eight or nine months, and the tailings seem to have drifted farther down.

16. *Mr. Vickerman.*] How much do you think has drifted farther down?—It is very hard to say.

17. In the bed?—I should say it has filled about half a mile in about two years, as far as I could judge.

18. *The Chairman.*] That is in the bed?—Yes; apparently that material has come from above—from the higher reaches. It has come down with the very large floods.

19. *Mr. Myers.*] River-sand?—No; coarse tailings. I should say there would be about 2 to 10 per cent. of river-sand.

20. *Mr. Hanna.*] Yesterday you gave an estimate of the quantity of tailings at Pereniki's Bend: I think you said there was about a million and a half tons?—I was only giving a rather low estimate. It was just a rough estimate which I gave. There is probably a great deal more than that above Pereniki's Bend.

21. Does it follow from your estimate that in your opinion there is half a million tons in the lower reaches of the river below Pereniki's Bend?—The figures do not agree with the figures I gave yesterday. I still believe there are from 400,000 to 500,000 tons of tailings below Pereniki's Bend. It is a very difficult matter to get at it.

22. *The Chairman.*] Before going further I should like to be clear on one point with regard to the quantity of tailings. An estimate has been given of 1,127,000 short tons in the bed of the river—mean water-level: you have not said that the claims of the extraction company do not extend beyond 2 ft. of each bank.

23. *Mr. Hanna.*] Does it say "original bank"?—When the matter was discussed before the Warden, the Warden said "it was the original bank of the river."

The Chairman: Your claim, you say, is to within 2 ft. of the original bank. Then I want an estimate of the amount of tailings remaining on the 2 ft.

Mr. Hanna: When this matter came before the Warden the question was fully explained and threshed out by counsel on behalf of the extraction company, and it was distinctly stated then that we were to work within 2 ft. of the original bank, and if our operations caused the sand accumulated on that bank to fall into the river it became our property, and we were entitled to treat it. That was the distinct understanding. That was what was meant by the Warden when he imposed that condition that we were entitled to work within 2 ft. of the original bank.

The Chairman: I suppose you can point out where the Warden stated that?

Mr. Hanna: There would be no difficulty in getting the statement of the Warden to that effect.

The Chairman: It might be well that it should be put in evidence. That is an important matter, and we want to be quite clear about it. I will instruct the Secretary to telegraph for a copy of the Warden's written judgment.

Witness (continuing): When the decision was given we saw the Warden personally about that portion of the river to the banks of the river, and he said that in his judgment he intended it to mean the original banks of the river. I explained to the Warden that in our operations, and by our suction-dredging, and by coming up to within six or eight feet of the bank, the suction draws away the loose tailings from the original banks of the river, but that would not affect the original banks.

24. *Mr. Hanna.*] That would follow in any event by your operations in the bed of the river?—Yes; even if we dredged in mid-stream the sands from the bank would come down. I have seen the sands from the bank coming in when we have been dredging 30 ft. away.

Mr. Mueller: I would like to mention one matter in connection with this point. There are a number of landowners owning land on the bank of the river. I think it is admitted, when land is owned to the bank of a river and to the water-level, that when accretions take place to the bank those accretions become accretions to the property adjoining the river. That question has to be considered as to whether the licenses that have been granted are only for the water-bed.

The Chairman: In other words, you say that as soon as the company commences operations some one owning property on the banks of the river may take action against the company for taking away the accretions—very valuable accretions—and that although they may be working below the water-line and within the limit of their 2 ft. from the boundary.

Mr. Mueller: If they go within 2 ft. of the original bank they are actually taking away these people's rights.

Mr. Hanna: If these people have got any legal remedy, there is a proper way for them to assert it. There is one patent fact—that our titles, the actual ground granted to us over which our license extends, goes to the original bank. The pegs have been put in on the original banks of the river, and our titles extend from original bank to original bank.

The Chairman: That is to say, if a private owner had an accretion to his property the Warden can by his decision and judgment give you a claim which overrides the other man's right at common law.

Mr. Hanna: This is a navigable and tidal river up to a certain point, and in respect to land abutting on a navigable river I submit that no accretions can attach to the property-holder, and at the proper time, if the question be raised, I can quote very strong authorities on the point.

Mr. Vickerman: All the judgments of late have given such land to the landowner.

Mr. Hanna: That may be so in a general way, but it does not apply to mining districts.

The Chairman: Is there anything in the Mining Act which would affect it?

Mr. Hanna: There may be some sections, and there may be decisions dealing with the point.

The Chairman: What I wanted to get at was, what is the volume of tailings upon a strict interpretation of subsection (3) of the Third Schedule of the claim?

Witness: I am afraid I could not give it to you.

25. You have already mentioned the amount of 1,727,000 short tons in the bed of the river. The question then arises as to the 2 ft. from the river-bank?—That estimate was as near as I could get at it.

26. You want to qualify your previous statement by saying that the 1,727,000 tons mentioned is below the water-level, and extends from the original bank on one side to the original bank on the other side?—Yes.

27. And you even then have not deducted the 2 ft. on each side that you are not entitled to?—We could not possibly dredge without those tailings coming into our machine. If we had not the right to disturb those tailings we could not dredge at all.

28. *Mr. Hanna.*] Will you describe the method you adopt of collecting the tailings and treating them, and the method of your operations?—The method of dredging is a combination of the Pohle air lift with the application of water-jets to assist in raising the sand from the river. The ordinary Pohle air lift will raise water, but it would not raise sand without these water-jets. It can suck or lift from any depth, providing the depth below water is about twice the height to be lifted above water. We raised the sand about 5 ft. above water-level in the barges. We lift about 1 of water to 1 of sand. Any excess of water overflows from the barge. Then we take it to our works, and elevate it by bucket elevator.

29. Do you require a great deal of water in your milling operations?—Yes, we must have sufficient water for various purposes.

30. *The Chairman.*] What is the flotation required by your dredge?—Our present dredger only draws about 18 in., but our sand-barges draw about 4 ft.

31. *Mr. Hanna.*] I think, for some few days you have been going carefully into a scheme with Mr. Kingswell involving a lot of calculations and figures. You are, I understand, thoroughly conversant with that scheme, and you approve of it?—Yes.

32. You consider it quite practicable?—Yes, I consider it practicable.

33. How have they got over the difficulties which have been raised or have arisen in connection with this inquiry?—Yes, I think it is practicable, for this reason: that it will increase the sectional area of the river, and will give a sufficient capacity if carried out to the full extent for carrying off the flood-waters containing the slimes without an overflow, and at the same time make the river navigable.

34. It is navigable now to Te Puke: do you mean to Te Puke?—Yes, navigable the whole way to Paeroa eventually.

35. You have heard of certain suggested remedies that have been made during this inquiry?—My own idea is that beyond increasing the sectional area of the river, and clearing it of snags and willows, stop-banks should be placed where the present overflows take place.

36. *The Chairman.*] So as to force the water to overflow in spots where it does not now overflow?—No, to confine the bulk of the water to the present stream, which must give it a greater velocity. If you raise the banks you must give it greater velocity. I would increase the sectional area by taking the material out of the river—by dredging and by including the area up to the stop-banks. I do not think the tailings in the Ohinemuri should be used for stop-banks, because they are rather too valuable to use for that purpose.

37. *Mr. Hanna.*] Do you express that opinion after your constant experience of the river all the time you have been in the district?—Yes; I have been up and down the river fairly often for the last two years.

38. You have seen the river in every condition?—Yes.

39. *Mr. Mitchelson.*] What do you mean by "clearing the bed of the river"?—I mean, by dredging the lower portion of the river, thus improving it, and, if anything, widening the banks, and taking the tailings, treating them, grinding them to slimes, and sending them to sea.

40. What will happen in the intervening fourteen years that it will take the company to treat the tailings?—I think that some very small lengths of stop-banks put along the Ohinemuri at the present time would prevent the township being flooded. The extraction company would then be gradually reducing the amount of sand in the river to such an extent that the floods would become less and less. The river would be improved immediately we commenced operations.

41. *The Chairman.*] Do you propose to have any process for discriminating between river-sand and tailings—any mechanical process?—Yes, we have a separate process. We take out as much as we can of the coarser river-sands, and any fine slimes or material which it does not pay us to treat. There may be about from 1 to 2 per cent. of fine slime-material that it will not pay to treat.

42. That you propose to put back again direct into the river?—Yes.

43. *Mr. Mueller.*] At your Waihi works you deposited the tailings in the Waititi Creek?—Yes.

44. And from there they ran into the dam?—Yes.

45. Did you notice, after the last flood, a large deposit of slimes in the Waititi Creek from your works?—There was absolutely no tailings or battery slimes in the Waititi Creek. We used the water for our boilers.

46. I was referring to the flat where the railway crosses the Waititi: were not your deposits thrown up the Waititi Creek as well as in the Ohinemuri River?—No; that deposit on the grass is a yellowish mud that came down with the flood of the Waititi.

47. That deposit has nothing at all to do with the material that comes from your works?—No.

48. You suggest that for the fourteen or fifteen years it will take your company to clear the river stop-banks should be placed in the meantime on the Ohinemuri River?—Yes.

49. Would not that have the effect of increasing the velocity of the water?—Yes.

50. Would not that have the effect of washing the present deposits in the Ohinemuri River lower down?—It might possibly do so.

51. So that even with stop-banks you might lose some of your valuable tailings?—It is quite possible we might lose some.

52. If that Pereniki's cut is put in, all the deposits of tailings at present in the meanders would certainly be lost?—I do not think so; I think some of them would run back towards the top of the cut.

53. That would be a small fraction of the lot?—No; I think a large portion of the deposits would go down the cut.

54. For a large portion to go down that cut it would practically have to run up the present bed of the Ohinemuri?—No, it would not. The depth of tailings there is about 12 ft., and, once the bank at the bend had gone, that 12 ft. must slope away. The depth of the tailings in the bed of the river is over 12 ft., and it would level itself off, extending further down the stream.

55. On what grade?—I do not exactly know.

56. What is the angle of tailings in still water?—I do not know, but I do not think they would stand 1 in 100.

57. That is the only portion of the tailings at present in the meander that you would lose?—Yes.

58. So that all the rest of the tailings would be absolutely saved to you if that cut is put through?—They would probably remain there, or a portion of them would probably remain. The portion down in that part of the river is very small. I may add that I do not know at what angle tailings will lie in still water, but I should think at approximately 1 in 100.

59. You remember the application made by your company to the Warden last September to remove the obnoxious condition which was in your license—the condition which prevented you returning the tailings into the river?—Yes.

60. The then-existing licenses were subject to such a condition—a condition preventing you returning the tailings into the river?—Yes.

61. And your company applied to have that condition removed?—Yes.

62. And there were numerous objections to that application?—Yes.

63. And the Warden held that he had no power to remove any condition?—He did, but finally he removed it.

64. In March last the matter came before the Warden again?—Yes, I believe it did.

65. That was by application by your company to surrender their old titles—the application being for fresh licenses?—Yes.

66. At the hearing of these applications numerous objections were put in?—Yes.

67. And I think you remember that amongst those objections was one which stated that the granting of the application would prejudicially interfere with a Royal Commission which was then talked of?—I believe there was something mentioned of that sort. I do not remember all the objections, but I think that was amongst them.

68. Do you remember that counsel for the objectors suggested to the Warden to postpone the matter for a month, pending the appointment of a Royal Commission?—Yes, I believe there was something of that kind.

69. Do you remember that at that hearing certain samples were produced, and that amongst them were two samples said to have been obtained from yourself?—Yes.

70. That sample was produced to show that the stuff had settled very close?—Yes.

71. It was in a bottle, and apparently it did settle very close?—Yes.

72. When the bottle was turned upside down it was shown that the stuff had settled very close?—Yes.

73. Do you remember such a bottle being produced?—Yes.

74. And do you remember the following day you came to the Court and explained why it was that the stuff would not shake down?—Yes.

75. You then explained that these samples taken for the Ohinemuri County Council were dried on a boiler?—Yes.

76. You alleged that by drying the samples on the boiler it produced some chemical result which made it become hard?—Yes.

77. That was the stuff which had been treated by you in your company's works at Waihi?—Yes.

78. And to make it settle in those works you used the ordinary process of lime?—Yes.

79. You have heard the evidence given by Mr. Grace, Professor Jarman, and others that when once that action had been destroyed it could never be restored?—Yes.

80. You restored it, evidently?—Yes, it did bring it back to a flocculent state again. I say that lime will make it flocculent. Lime added to any of these samples will make them flocculent.

81. *The Chairman.*] Therefore you are in direct opposition to the technical evidence that has been given by others on that point?—No, I do not think I am. Those witnesses were speaking about the colloidal action in connection with the slimes. I am speaking of the settling or coagulating effect.

82. Do you mean to imply that those gentlemen were perfectly correct so far as they went, but they did not go far enough?—I should not like to say that either.

83. *Mr. Mueller.*] You have stated that these tailings, as compared with river-sand, lie much closer together and do not shift easily—I refer to the tailings at present in the river as compared with the river-sand?—Yes; I say they lie closer together.

84. And therefore it is harder to shift than Waihou River sand?—Yes, once they are in a bed.

85. You also stated you have to start your pumping to give them a start to shift them?—Yes; the effect of our dredging causes them to move on.

86. That is because they are finer than the Waihou River sands?—They are finer and a good deal heavier, I should say.

87. *The Chairman.*] Have you got the specific gravity of the two sands?—No; I am simply judging by observation and by feeling them.

88. *Mr. Mueller.*] So that it follows that, the finer you get the stuff ground, when once it is settling, the closer and the harder it will settle?—Yes, providing it is not in a flocculent condition—providing lime has never been added.

89. Your company had made arrangements for impounding or stacking the residuum?—We have never made any arrangement.

90. You had an option over a piece of land?—Yes, in case we were compelled to stack the tailings.

91. What area was it?—I could not say.

92. Anyway it was, in your opinion, large enough to carry on your operations, and put the residuum on the banks?—Yes. It was a swamp just below our present mill and plant site.

93. So that if that condition had still remained on your license you would still have continued to treat this stuff, and you would dispose of the residuum in some other way than by putting it into the river?—We should have tried to get rid of the slimes on that land.

94. You think there is no insuperable objection to placing these slimes upon the land?—It would be expensive.

95. You have had an experience in your Waihi works of that?—Yes. We never tested any impounding scheme. At that time we expected to get some assistance from the Government in clearing the river. I do not know the result of the application.

96. If you get a subsidy now, I gather that your company would be perfectly willing to treat the tailings in that way?—I do not know. We have changed our opinion as regards stacking the slimes since it has been found that it is not so easy a job as was anticipated.

97. Has the evidence you have heard in this Court changed your opinion on that matter?—No; long before I heard any evidence given here I came to the conclusion I have indicated.

98. *Mr. Hanna.*] What was your idea of sending these samples round to the different County Councillors?—Simply to give them an idea of the fineness to which we were grinding.

99. Did you at the inquiry held before the Warden produce a sample of slimes in a bottle?—Yes.

100. Did that bottle remain in the Court during pretty well the whole course of the procedure?—Yes, it was there all the time.

101. Was there any settling?—It settled down, and left a clear solution on the top: but it never settled hard—it remained in a very soft, flocculent condition, irrespective altogether of its chemical action.

102. What is your practical experience of the course of treatment of tailings by the Waihi Company's plant—that is, as to the slimes?—Once it is discharged from the mill it all went away in the river.

103. Have you traced any appreciable quantity in the river-bed right down to Te Puke?—No.

104. Is there any appreciable quantity of slimes from the works right down to Te Puke—I am speaking generally?—No. The only place where you can find what I call slimes is a little accumulation on the banks, probably through the action of the willows retarding a small portion at those places.

PERCY NICHOL KINGSWELL examined. (No. 93.)

1. *Mr. Hanna.*] You are managing director of the Waihi-Paeroa Gold-extraction Company?—Yes, and also of the New Zealand Portland Cement Company.

2. Your company has a capital of £100,000, the shares being £1 each?—Yes.

3. And it was formed for the express purpose of working these claims and tailings?—Yes.

4. I think you have had a good deal of experience in connection with mining claims, and especially with regard to the treatment of tailings?—Only as a business man coming in contact with these operations daily, but not as a technical expert. This has been mostly in the South Island, and my experience has been principally in connection ——.

5. When you came to Auckland, before you formed this company to take over the river claims, I think you had exhaustive tests made of the samples that were taken, and you examined the river yourself?—Assays had been previously made, and I made it my business to check them as far as I could. I took samples out of the river. I did not bore at that time. After satisfying myself that the values were there I raised the capital and erected the Waihi plant, and sent for Mr. Aitken. I have since then taken samples on different occasions with Mr. Aitken, and have checked his samples with mine. I have been up and down the river on dozens of occasions, both by boat and by walking along the river-banks. I have watched the accretions of sand very, very carefully for the last three years.

6. *The Chairman.*] And the decretions?—There have been no decretions, as far as I know of, at Paeroa, but only at Waihi.

7. When was it you first became interested in this matter?—Three years ago last September.

8. You have heard the evidence given by Mr. Aitken, and his estimate of the quantity of tailings in the river, and as to their approximate value: what do you think about those estimates?—I have had the assays checked by others, and I am quite prepared to support the figures which he gave. We agreed upon that some months ago, and at that time arrived at what we considered safe figures upon which to base our calculations. That is all we did it for.

9. What about the values?—I had the assay checked, as I have stated.

10. Mr. Aitken gave us an idea of the value of the tailings in the river?—Ten shillings a ton all round.

11. Mr. Aitken mentioned 12s. 6d.?—That is the assay value before treatment; the other is the actual value before treatment.

12. The treated value is 10s. per ton?—Yes.

13. And out of that 10s. can you give us what you reckon to be the profit?—6s. 6d. to 7s. we are relying on; it may be a little more than that if we improve in the working.

14. You have heard Mr. Aitken's evidence in regard to the soundings taken by him, and also as to the samples he has taken from time to time, and his report upon both?—I have not been with Mr. Aitken on every occasion he has referred to. I have been with him on two occasions, and have spent the whole day putting down some twenty bores. On two occasions we went down to 14 ft.

15. Have you in all that portion of the river found any appreciable deposits of slimes?—No. That is one thing that I have always been very anxious to ascertain. Personally, I have never seen what I call a deposit of slimes from the Junction right up to Waihi, unless when the river was exceptionally low in summer-time; and in places where there is very little flow slimes sometimes do accumulate to the extent of four or five inches, and sometimes even a little more than that; but on the occasion of the first rain or rise in the river they always go away.

16. Then, do I take it from your observations and from practical results that you are of opinion that these slimes will go out to sea?—If they do not do so I should like to know what becomes of them; I should like to know what has become of the millions of tons of slimes that have gone into the river during the last few years. As a business man I would ask, where are the slimes? You cannot find them anywhere. Take the figures, Waihi Company and our company, for some time past. Three or four hundred thousand tons of slimes have gone into the river. Where are those slimes now?

17. We will come to the cut at Pereniki's Bend: what effect would that cut have upon the operations of your company?—If we had any thought that the cut was going to be put through we should not go on with the erection of the large plant that is to be erected there.

18. Why?—Because we should be afraid of the results. Firstly, it would take away, in my opinion, the greater part of the tailings above the cut.

19. *Mr. Mitchelson.*] Apart from your own works, do you think that cut would benefit the river?—I cannot say that it would. If it was not a tidal river I should think so. It would scour the sands both from the bed of the river and the banks. We should not be able to get our pontoons and barges over the mouth of the cut.

20. *The Chairman.*] Why?—Because there would not be any water. The tailings at the mouth of the cut—there would be a bank formed there. There is a gradual slope from there to the Junction, unless you dredge the bottom of the river.

21. What effect would the new cut have on the river itself? The surface of the water at the top—it is at a certain level now: if you make a new cut what will its effect be?—It will reduce it somewhat.

22. An inch, or what?—Say there is 7½ in. between the two ends, in that case it would not reduce it so very much.

23. If the water-level is lower by 4 in., how is that going to affect the water-level in the meanders?—I should not think it would lower the water in the meanders below the water in the cut.

24. There is a depth of the river at both ends of the cut more than sufficient for the navigation of the barges?—Yes.

25. *Mr. Hanna.*] In your opinion, if an amount of this material were taken down the cut, where would it go to?—It would be taken down into the Waihou. It would be taken beyond our claims. After being mixed with Waihou River sand it would not pay us to treat it. And, in my opinion, it would bank up in the Waihou lower down, and would do harm both to the mining companies and the farmers, and it would be a danger to Netherton.

26. At your mill, I think, you have had some experience of the nature of the soil?—Yes. Our engineer had to find a bottom or foundation for the plant. I have seen the bores. I have a letter from him. [Exhibit No. 75—Mr. Banks's report and samples.]

27. You have heard a number of schemes put forward to ameliorate the troubles in connection with the Ohinemuri and Waihou Rivers. You have a scheme of your own which you wish to bring before the Commission?—Before putting that scheme before the Commission, I wish to say that what I have taken into consideration is this: that, knowing the difficulties and costly nature entailed in the settling of slimes, I propose to remove weekly from the Ohinemuri and Waihou Rivers a greater volume than is put in by the mines—including mining *débris;* and in the course of six or seven years the operations would have the effect of clearing the channel from either Netherton or Te Puke right up, including the Ohinemuri River; and I anticipate there would be a sufficient volume of water and sufficient velocity to carry all the slimes right out to sea. That would be a permanent remedy. [Exhibit No. 76—Mr. Kingswell's letter.]

The Chairman: I think that letter should have been addressed to the River Board, as there is a trust at the present time—the controlling authority.

Mr. Hanna: There is one difficulty—namely, whether the River Boards Act places rivers within a mining district, which have been declared to be sludge-channels—whether they are placed under that authority.

The Chairman: Have you any doubt on the point?

Mr. Hanna: It is a question, I think. It is not a matter I have properly considered, and I only mention it incidentally.

The Chairman: I am glad you have expressed that doubt, because when I formerly raised that question I thought you rather pooh-poohed it.

Mr. Hanna: I said our titles were indefeasible; but I made no remarks about the River Board. That, however, is a point, and if the Commission considers it worthy of consideration, it could be referred to the Government.

The Chairman: One of the objections to the proposal in Mr. Kingswell's letter appears to be that you eliminate the question of the snags, the islands, and the shoals, and I am perfectly certain that in most cases the islands and shoals have originated from snags, and it seems to me that the two things cannot be separated.

Witness: In respect to the island at the Junction there is a lot of *débris*, and, in my opinion, the willows there could be very simply removed. If you take away the heel of the island, the first flood is bound to remove a lot of stuff and relieve a lot of the limbs, and they can then be pulled out, I think.

(Mr. Hanna and Mr. Myers put in a number of exhibits: See appendix.)

Henry Halbert Metcalfe examined. (No. 94.)

1. *Mr. Mueller.*] What are you?—A civil engineer.

2. You have had a number of years' experience?—Forty years'.

3. About a month ago you went down to Paeroa for the purpose of examining the Ohinemuri River?—Yes.

4. How long were you down there?—This time about a week, but I have been at Paeroa a great many times before.

5. You have known that district for a number of years?—Yes; I think I first went up the river in 1883, and I had a flax-mill at Te Aroha about 1890. I had a small steamer running on the river in those days. That was on the Waihou River.

6. Can you give us shortly the condition of the rivers now, and what they were when you first knew them?—My experience of the river was above Paeroa mostly. I have been stuck below Hikutaia in those days in a 3-ft. draft steamer, but very likely that was due to bad navigation.

7. Have you been recently on the upper Waihou?—Yes, I have just built a bridge at Te Aroha.

8. I mean as regards navigation?—No.

9. In this week of inspection at Paeroa, you were there specially for the purpose of examining the deposit of tailings?—Yes.

10. What did your observations lead you to state as regards the effect upon flooding of the country caused by the deposit of tailings?—Below the Junction the slimes seem to have settled on all the vegetation alongside the river and for some chains back, leaving a white coating which did not wash off with the rain.

11. Did you see much of that white coating?—Everywhere I looked.

12. And about how long after the last flood was it that you were there?—I was there just at the end of April—I think the flood was fully a month before.

13. And this white coat was on the vegetation?—Yes, on the grass.

14. What effect do you think that white coat would have on the vegetation or on the cattle that ate it?—I do not know.

15. I suppose you observed large deposits of mining tailings in the water channels in the Ohinemuri?—Yes; they have silted up the bottom and sides very much.

16. What effect would that have on the carrying-capacity of the river in flood-time?—It would reduce it, of course.

17. I believe you made some examinations of the bottom of the Waihou River below the Junction?—Yes; we went down below Hikutaia, and got samples of the bottom and sides.

18. What do you consider these samples consisted of?—Well, the sides were tailings distinctly. The bottom was mostly river-sand. Mind you, I examined more particularly the shallows and not the "deeps." I dare say you would find tailings in the deep holes, but on the bars and shallows it was almost perfectly clean sand.

19. You did not examine the deep holes?—No.

20. Since you took these samples has your opinion undergone any change as regards the quantity of tailings that was in these samples?—When I took them I thought there was absolutely no tailings in them, but after they dried you could see small traces of tailings in them.

21. When wet they appeared as if they were wholly clean river-sand; and, dry, you could see traces of tailings?—Yes.

22. As regards the carrying-capacity of the river below the Junction, has that been affected by the deposit of tailings or otherwise?—Yes, the channel has been narrowed a great deal by the deposit of tailings in the willows at the sides. I do not think the depth has been reduced much, but the width has certainly been reduced.

23. In examining these deposits in the lower Waihou, can you give any idea as to how far they extended out from the bank?—I took them roughly to be 30 ft. on each side.

24. *The Chairman.*] And all the way?—I was going by the trees. I had an old resident with me, and he was showing me the old bank. Of course, it was not uniform by any means, but I think you could take a fair average, and say 30 ft—where the willows were, that is; not otherwise.

25. And how many cubic yards at the cross-section do you think on the average?—I should think 50 square yards of the cross-section on the two sides: that is only a pretty rough shot.

26. And that is from where to where below the Junction?—I do not know. I should not like to make a calculation on the assumption that it was uniform the whole way. The width of the river is not uniform, for one thing.

27. What portion of the river have you in your mind when you make that statement?—Away below Thorp's for the next couple of miles, and I may say above Thorp's as well—pretty well from the Junction to two miles below Thorp's.

28. *Mr. Mueller.*] At the Junction there is a large deposit?—Yes.

29. You saw the groin that had been put in?—Yes.

30. What was the effect of that deposit at the Junction on the flooding?—It undoubtedly banks up the Ohinemuri River. The groin gives a scour across to that river, and that has intercepted the silt-laden dirty water, and dumped it in a heap on the right bank, which has pretty well blocked up the mouth.

31. With what effect in flood-time?—I suppose it would raise the flood-level of the Ohinemuri above that.

32. And the upper Waihou?—A little island has formed in the Waihou which has blocked that at the head of the groin—with silt on the lower side and mud on the upper side of the island. That would turn the water over the banks of the Waihou about a mile from the Junction.

33. And cause the Waihou to overflow its banks about a mile above the Junction?—Yes, in a straight line.

34. In the Ohinemuri itself you say there are large deposits of tailings?—Yes, a great deal.

35. As regards the alleviation of the trouble, what would be the first work that you would suggest?—I think you should cut off the Waihou before you do anything—cut off about three miles of it by a cut 60 chains long.

36. Coming in back again to the Waihou where?—At the end of that bend that Thorp's is on.

37. To what depth do you suggest that cut should be carried out?—I think if you took it down to ordinary water-level the river would do the rest. You would get a flood-channel then.

38. And what would be the effect of that cut?—That would leave the present course of the Waihou from the Junction down to the new junction entirely for the Ohinemuri River.

39. Would you suggest doing anything with the accumulation at the Junction?—Yes, I would clear the groin out at once. I do not think there would be any need to do anything more.

40. About how much would that flood-water channel shorten the course?—I think it cuts just about three miles off the length of the Waihou.

41. Would you propose to throw the whole of the water of the Waihou into that cut straight away, or would you let it define itself?—No; you would have to turn it all down at once to keep navigation going. I think that could be easily taken down in a short time.

42. What would be the next thing you would suggest?—I would treat the Ohinemuri in the same way, and cut off three miles more with about a little over a quarter-mile cut down to the present Junction—that is, at Pereniki's Bend.

43. How deep do you propose to make that cut to start with?—Just down to the ordinary water-level.

44. And what beneficial effect do you think that cut would have?—You would steepen the grade between Paeroa and the Junction very much, and consequently the flood-level of Paeroa would lower.

45. You think it would benefit the Township of Paeroa?—I think there is no doubt about it.

46. I do not know whether you took the actual levels for that cut?—No.

47. Would these cuts not have the effect of bringing the tailings already in the river lower down?—Certainly they would. I consider that would clear out the tailings from all about Paeroa, and drop them in that old channel between the present Junction and Thorp's, where there would be plenty of room for the tailings and the Ohinemuri.

48. You mean they would be taken down to the exit, to just below the Junction?—I think so.

49. Would you suggest any way of dealing with any deposits which might be in the river or which might get in the river, so as to keep the rivers open for navigation up to Te Puke Wharf and up to Te Aroha? If you take the tailings lower down, will they not have to be dealt with in some way?—I do not think so. I do not think that they will extend to the new junction.

50. *Mr. Mitchelson.*] You do not think the effect of the two cuts would be to fill up the lower Waihou just below the Junction?—To a certain extent it would.

51. Not to a large extent?—Well, the present channel takes the combined Waihou and Ohinemuri Rivers, and it would only have the Ohinemuri to carry then. I think it would fill up to a certain extent.

52. But nothing appreciable?—Not to cause any flooding. I am looking solely to carrying the water out to sea without spreading it over the adjoining land.

53. That will give the water a quicker run?—Yes.

54. *Mr. Mueller.*] Then you think any straightening of this watercourse will have the effect of shortening the run and so lessening the liability to flood?—It steepens the grade by shortening the length, and so increases the velocity.

55. Would you suggest anything further in the way of clearing the river?—I think the willows should be cleared away. You want to increase the size of the channel wherever possible.

56. *Mr. Flatman.*] Would you take them out altogether—root as well as top?—That would be a work of some time. I do not think you would do that all at once.

57. In the interests of the river would you remove the willows altogether?—Yes, gradually. Certainly I would grub them out eventually.

58. *Mr. Mueller.*] Would you suggest anything in the nature of stop-banks?—Well, I think you would have to put stop-banks about 500 ft. back from the river, because if you put the stop-banks alongside that river and confine it you will make matters worse. You must leave the river room to spread, and if you do that you would sacrifice the lands alongside the banks. I think it would be worth doing to straighten the course and put the stop-banks about 500 ft. back from the river.

59. That would endanger the homesteads, because they are on the high land which is always next the river-bank?—That is so.

60. As to these cuts which you suggest, can you give us any idea of the cost of cutting a flood-channel to water-level in the Waihou, which is the larger cut?—I think you could do it for £6,000.

61. *The Chairman.*] Exclusive of land?—Yes, I did not consider the cost of the land at all.

62. *Mr. Mueller.*] And the cut in the Ohinemuri?—I think I estimated that at about £1,500.

63. As regards this cut, have you any other idea about slightly altering the course of that cut?—Yes, I looked at one from the same Pereniki's Bend down below Mr. Kenny's house to the Maori ground; but, although it is a better position for the cut, it would destroy several houses, and would cut across the Main Road, and would be a much more costly thing. It is a better line if you had the ground all open.

64. By taking it that course would you go into the Waihou a little below the large deposit?—Yes, altogether below that—about half a mile down, I suppose. It would come in half-way between the Junction and Thorp's.

65. But you think the extra cost is not worth the extra advantage?—No.

66. In addition to these amounts you have given us are there any other items of expenditure which would be necessary? You say the land is not included in this?—You would probably want a couple of dredges. There is a severance in that piece on the Ohinemuri, and there is a severance again in the piece cut off by the Waihou cut.

67. Then, as regards cutting the willows?—I reckon that would be a continuous job, which would go on for years to come. You could spend, say, several hundreds now in cutting the willows down, but the grubbing would take a long time. I think I put down £560 for cutting down the willows and clearing them out of the way now.

68. Is that on both rivers?—I do not think you want to do much on the Ohinemuri. There will be a very short piece left—not more than half a mile—on the Ohinemuri from Paeroa to Pereniki's Bend.

69. After these works were completed there would be some works that would have to be carried on from time to time?—Yes. I think you would have to leave the river in charge of somebody to look after it and give them some money to work with.

70. What amount of money do you think they would want per annum to work with?—I think I could see how to spend about £4,000 a year.

71. Is that in addition to the interest and sinking fund on the original outlay?—That is exclusive of capital expenditure on works.

72. You noticed, I suppose, in examining the river, the outfalls of the drains?—Yes.

73. Did you notice any deposit of silt in these drains?—Yes, there is silt in the drains, of course. Wherever there is slack water the silt is bound to drop.

74. Would they not have to be cleared out from time to time?—That is one of the things the River Board would have to attend to, certainly.

75. Is there any erosion from the drains falling into the river?—No doubt the floods sluice out the drains time and again into the river.

76. On what part of the Waihou were you engaged with this flax-mill?—Just in front of Te Aroha; and I used to fetch the flax down from above as far as Shaftesbury, and higher if I could get water.

77. Has there been much erosion of drains in that district?—Yes, there were some side creeks I know got washed out. There must always be erosion in pumice country, no doubt.

78. There has been a suggestion in regard to your Waihou cut to carry that cut to below the next bend?—Then you lose the landing at the Puke Wharf. It would be an excellent thing, but you would lose the landing, and that is my reason for not showing it.

79. *Mr. Mitchelson.*] It would be a great improvement to the river?—Yes, but I considered there would be so much opposition to the loss of the landing at the present place at Te Puke.

80. Supposing that opposition were removed, do you recommend the extension of the cut as an engineering feature?—By all means.

81. *The Chairman.*] We have been told, if that were done it would be impossible to build another landing below the cut, on the ground that the river is wide and shallow, and that there is no deep water in which to put it, and no width of deep water in which a vessel could swing: does that commend itself to you?—I think you could get room. They manage to turn steamers almost anywhere.

82. From your knowledge of the river do you think you could build a landing-stage below the junction of the second cut if it were adopted? The new cut would come out very close to the Puke–Netherton ferry: do you think you could make a new landing-stage just below the ferry?—I have not looked at it from that point of view, but I think very likely you could get it there. However, I should not care to give an opinion on it.

83. *Mr. Mueller.*] You only had a few days at Paeroa, and you gave all the time at your disposal while in the district to this river question, but you had not time to go into every little detail?—I did not consider the question of shifting the landing at all.

84. But I mean, even in the suggestions you have made did you have sufficient time to go into the actual details of every little item in connection with them?—I do not say that. I think these are the leading features of what should be done.

85. *The Chairman.*] A good working preliminary report?—I think so.

86. *Mr. Cotter.*] Taking first the Ngararahi cut—that is, the Waihou cut—I understand from your report that you only speak of that as an overflow cut?—In the first place.

87. Is that only intended to operate in the first instance, leaving the river to scour its own course down there?—Yes.

88. Then that would mean all the earth, or sand, or whatever it is being scoured into the main river at and above the Puke landing?— I do not think so. If you get it moving it will keep on moving and go out to sea. The river takes down more than that every year.

89. Yes, but you are opening up a very wide and very long surface all at one time?—Yes.

90. Do you not think, whether that scheme is adopted or not, it would be very advisable for the controlling body to have a dredge at or about Te Puke to control any accumulation of silt that might even temporarily lodge and be a danger to navigation?—It would be a useful thing. I do not think it is absolutely necessary. It might be found necessary afterwards, but I expect you could get along with it.

91. Would not the effect of that be to practically shut up for all time the Ohinemuri above Te Puke?—Oh, yes! I think the Ohinemuri is done. I do not think it is worth clearing it out.

92. The residents of Paeroa may have a different opinion?—I mean commercially. I do not think you would get an adequate return on the expenditure in clearing that river—not with that circuitous course, at any rate.

93. Have you considered the character of the land at the Ngararahi cut? Have you taken any borings or anything of the kind?—You can see the river-banks.

94. In this estimate of yours have you only estimated the bare cut, or did you intend to line or do anything of that kind to prevent erosion?—No; I should let the river erode to make the bed it wanted. That is the whole principle of the thing.

95. It might not only be the principal, but it might have a very accumulated amount of interest: it might be that the interest would be very much larger than the principal?—I do not think so.

96. We are told that it is very dangerous to have these cuts unless they are lined or protected: that is not your opinion?—No.

97. Is it your opinion that the banks would erode to a considerable extent?—The river will cut out the banks until it gets a sectional area big enough to allow it to get away.

98. *The Chairman.*] Is not the position that it will cut out the bottom and sides until it gets a sufficient sectional area?—Certainly. I do not wish to confine it to the sides. The river will fix up its velocity and sectional area to suit itself. It will reduce the velocity by increasing the sectional area, and when it has so reduced the velocity it will not erode any more. That is the plainest way I can put it.

99. *Mr. Cotter.*] You say that the river will cut its own way, and make such a cross-section as will provide for the normal river. Then comes a flood, and I want to know what the effect of the sudden change will be: will there be a huge erosion then?—I am afraid there will not be. If there was, you would be getting a channel which would carry the whole of the flood-waters, and there would be no flood.

100. And do you not think that would be the effect of it?—No; I think that is very much to be desired. I am afraid it will still flood, and you will have to cut out these bends and put banks up a long way back—not where most people put them, on the banks of the river. That is only laying yourself out for trouble.

101. I understand you to say that what you will want is a stop-bank 500 ft. from each side of the stream, which is giving 1,000 ft. in addition to the width of the stream itself. And what height would the stop-banks require to be?—About 6 ft.

102. And you think that would be required on both sides of the Waihou and Ohinemuri in order to carry the flood-water?—I do not think anything at all about the Ohinemuri. That would not want anything. If the cut is made I do not think it would flood at all over the banks.

103. You think a cut at Pereniki's Bend would solve the difficulty so far as the flooding of Paeroa Township and the adjacent lands is concerned?—Yes.

104. The other you are speaking about is in regard to the flooding at Netherton?—Yes. But you must not cut the Ohinemuri until you have done the other, or else you will make it ten times worse.

105. Have you considered the question at all of, instead of the Ngararahi cut, just making a cut a little below the Junction as indicated here?—Yes, I looked at that, and I did not think it was big enough. I did not think it was worth doing.

106. Do you think Thorp's Bend would operate prejudicially against the water coming down?—I am losing three miles of distance by this cut, and taking all the flow over three-quarters of a mile instead.

107. Then, in regard to the Pereniki's Bend cut, do you intend that that cut should be the same as you advocate in regard to the Ngararahi cut—that is, a cut in the first instance only to the water-level?—Yes; I think the river would soon cut it down.

108. You know that the Waihi-Paeroa Gold-extraction Company have a license to treat these tailings in this bend?—Yes.

109. Have you considered the question at all as to what time it would take the river to cut out that channel to its bed-level?—It would cut it out directly. I would help it to cut it out directly if it did not.

110. *The Chairman.*] You mean, in the course of three or four days?—I think a couple of floods would do it.

111. *Mr. Cotter.*] Have you taken any borings there?—No, but I can see the banks. There is clay on the upper end.

112. I think I was there, and I could hardly see the banks for silt?—There is clay along against the Maori house.

113. Is that not all pretty well covered with mining tailings?—No; just in this corner you can see the clay.

114. Then the effect of this cut would be that the river within a month or so would find its true level down this cut?—That is the desideratum, at any rate.

115. What would be the effect of that, in your opinion, on this Pereniki's Bend in regard to water?—That would be a back-water.

116. Having no flow at all?—Only what the tide brought it. The tide comes up there now.

117. And, in your opinion, in a very short time the effect of this cut would be to bring the tailings from Mackaytown to Pereniki's Bend down through the cut, and deposit them between the end of the cut and—where? Thorp's Bend?—To some extent. I do not say all, but it would bring some down, without question.

118. Would it have an appreciable effect in diminishing the risk of flooding in regard to the Paeroa Township?—I think so. It would bring down a considerable amount of tailings in that lower part of the river. I think it would bring down a good deal of the tailings about Paeroa.

119. Would it not likely bring these tailings down to the Puke?—I do not think so.

120. Why?—Because there are some deep holes, and they will all have to be filled up first.

121. But is not your experience this with regard to deep holes in the river: that there may be these deep holes, and yet they will not fill up, but the tailings will be carried past them?—I do not know.

122. Have you made any soundings in Pereniki's Bend to test that?—There is deep water from that corner right on.

123. But it is holes I am talking about, not the deep water?—It is deep all along there.

124. When talking about a hole I do not mean a long stretch where there is deep water, but what has been called pot-holes?—I do not know that they exist here. The bends are generally the deeps.

125. But you have not taken any soundings at all?—I sounded right down the Ohinemuri for the purposes of this report.

126. Then you do not consider that any of these tailings above Pereniki's Bend would be taken down to Te Puke even in times of flood?—Not judging by what goes on now; I say they would not lodge below the Junction.

127. Then, by that, do you mean that they would settle or be detained above the Junction?—Yes, above the new junction.

128. Are you aware that in the last flood a large quantity of these tailings above Mackaytown were carried down the river at any rate—to which particular spot we cannot say?—I was not aware they lost any at Mackaytown.

129. But, in your opinion, these would not be carried out to sea, but would be simply taken to some part lower down, not as far perhaps as the junction above Te Puke?—The river drops the coarse stuff almost immediately, and carries the fine stuff farther and farther.

130. Do you say that that is evidence that the material in Pereniki's Bend at or opposite the site of the new extraction-works is finer than the material about Paeroa Township?—No, I do not say there is any distinct difference there. The velocity of the stream varies from time to time, and when it runs it hardly carries the coarse stuff a little further down. I do not see much difference down to that.

131. *Mr. Myers.*] Did you ascertain the velocity of the stream in different places?—No. I know the river pretty well, and I know the velocity you can expect.

132. You did not measure the velocity anywhere?—No.

133. Did you take cross-sections at all?—No.

134. Not anywhere?—Nowhere. I know the width of the stream.

135. But does not the width vary a great deal?—Certainly it does.

136. And the depth?—Yes. A cross-section would be just about as much good as a headache on a stream like that.

137. I suppose you will say the same about the velocity?—Yes; the velocity is always varying everywhere.

138. *Mr. McVeagh.*] You spoke of stop-banks, but you did not say anything as to the cost or extent of these stop-banks: can you give us any information on that point?—If I was making these cuts I should draw the stuff to one side in one act, and make the bank alongside the cut, but further down, because the height would vary with the ground.

139. I understand you to advocate that stop-banks should be constructed at about a distance of 500 ft. from each bank?—Wherever there were low places in the ground.

140. In both streams?—Not in the Ohinemuri.

141. Have you the fall, say, between Mackaytown and the Junction?—No; there is about 70 ft. up to Karangahake. I forget what Mackaytown is. But the levels of these rivers and the velocity are always varying with the tide.

142. What I wanted generally to get is where these stop-banks were to be constructed, and the extent of them, and the cost?—They would be below the present Junction.

143. And none on the Ohinemuri?—No, unless you had one just about the two-mile post on the railway, where there is an overflow now; but you would not have to put that until you got the tailings cleared out, or else you would flood Paeroa worse than at present.

144. Whereabouts on the lower Waihou would you have the stop-banks?—I should not put them until I had looked at the ground during floods.

145. You say two new bridges would be necessary: have you formed any estimate as to what they would cost?—They would be worth about £6 per foot, and I suppose they would be 200 ft. each.

146. That has to be added to your estimate, I suppose?—Yes.

147. Have you any information as to the difference in the levels at the point of intake and the point of outfall at the site of each cut?—In the Ohinemuri very little, because sometimes the grade is the other way. It runs up to this level, so the water-level must be higher down-stream at some stage of the tide.

148. Have you any information at all as to the difference in the level?—But the water-level is always altering.

149. As to the bed-level?—I do not suppose there is anything you could detect.

150. Is the bed-level immaterial?—I think so, quite.

151. In the case of both cuts?—There would probably be a good fall on the Waihou one.

152. Have you any information as to the extent of it?—No.

153. *Mr. Hanna.*] I understand from you that by putting in this Pereniki cut in time the water would be cut off entirely from what is called the meander that runs right round?—Yes.

154. You said the effect would be to make that a back-water?—Yes.

155. Would there be any current at all in that back-water?—I think a couple of little creeks run into it.

156. Supposing these creeks are running into it in summer-time, would there be any current then?—Only what the influx and outflow of the tide would give.

157. How wide do you think this cut should be?—I think it should be 100 ft.

158. Is that at the bottom?—I do not think anybody could go into it so nearly as that in a preliminary investigation, to take out the mean width.

159. I take it you consider the flow of the water down there would carry all the material on the present surface of the ground and on the bottom of the bed away down the river?—The material at the present level would be excavated and shifted out.

160. What do you propose to do with all the material to be excavated and shifted out?—I did not think that out. You could always find a place to put it.

161. Is it quite clear, in your opinion, that the effect of that cut would be to take away a considerable quantity of the tailings above Pereniki's Bend?—That is what it is meant to do: that is the only object in putting it in.

162. No matter what the circumstances might be, the carrying-out of your scheme would take several years to complete?—Yes, it is not going to be done all at once.

163. It would take some years to carry out in its entirety?—I think a couple of years.

164. *Mr. Mueller.*] How does the fall in the upper Ohinemuri compare with the fall below Mackaytown in the same river?—It is much steeper.

165. You mention in your report the question of some Board being constituted: I gather that the details of all these matters would have to be gone into as they arose?—I think so. I do not think it is possible to foresee everything that is going to turn up, so long as you set the thing going in the right direction.

166. It might be necessary to line a small portion of the cut to protect it in some way?—Yes.

167. *Mr. Flatman.*] It would be possible for either cut to scour out to a fair depth in any big flood, or it might take six or seven years before it accomplished it?—I do not think so. I should help it if it was taking as long as that. You see, instead of taking over three miles it is taking 20 chains. Well, the water will run with greater velocity through that, and will almost certainly erode a bed, particularly if it is encouraged.

168. You would just take it down deep enough to keep the flood-water in its proper course, and leave the river to scour?—Yes.

169. *Mr. Vickerman.*] At Pereniki's cut the difference in the low-water level from point to point is 7½ in.?—Yes.

170. What extra speed do you expect to get out of that?—It is flood-water that we are dealing with; the ordinary water-level is nothing, as I said just now—sometimes it is the other way. But

during floods we get a great difference. I suppose the water-level in Paeroa will be 6 ft. or 7 ft. above the Junction in time of flood.

171. That would all depend on whether the Waihou had risen or not?—It is an ever-varying quantity.

172. Very often the floods come from the Waihou and go up the big drains to Paeroa?—Certainly they do. The Waihou runs up the Ohinemuri very often.

173. How would you get the cut scoured out when that happens in most instances?—I think the flood in the Ohinemuri always happens first.

174. I think the Waihou is generally entering in flood when the Ohinemuri comes down; I do not think you would get the cut scoured out?—Then you would have to help it.

175. Take the other cut: we have just got the levels of it. There is a difference of 4 ft. 9 in. between the two ends at low water, and you would have a 4 ft. 9 in. fall in 60 chains?—Yes, and that would give a great velocity.

176. How would that affect the navigation? Do you think the river would stay deep enough for boats to get up?—Yes, I think so.

177. Do you think there would be enough water there with that speed on?—I think so.

178. You know it takes you all your time to get 3 ft. in the upper Waihou now, but it will take you all your time to get 2 ft. with this fall?—Yes, but it will cut the river down and make a new level; I think the river will regrade itself for a great number of miles. There are hard bars in that river every now and again—hard sandstone formation.

179. *The Chairman.*] Can you fix where they are?—I am afraid I cannot.

180. *Mr. Vickerman.*] Then you do not think there would be any danger to navigation in the upper Waihou?—I think they could still manage to get to Te Aroha. Up towards Shaftesbury there was a winch, and we used to wind up with a chain when the water was low, and we got up first-rate.

181. *The Chairman.*] You think there might be some temporary inconvenience to navigation until the river came to its permanent longitudinal section?—There very likely might be. I should think it could be got over.

182. In your view, you would appoint a River Trust with a competent advisor, and leave it to him to get over these difficulties as they arose?—I think so. I do not think it lies with anybody to foresee what is going to happen in that river.

183. You stated you knew the river between 1880 and 1890, and that it used constantly to shoal?—That was going up on the stickles in the river—just where these hard bars are. There is a little rapid in the river, and we used to stick there sometimes—that is in the upper Waihou. But we have also stuck down below Hikutaia at low water, and have had to wait for the tide.

184. There is a sandbar somewhere down there?—Yes; but it was very likely bad pilotage.

185. Your scheme has been to save money—to simply cut down to water-level and leave the flood to scour out; but you have no objection to putting in the cut at once in one operation and work up from the bottom?—Far from it, but I think it would probably run into too much money.

186. But suppose you were asked to do what is best for the river within moderate limitations, how would you modify the report you have already sent in?—I would cut the cuts out to their full depths, and I would drag the material from the upper cut out to a spoil-bank on the west side.

187. So you would get over the fear of the material being eroded and carried down-stream to make further shoals?—Yes.

188. And if the money can be found, you think that is a possible and practicable scheme, and that it will result in great benefit to both rivers?—I think so. It is the only way I see out of it.

189. If that cut were made, and cut down to a suitable cross-section at Ngararahi, would you close up the present bed of the Waihou where the cut leaves it?—Yes, I would put sand-bags across the mouth.

190. *Mr. Vickerman.*] Do you not think the river would do that itself?—Probably you would not have enough water for navigation purposes unless you turned it.

191. *The Chairman.*] We are told that the difference in level in Pereniki's Bend is some 7½ in. Now, that difference of 7½ in. will not remain constant between the top and bottom ends of the new cut, but will gradually work its way up the river for some considerable distance, and to some extent it will work down; so that the river-level would not vary 7½ in. between the two ends?—It does not now, continually.

192. We are talking about dead low water: that would not in any way affect the level of the water in what is called the meander in the long three-and-a-half-mile bend?—I do not think it would. The tide backs up to the bridge sometimes. I do not think it is ever clear of it.

193. And the effect of making a straight cut would be to make the tide run up stronger?—Probably.

194. But is that not a well-known fact?—Yes. It would improve the river in every way.

195. And would probably carry the water-level higher up, and therefore give more water in the meander?—I do not know. I think that has rather complicated that part of it. There is a little water runs into that meander all the time.

196. How do you arrive at the £4,000 a year which you want to spend on works?—I put down a great many things as I thought of them. I allowed for a punt and some winding-gear and things to pull these willows out with, and then I consider there would always be a certain amount of cleaning out of drains and repairing banks, because I think it will be necessary to put stop-banks in some low places.

197. Did you intend to include a dredge at all?—I thought it was very likely.

198. We were told by one witness that the cost of cutting out Pereniki's Bend to the full depth would be from £30,000 to £40,000: do you think that is a fair estimate?—I should be very glad of the job with 10 per cent. off.

199. You think that is an excessive estimate?—I do. I did not contemplate doing this work with a wheelbarrow. I imagined you would get derricks up and a scoop to work.

200. You think the job is of sufficient importance to warrant putting up a proper plant?—Yes.

201. How much a yard do you think it could be taken out for, supposing you take it out for the full depth?—I put down 6d. for the Waihou one, and I think 1s. for Pereniki's, but I do not think it will cost half of that when once you have paid for the plant; and that need not be a very expensive plant.

202. You suggest stop-banks 10 chains back from the river, and tide-traps on all drains: that is going to reduce the available area of land very considerably?—In flood-time the effect would vary, and it seems to me that is what it would take to keep it in. The different states of the tide make it so uncertain as to what would happen.

PERCY NICHOL KINGSWELL further examined. (No. 95.)

1. *Mr. Hanna.*] You wish to make clear a certain point in regard to your evidence?—Yes. I did not intend it to be understood that I would kill the willows or do anything like that with them. Wherever our dredging operations are to be in the Ohinemuri River I shall have to object to the killing of the willows. I meant cutting them down to within 2 ft. or 3 ft. of the bottom, but to keep the roots and about 3 ft. of the boles, otherwise you will get me into trouble with the freeholders. The people put the willows there for the purpose of protecting the banks. To my mind there would be a very great risk in killing the willows, as the banks would be liable to scour in time of flood. I have to have anchorages in time of flood, and if I have not got the willows to hang on to I should have to get rights to erect anchorages from the freeholders all the way up the Ohinemuri. That is the reason I do not want the willows in the Ohinemuri destroyed.

2. You have no objection to all the branches and the bole 3 ft. up being cut off?—That is so, otherwise I could not do it at the price at which I offered to do it. But this applies only to the willows in the Ohinemuri: in the upper and lower Waihou they can kill the willows, or do whatever they like with them.

ERNEST FELTUS ADAMS further examined. (No. 96.)

1. *Mr. Hanna.*] When you appeared before the Commission at Paeroa you stated you would not be in favour of this Pereniki's cut?—Yes.

2. Since then have you seen fit to alter your opinion?—No.

3. I asked you to give me an estimate of what you consider the cost of putting in that cut would be. I understand you have considered the position, and you have taken various other matters into consideration as well, and this is a copy of your estimate of what the putting-in of that cut and the incidentals connected with it would amount to [Exhibit No. 72]. If any cut were put in, in your opinion it should be in accordance with your plans?—I think a fair way to put it would be this: If I were called on to report in regard to the cut, this is the report I should lodge, and these are the suggestions I should offer in regard to the matter.

4. *The Chairman.*] I understand you to say that in a rather half-hearted kind of way—that is to say, you do not recommend the cut?—No.

5. *Mr. Hanna.*] Do you say that, in your opinion, the estimate of the cost you have given there is a fair and reasonable estimate of the cost of that particular cut you would put in if requested?—Yes, I think that is a fair estimate of these works.

6. I think you have taken them all out in detail?—Yes.

7. And you have worked these out at the ordinary prices that would be charged for the particular work?—Yes; there is only 1s. a yard allowed for excavation.

8. That is the regular price that the Government pay for that work?—I do not know what they pay, but 1s. a yard is what I estimate it is worth.

9. *The Chairman.*] I notice you have taken E to E across Thorp's property—across almost the highest land in the district?—No, I was trying to avoid the highest land. So far as the quantities on the lower cut are concerned, I did not estimate for going through the hill. It would pay to take the cut a little to the westward, so as to approach the hill and take a bend that way. The line is not carried up to the full height, and the cut is cut out to the river-bottom.

10. *Mr. Hanna.*] Have you made any provision whatever in that for the removal of spoil?—The cut spoils would be put clear of the banks, so that they would not fall in again.

11. Have you made any provision for the acquisition of some place to deposit this spoil?—I have not considered the question of land.

12. But it is inevitable a place must be provided for the deposit of the spoil?—It is inevitable there must be a right to cut before you can start the cut, and you might as well include that.

13. *The Chairman.*] The reason you think you would recommend this is because, in your opinion, it gives a very much better run to the river?—Yes, and it is quite safe.

14. Why do you not think the previous suggestions quite safe?—Because of the velocity of the Ohinemuri River.

15. You think it would be too great a velocity?—Yes.

16. We had it that the velocity in the Ngararahi cut would be very much greater than in the Pereniki cut?—I am quite satisfied that is not correct. On first putting the cut in in the Waihou the velocity might be greater than the velocity on first putting in the Pereniki cut—that is, the ordinary low-water velocity; but by the time the Waihou cut had brought down river-gravel from as far as Mangaiti in regrading itself, its velocity would be reduced to the normal state. As far as the Pereniki cut is concerned, in ordinary times the river has no great velocity, and you would

not have to provide for lining, but when the flood-waters came down the Pereniki cut I am quite satisfied the floods would go through there at 7 ft. a second.

17. You gave us 10 ft. the other day?—I was giving it approximately. Of course, one cannot anticipate being cross-examined in detail on all these points; but I am quite satisfied it will go through there at 7 ft. per second. I base that to a considerable extent on the velocity of the Kauaeranga, which is a river with approximately the same gradient and will have a similar channel, as far as curves are concerned, to the Ohinemuri if this cut and the training-works were put in. The Kauaeranga River is tidal for about a mile and a half to two miles. It throws gravel and shingle half a mile outside the Shortland Wharf. On these grounds, and on the grounds of these velocities that I have worked out in regard to the Ohinemuri and the Waitawheta, I feel quite satisfied that the Ohinemuri in that new cut will come down at the velocity I estimate, and that the cut will certainly require lining.

18. *Mr. Cotter.*] Is that your cut?—Anybody's cut will require lining.

19. Does that lining refer to the Ngararahi cut as well?—Oh, no! that is a different proposition altogether.

20. *The Chairman.*] What I understand is this: that the Ngararahi cut is a portion of a very long stretch of river, and therefore the cutting of three miles out of a river thirty miles long is a small matter, because the river will grade itself for the whole length of the thirty miles?—Yes.

21. But that if you take a shorter river, such as the Ohinemuri, with, say, ten miles, and cut one-third out of it, that is a dangerous thing to do, because there is not sufficient length for the river to regrade and produce the same safe velocity?—Yes, and that the Ohinemuri inclination is so much greater; it is irreducible.

22. That is true from one aspect, but we have it that the Ohinemuri grade for three miles and a half of the meander is only 7½ in.; therefore it does not appear to me to be any great risk to cut that three miles and a half out, and shorten it down to a quarter of a mile?—The particular matter that makes me think it would be risky in flood-time without a lining is the fact of seeing the gravel and shingle below the Railway Wharf in the Ohinemuri at the present time.

23. And that would continue down the new cut, and down into the junction of the extended Ohinemuri with the Ngararahi cut?—Yes.

24. You are practically increasing the length of the river by adding the piece from the present junction to the new junction, but decreasing it by cutting out the meander?—Yes.

25. Therefore it will have very little effect on the gradient of the river for the total length?—Very little.

26. Would it not then come to the former flow in a little while, and would not that risk be removed?—No. It is not a matter of length entirely, in my idea—it is a matter of the tortuous character of the river at its termination. Take as an illustration the Karaka Creek at the Thames. It used to meander through the town and used to flood the town; but it did not carry anything bigger than gravel to the beach, or to a very small extent. The Karaka Creek cut was put through, and as far as length is concerned it did not amount to a very great amount of reduction, but the Karaka Creek now throws boulders as big as a man's hat on to the beach.

27. The Karaka Creek comes down fast?—The Karaka Creek from almost the battery to the beach has a very low gradient relatively to its gradient above.

28. The walls are lined with boards, and it is a flume, and not a long river at all?—Yes, with a rough bottom.

29. That is a different aspect altogether: you get a head of water at once?—You get less friction.

30. But here is a case where you have three miles of level above the cut: you have hardly any rise until you get to Mr. Cock's place?—There is no great rise.

31. The tide still goes up there at spring tides?—According to Mr. Cock's evidence there are boulders as big as a hat there, and I know that river before the mining *débris* came down was full of big shingle and gravel at Marsh's place, because I was there reporting on them.

32. But the increased length of the river down to the new junction makes up pretty nearly for the meander?—Yes, it does from that point of view; but considering the great stoppage of water there must be at the present time, and the great reduction in clearance, and the fact of seeing the shingle in the position I mentioned, I think that with the new clearance, which must be very much greater, larger shingle and more of it will come down that new cut.

33. But you are going to give the Ohinemuri plenty of room by giving it a channel to the Waihou to the new junction, by which the water can get away—a double-width channel all the way; and you have the Waihou full up below that again to form a cushion for it?—That is so. I was not suggesting lining the Ohinemuri cut beyond Hape Creek.

34. What puzzled me was the 10 ft.-per-second velocity you gave us for that cut the other day. You have now reduced it to 7 ft., and given your reasons by analogy?—Yes; of course, all I could put in directly in regard to that matter would be simply the rough computation I made in regard to the average velocity in the Waitawheta and Ohinemuri Rivers.

AUCKLAND, WEDNESDAY, 8TH JUNE, 1910.

(The following exhibits were put in: Nos. 79, 80, 81, and 82.)

ERNEST FELTUS ADAMS further examined. (No. 97.)

Witness: I have handed in a statement showing the progress of floating material in the river: I suppose a fairer way to put it would be to call it "suspended matter" [Exhibit No. 83].

1. *The Chairman.*] Your statement shows that it takes twelve hours from the battery at Waikino for a particle in mid-stream to arrive at the Junction Wharf?—Yes.

2. And in your statement you give what may be called a history of a particle during its course in the stream, and that shows that it takes thirty-eight hours from the Junction before it gets out of the river. That makes fifty hours in all for a particle floating in mid-stream, where there is the greatest velocity, to get out of the river?—Yes.

3. Then you want to correct the evidence you gave before when you said you took certain samples of water and found a certain quantity in suspension. Those samples were taken on a Tuesday, fifty hours after the batteries had ceased depositing on the Saturday, and therefore that accounts for the small amount of suspended matter?—The first set of samples were taken on a Friday and a Saturday. They were low-water samples. The last set of samples were taken on a Tuesday—24th May. From the most careful deduction I can make within my power, that day at Kopu, where the samples were taken, would be the river's holiday in regard to battery tailings.

4. And therefore you recommend that those observations should be treated as being only a minimum?—Yes, looked at only from that point of view, I think that would be fairer. It would be a minimum, I should think.

5. And that satisfactorily clears away in your own mind the difficulty you had as to why one set of samples vary so much from the other?—Yes, that is exactly the position.

JAMES ALEXANDER POND examined. (No. 98.)

1. *Mr. Mueller.*] You are a Fellow of the Chemical Society of London, and an analyst?—Yes.

2. In May last you received several samples which were sent to you from Paeroa?—I did.

3. You sent down a report upon those samples?—I did.

4. That report has been furnished to the Commission. You asked, prior to making your report, for a sample of slimes or residue direct from the tube mill?—I did, for comparison.

5. The statements made in your report you confirm?—Yes.

6. And as regards this deposit of fine slime upon the vegetation, can you explain the effect of that to the Commission?—I think it would be better if you would allow me to deal with the matter from my own point of view. As I could not obtain a sample from the mines for comparison, I obtained a sample of the pumice which is at present being washed into the river—Waihou River silt. This shows 73 per cent. of silica. The highest of the samples submitted to me showed 92 per cent. of silica. Eight out of the eleven samples submitted contained silica between 84 per cent. and 92 per cent. The microscopic evidence shows that the particles in these samples are nearly all silica quartz. The particles were such as would be found from crushed quartz, passed through the mills—being roughly quadratic, and having the peculiar conchoidal fracture which always occurs with silica after a blow.

7. *The Chairman.*] Amorphous quartz will crush in cubes?—All rocks will crush in rough cubes when a certain pressure is brought upon them. Take road-metal, it is roughly cube—I do not say it is actually so, but it is roughly cube when certain power or pressure is brought to bear upon it. The aluminas did not vary very much; the higher silicas contained less; lime was present in all the samples examined. And beyond the analysis made for my own information, and thinking it was necessary for this work, I found magnesia and phosphoric acid. In four samples I found magnesia, and in three samples phosphoric acid. I had no anticipation of it having any bearing upon this matter. I should say that this class of silt is capable of supporting vegetation. The same thing applies, of course, to the detritus thrown out at Tarawera. The same thing applies to the marine sands so largely composed of siliceous matter. I would refer to the Landes, in the south of France, on the Gascogne coast, where thousands of acres of siliceous sands have been added as fertile plains to France. The classes of plant which it will be possible to grow on this soil would be certain grasses, a considerable number of legumes, and a large number of tree-species—the pines more especially. This, therefore, points to the desirability of placing this silt, if possible, where it can be utilized for this purpose, rather than filling up the river.

8. Instead of being sent to sea?—It would mean simply forming deltas at the mouth of the Thames. It is a matter of flocculation, as if it was clay. What escapes the river must close up the channel at the mouth, except that which may be retained in narrow tortuous streams. That is as far as I wish to go in regard to that portion of the subject.

9. You are not able to go further, as to the division of the grasses you have referred to?—I should have been glad to have done that, but I have not gone into that matter as fully as I should like.

10. You are aware that the Department of Agriculture has investigated this matter, and that a report on the subject has been furnished by Mr. B. C. Aston, Chemist of the Department. Have you seen his report? It is attached to the annual report of the Department for 1909?—Yes, I have seen it. He gives figures relating to the effect of siltage on vegetation.

11. Have you studied that report?—I have seen it, but I have not gone through it sufficiently.

12. One would like to know whether you agree or disagree with his conclusions?—I should hardly like to give an opinion on that point just at once: I am working on this subject on my own land. I have knowledge which entitles me to give an opinion upon the possibility of legumes growing upon that soil—particularly legumes, because that will so enrich our country.

13. Mr. Aston has recommended legumes also?—Yes. I may add that if this was solely silica I could not take up this position, but in the crushing of the material there is a large amount of clayey matter in the rocks which is included in the material.

14. One of the objections raised to silt-pits is that after the pit is filled the surface will dry up and become dusty, and will blow about, thus preventing vegetation growing upon it: you hold a contrary view—that it may be suitable for vegetation?—Subject again to the matter of depth.

Where the depth is too great for the capillary action it would not do. I may state that red clover will throw down its roots 30 ft., and another plant down to 50 ft. or 60 ft. Those are both legumes. I am speaking, of course, of the maximum.

15. Will you give us an outline of your views as to a solution of this serious difficulty that we are dealing with?—I am not an engineer, and I shall make no attempt to deal with the engineering difficulties of the scheme, but to my mind it is one that should be thought of, and which, I think, must have a possible remedy. The collection of this silt into reservoirs or pipes is a necessary outcome of the mining. There is no difficulty about that. There is, however, the difficulty of the removal of the stuff. I think that to attempt to force this silt by pressure or pumping to any long distance would be a failure. I think, however, that the method of dealing with silt by means of a vacuum is feasible—pulling it forward—and there are many instances of it having been carried into effect. I do not say mining silt, but silts generally, and I have very little doubt whatever of its being fully accomplished. Now, this is a matter of power, and that power I propose to suggest to the Commission. The Waihi Company are proposing to take power from the Waikato River at the Horahora Falls. I believe their proposal is to take 10,000-horse power from that source. Seven or eight miles south of that place, on the same river, the Waikato flows through a narrow gorge, and there is a fall of about four times what there is at Horahora. The place is singularly well formed for a dam; and at the highest point of the dam there is a narrow ridge of rock—that is, as far as I have seen from the bottom; I have not been up to it. A channel through that narrow ridge will convey the water into the bed of the Haihaitaha, which, again flowing through rock, falls over rock again into the Waikato. It might be reasonably anticipated that 40,000-horse power could be obtained, roughly speaking, from this part of the river. The ultilization of this would give the power required for moving the silt in the vacuum, driving sand-dredges on the Waihou to relieve the present accumulation, and any excess might be utilized in driving crushing plants in the Thames district.

16. You suggest that the surplus power so obtained might pay for the whole cost of shifting the material?—That is my proposition.

17. You think that the horse-power so obtained would be so valuable that it would pay for the capital cost of the piping and the plant necessary to remove the silt?—I think so.

18. It is a question where you are going to deposit the silt?—Yes. The pull would be, of course, to the highest point of the pipe-line, after which there would be a descent to the plains lying between Waihi and Tauranga Stream, in which there are many depressions, and which would take a very large tonnage.

19. *Mr. Mitchelson.*] It is poor land?—Yes, it is poor land.

20. What effect, in your opinion, would suction of the silt have upon the pipes?—I do not think it would be an advisable thing to force it through the pipes. I think that would be a fatal error. But if it is drawn through the pipes I think the attrition on the pipes would be reduced to a minimum compared to a maximum the other way. But that is a matter I cannot give an opinion upon of great value.

21. *The Chairman.*] On the other hand, it is the governing feature of the whole proposal?—Silts are carried by vacuum in a great many cases, and I think there would be a very long life in the pipes—though how long I cannot tell you.

22. *Mr. Myers.*] Have you calculated the length of the pipe you would require?—No.

23. So that it is not of very much use questioning you further on that point?—No, not on that point.

24. The question of cost you have not considered?—No: my object is to try and save the lower lands from being ruined by the sand.

25. Where do you propose to erect your plant for the purpose of drawing or suction?—I do not know. I have not seen the ground for many years, and I cannot attempt to give an opinion on that.

26. *Mr. Mueller.*] You stated that the object of the whole scheme was to save the land from being ruined by the deposit of silt?—Yes, and the river.

Mr. Cotter: The matter you are called upon to investigate presents a very unique position, and one which I do not think that, although my clients have made inquiries, we can give you very much assistance upon, because I do not think there is any other river in the Dominion where the interests that have been practically granted in respect to such a body of water are of such a conflicting character. We have, first of all, this river practically handed over to a River Board. If we are to consider the provisions of the River Boards Act it is to keep that river clear and free from obstructions; but immediately—when I say "immediately" it is not in a literal sense, but shortly afterwards—we have this very river constituted a sludge-channel in which all the mining companies are entitled to deposit *débris* and sludge, practically preventing the river from being used in that sense that the River Board was constituted so as to enable it to be used.

The Chairman: I presume the River Board could have objected.

Mr. Cotter: I am coming to that question subsequently. Over what was in the bed and towards the banks of the river for a large portion of its course a mining claim has actually been granted, so that you have the position of this river—that there is a River Board appointed for the purpose of keeping the river clear from obstruction: you have these mining companies granted rights to cast sludge and *débris* into it, and then you have the particular matter that a claim has actually been granted that entitles the holders of that privilege to mine in the river, and, as a mining company, to again cast sludge or *débris* into it. This is a peculiar position. You have rightly said that objection might have been made by the River Board. That is so, but I think when you have considered the position of these mining companies at the time, you will see that no one could reasonably have anticipated the quantity of material that would be sent into that river by

the mining companies carrying on operations on its banks; because I think it is common knowledge that, so far as regards most of the mining companies in and around this district prior to this river being proclaimed a sludge-channel, these companies have only operated on what might be considered high-grade ore, and it is only through the discovery of new methods and new processes, and the discovery in the Waihi Mine of such a large body of what one might call, in comparison with that previously mined, low-grade ore, that has caused the sending into the river of the very large quantity of tailings that we find now in the bed and upon its banks. In fact, you will remember that, so far as the last five years are concerned, the output from the Waihi Mine has increased from one-third to one-half. I am not putting this in any way as an absolute excuse: I am only giving it just to put before the Commissioners in a succinct form the condition in which the river is, and in order to help my clients and to assist the Commissioners in trying to obtain a solution of the difficulty. There is one other position that I think it right to put before you on behalf of my clients, and that is this: that while, on the one hand, the Ohinemuri County comprises farms affected by these deposits of silt, yet, on the other hand, it comprises a much larger area of land that is practically of no use, and never will be of any use, except for mining purposes. So that the Ohinemuri County Council have had to consider, and have still to consider, the rights of both the mining community and the agricultural community. In former years, and especially when the river was first declared a sludge-channel, the agricultural and pastoral interests of the district had not become so valuable as they have of late years, and no doubt if this tremendous quantity of tailings in the river had been cast into the river in 1890 or preceding that year it would not have done the amount of damage that you yourselves have seen on your recent visits there. And in any scheme for the amelioration of the trouble the County Council, acting as a County Council and as a River Board, would also have to consider the position of the mining and agricultural communities with regard to any scheme put forward for preventing a continuance of the present order of things. When I am making any observations to the Commissioners, and while I may be representing the Ohinemuri County Council and the Ohinemuri River Board, in reality I am only representing for the time being a majority of the members composing that body, because, while the mining members—those returned by the mining constituents—are anxious that no improper imposition of what might be considered restrictions should be put on the mining industry, the other section—the farmers—naturally look particularly to their own interests. So that I do not want to be misunderstood, therefore, when I say I am instructed to say a particular thing. You will quite readily understand that it is only as agreed to by a majority and as represented by the Chairman. After hearing the evidence that has been submitted, I am instructed to say that the Ohinemuri County Council consider that a dredge not only would be advisable, but is absolutely, in their opinion, necessary, for preserving the navigation of the river at any rate up to Te Puke. There has been a conflict of evidence—and you will quite understand that I am not going to attempt to analyse it, but am only treating it generally—but upon that conflict of evidence that has been given you will come to this conclusion at any rate: that there is such a doubt as to the ultimate deposit of either tailings or slimes that it would be undoubtedly advisable that some means should be at hand at Te Puke and below in order to prevent any accumulation that may become an obstruction to the river. The next part is with regard to the present accumulation of tailings, especially past the traffic-bridge opposite Paeroa. My clients are clearly of opinion that something should be done with regard to not only that part of the river, but also to the part of the river from the railway-bridge down to below the township, so as to prevent any possibility of another flood doing the same or anything like the same damage to the Township of Paeroa.

The Chairman: Why leave out that portion of the river between the traffic and railway bridges.

Mr. Cotter: I did not mean to do that—I should have said between the traffic and railway bridges; and they are very anxious, if possible, to assist in every way they can the operations of the extraction company in helping them to do this work, and, you will see, for more than one reason. First of all they recognize, if these tailings do contain the value that has been placed upon them by Mr. Kingswell and Mr. Aitken, that it would be in the best interests of the district that the gold therein should be recovered, and, of course, in the recovery thereof you can well understand that my clients will obtain a proportionate part, so that if the extraction company were enabled to continue their operations, and those operations should turn out to be as successful or profitable as the operations they conducted at Waikino, it would be an advantage in both ways—first, as to the result to themselves and to the community at large so far as relates to the retention of the value; and, next, as to the cheapest way of getting rid of what is now clearly admitted to be by all parties a danger to Paeroa. I will come later to their proposals, and to whether their operations are beneficial or otherwise with regard to that proposition. The next item is the removal of the willows. My clients consider that, so far as the Ohinemuri River is concerned, operations should be at once commenced with that object in view, only commencing at the lower end and working upwards. They consider that it would not be either necessary or advisable to uproot them. They consider that it would be quite sufficient to ringbark and kill the willow, afterwards very likely removing the root portion to enable the trunk to remain as long as possible, so as to be a further protection to the banks. And while upon that subject you will allow me to make these few remarks: Every one seems to have had something to suggest with regard to the removal of the willows, and as to their being the principal cause of the trouble. My clients do not agree that they have been the principal cause of the trouble, but they do say undoubtedly that the growth of the willows has contributed to the retention in the stream of a lot of these tailings. They consider that if these willows had not been there and retained a large portion of the tailings in the upper part of the Ohinemuri River the probable result would have been that the Waihou River would have received a much larger body of these tailings, and that it would have affected the

navigation of the Waihou River at and below the Junction. To have cleared these willows would have cost a considerable sum of money, and the Ohinemuri River Board, to obtain that money, would have required to have rated the settlers and inhabitants of Paeroa; and they considered that it would be extremely unfair to rate these persons to remove a difficulty that they themselves had not created. You see they would have no power to rate the mining companies in the slightest, and you will also see that with regard to the particular fund that they consider should be used for this purpose, although application was frequently made, the Government did not assist in the slightest in having that fund appropriated. I refer to the gold duty. I am not sure that you are aware of the provisions of the Gold Duties Act, 1908. This provision was in previous Acts, and it has not been referred to, and therefore it may be advisable for me to refer to it now. Sections 12 and 13 of the Gold Duties Act, 1908, are as follows: "12. The duty received in respect of the gold produced within the boundaries of each provincial district shall be placed to a separate account in the name of such district, and shall be distributed from time to time by the Minister of Finance amongst all the counties and boroughs within such district in the proportion of the quantity of gold produced in each such county and borough, as shown by the aforesaid declarations. 13. (1.) Notwithstanding anything in the last preceding section, the Governor may from time to time, by order gazetted, distribute any part of the gold duty not exceeding one-half among such local authorities and in such proportions as he deems just, having regard to the locality in which the gold was produced, and the extent to which streets, roads, and other public conveniences were used in connection with such production. (2.) No such order shall be made except on the award of the Warden of the mining district wherein the gold was produced, who may be directed by the Minister of Mines to make an inquiry and assess the proportion (if any) in which such gold duty should be paid to each local authority, and the local authorities interested may be heard by the Warden prior to the award being made." So you will see there that there is the expressed intention of the Legislature that where gold has been produced, and where streets, roads, and other public conveniences are used in the production of it, then the gold duty to the extent of one-half may be allocated to pay the costs thereof. It may be legally argued that the words "public conveniences" do not include a river: but I think the words "public conveniences" must be taken to include the river, because the river is now used by the mines not only as a roadway for getting away their refuse, but as the actual traction-power to remove it from the locality. So that I respectfully submit to the Commission that, whether or not a Court of law would hold that these words were strictly within the meaning of the words "streets and roads," yet for all practical purposes the words "public conveniences" were undoubtedly intended to include the river. In that respect I mean to put before the Commission a letter written in the newspaper by Mr. Moss, the former member for the district [Exhibit No. 84]. The next suggestion that has been made which my clients have instructed me to state they approve of is the erection of stop-banks; but they do not consider that these stop-banks should be erected so far from the banks as Mr. Metcalfe has suggested, because they would actually take up such a large portion of country on both sides that the claims for compensation would in my opinion be very large indeed. You will see that, although I am not an engineer, it would amount practically to an area of 500 ft. on each side of the bank of the river, in addition to the width of the river itself, and if it were 6 ft. in height it would give a sectional area that would carry away any flood-water that may be expected to come down either of these rivers. My clients, although they quite realize that the cut at Pereniki's Bend would undoubtedly facilitate the more speedy restoration of the flood-area of the river above and just about Paeroa, yet they cannot help feeling that if that cut is made it would interfere prejudicially with the operations of the extraction company, and that if that company is not allowed to carry on its operations so as to get advantage of what one might call the coarser tailings that are up at and above the bridge and from that down to where the head of the proposed cut is to be, it may result in the company either abandoning its present intended operations or in restricting the company to such a small operation as not to be the advantage that the Council at present anticipate. There is one other reason, and that is they still hope that with the stop-banks, the willows, the dredge—and they are to put on a dredge—and if the operations of the extraction company are allowed to continue and the other improvements to be made—they hope that the previous condition of the river may be restored, and that boats of a fair draught may still be able to come up as far as the Railway Wharf at Paeroa. They consider that these cuts in a river so tortuous as the Ohinemuri River may be very easily made, but there is always a danger of unforeseen results being produced. They also view with some alarm the expense of both the Pereniki and Ngararahi cuts. A glance at the map shows the land at Pereniki's Bend and also the land that will be affected by the Ngararahi cut—shows possible claims for a very large amount of compensation owing to severance of the land and deprivation of water frontages. And, of course, in all these matters, as practical men they are aware that if any suggested scheme is ever allowed with a large amount of claims for compensation, the remedies that may be suggested may be postponed for a very considerable period. The County Council have also instructed me to say that, as regards all the suggestions with regard to the stacking of the tailings at the Rotokohu Swamp, they do not consider that they are practicable. What I mean by "practicable" is practicable from a paying point of view of the mines. Nor is it desirable that that expense should be put upon the mines until the present operations as regards the slime-production are shown to be absolutely prejudicial. And when I say "prejudicial" I mean prejudicial to a serious extent to the river. When I say "river" I mean the river and surrounding lands—I mean the river district. They think that if these stop-banks are judiciously erected down the river they will prevent the distribution by flood-water of these fine slimes which have resulted in the greatest damage in the last March flood. They also say they do not desire the revocation of the Proclamation until a serious attempt is first made to find a remedy without resorting to that drastic operation.

The Chairman: Have they considered the question of a modification of the Proclamation?

Mr. Cotter: Yes. As to a modification, they have considered these two points which might be advisable—advisable so far, at any rate, as the Waihou River is concerned. I understand that no mining operations are being carried on either at Waiorongomai or Te Aroha, and that there might be a revocation of the Proclamation in so far as mining operations in that river are concerned. I understand that they are crushing only to a very small extent on the Waihou River, and it would only affect future operations and not present operations. And my clients are a little doubtful with regard to what they call fine grinding. They are a little bit afraid in respect to the evidence given before the Commission by the representatives of the company that they have ground their slimes very, very fine indeed. Yet these witnesses now come forward and declare that they do not intend in the future to put out more than a very slight percentage of coarse quartz into the river. They might agree to the Proclamation being amended to the extent that no company should be allowed to cast tailings into the river that do not pass the 100-mesh.

The Chairman: I presume they would be prepared to accept something finer than that.

Mr. Myers: That is fine enough—I mean, fine enough as a minimum.

Mr. Cotter: I do not know whether my friends mean that they would not like to go finer than that, or coarser.

Mr. Myers: If you say nothing is to go through that does not pass a 100-mesh, it is quite sufficient, I take it, for the protection of the river.

The Chairman: It might clear the ground if you said you would be willing to accept such a condition.

Mr. Myers: We shall be in a position to consider that. I cannot take upon myself the responsibility of answering that question offhand. The operations which have applied in the case of one company up to the present time have not been adopted by other mills.

Mr. Cotter: They will have to do so, that is all. And in answering Mr. Myers's remarks with regard to the position of the old mining companies under the Proclamation, I only desire to make one remark. I do not want it to go forth that the Government in making any modification of the Proclamation would by so doing incur the odium which my friends say would result, because so far as the Proclamation was concerned it was originally issued under the provisions of the Act of 1891, section 152, and that section declared as follows: "The Governor in Council, from time to time, by Proclamation published in the *Gazette*, may proclaim and declare that any watercourse or part of any watercourse shall be a watercourse into which tailings, mining *débris*, and waste waters of every kind used in, upon, or discharged from any claim or licensed holding shall be suffered to flow or be discharged, and in like manner may withdraw any such watercourse from the operation of this Act." So that, although the power was given to proclaim the watercourse, the same power was given to withdraw that Proclamation. This is the principle of the Act of 1891. In answer to a remark made by my friends, I may say that I have looked very carefully into the Mining Act of 1898, and the right is preserved of withdrawing the Proclamation, and the same preservation is made in the Mining Act of 1905, and the same in the Mining Act of 1908; so that, although the exact words have not been put in the new section, there is a general section put in dealing with that point. While upon this question I may say that we have no desire that the Proclamation should be withdrawn, but it is right to put it before the parties——

The Chairman: It would seem strange to say that the hand that gave could not take away.

Mr. Cotter: That is so. With regard to the gold duty, if you remember, Mr. McVeagh put it that the gold duty was originally intended only for municipal purposes, and the reason I have referred to this Act is to show you that this is not so, at any rate, with regard to the 50 per cent. It is quite clear that under that Act, supposing a large mine in the Waihi Borough had to make use of roads or streets for the carting of its *débris* away from its mines, even if it goes into the Rotokohu Swamp, then the gold duty would be the first purse that would be opened to pay back the expense of so doing, at any rate to the extent of one-half of the cost thereof. Therefore it seems to me that the same could apply with regard to the river. The next point I shall just touch upon shortly. You have received a letter from the Raglan County Council. In regard to the Ohinemuri County Council, I have stated that its position is very unique in respect to the river. It is also unique with regard to the position of the county, because so far as the county is concerned, although on the map it looks a large district—so far as either the County Council or the River Board is concerned, its position as a rating body would seem to be extended over a large area—yet in consequence of the gold-mining industry being exempt from ordinary rating, the Crown lands being also exempt from rating, in reality it is not so. I have touched upon the gold-mining operations and upon Crown land and Native land.

Mr. Mitchelson: You include the mining land with the Government land.

Mr. Cotter: Except that they pay a rate in the shape of the gold duty.

Mr. Mitchelson: There are within the district a number of sections let at peppercorn or low rentals that pay rates.

Mr. Cotter: Yes; I mean only the property used for mining purposes.

Mr. Mitchelson: What about the Government land included in the mining district that is not let: should it not pay?

Mr. Cotter: I am not dealing with what the land should pay: I am only putting the present position of things in the Ohinemuri County. I want to put as clearly as possible the actual position in which my clients are in regard to these matters. The river runs through the county, but so far as the county is concerned, and its rateable possibilities, it is able to rate such a small portion of the whole aggregate as to be hardly worth talking about; and if a large rate was struck it would be practically penalizing a number of persons who in no way whatever have contributed to this evil. While on this subject I should like to say this: that the Ohinemuri County Council would not like it to go forth in any way that the Government have not most materially assisted it in carrying on the business of the county. I have a return prepared showing the way in which the

Government have been absolutely practically compelled—when I say compelled I am not using it in its legal sense—but it has been compelled to assist the county, otherwise the county could never have carried on its ordinary work. I have had a return prepared with respect to the Ohinemuri County of the goldfields revenue received during the last five years, and also the Government grants received. I may be permitted to read this, so as to show how far the Government have been compelled to give assistance to the county in doing its work. The amounts are—1906, £1,563; 1907, £1,785; 1908, £1,684; 1909, £7,278; 1910, £8,124; and the Government will now have to assist the county with regard to repairs of the Main Road—the damage which has been caused by the floods—because the county could not touch the thing out of its own revenue. We have to lean on the Government to enable us to carry on the government of the county. That has been granted independently of gold duty.

The Chairman: What are the special grounds for the large increase in the grants during the last two years?

Mr. Cotter: There are four mining townships to keep up, leaving out Waihi, and there is the expense of keeping up these roads leading to mines in some parts of the districts, and not a penny of gold duty comes from them. But the roads have to be kept in repair, and they are very expensive, because they have to be made so as to carry heavy mining machinery over them. There is also another reason, and that is that in the county there is a large area of Crown lands, and in various places where the Government have either granted or leased pieces of land, in opening up the place roads have to be made to them, and the Government have given grants to the Ohinemuri County Council to enable it to construct or maintain these roads.

The Chairman: Is it for that purpose that this enormous increase has been made in the grants?

Mr. Cotter: I believe it is. I have returns giving all these particulars [Exhibits Nos. 85 and 86]. I do not intend to speak at length with regard to the various reports that have been submitted to the Commission—those of Messrs. Adams, Breakell, Blow, Cheal, Clayton, Metcalfe, Perham, and you will also have the evidence of Mr. James Stewart; the only observation I would like to make with regard to these reports is this: So far as my clients are concerned they think the evidence given by Mr. Clayton is valuable in respect to the operations of the stop-banks so far as the Hutt Valley is concerned; but, seeing that this river which we are concerned with is not of such a character as the river at the Hutt—it does not flow so rapidly—they do not consider that these banks here should be constructed in such an expensive way as apparently is considered necessary at the Hutt. So far as Mr. Perham's report is concerned, we agree about a dredge being obtained for dealing with the river-sands and whatever material comes down to the lower Waihou, and that that material would be found advantageous not only with regard to the roads and for the suggested railway-line, but possibly with regard to the stop-banks as well. We consider that is another argument in favour of obtaining a working-dredge. With regard to the River Boards Act, and the Drainage Act, and the Public Works Act, there are in these three Acts provisions which should have been brought into operation by the Ohinemuri River Board; but the previous observations I have made with regard to the bringing into operation of these provisions I need not repeat, because the Ohinemuri River Board and the Ohinemuri County Council consider that this matter got into such a serious state that they were practically unable to cope with it, and the evidence given by various persons in the course of this inquiry I think has proved that if they had attempted, without very much more expensive engineering aid than they as a county could possibly provide, it might only have given justifiable reason for persons to complain as to the effect being produced by their operations that they certainly did not anticipate, besides also the cost of them and the fact that that cost would not come out of the pocket that they thought should provide it. I think it only right to refer perhaps at a little greater length to one scheme, and that is Mr. Kingswell's suggestion of yesterday. My clients would have been very glad if they could have seen their way to have recommended that scheme as a feasible and economical way of overcoming the difficulty, but I regret to say that they cannot. The scheme, as Mr. Kingswell himself admitted, was rather hurriedly constructed, if I may use the term, and imposes a responsibility upon whoever may have the control of this river that I do not think any such authority would care to accept.

The Chairman: That is, you mean removing the material day by day?

Mr. Cotter: Exactly. Any local authority, to my mind, if this material is simply to be dredged, would far rather provide a dredge, and dredge it in accordance with their own requirements, and take away the stuff at suitable times, and not leave it to a contractor to shoot as many thousand tons as he pleased at any particular place, and ask them to provide the punts. They also considered the question of price. They considered that if they had their own dredge they would be able to do the work as cheap or cheaper than under this scheme. There is one part of the scheme they do not like at all—that is, on page 3, where it is said that the company is to have the right to separate and treat any sands that may, in their opinion, be profitable or saleable. So that would simply be, as far as Mr. Kingswell is concerned, that he would be able to differentiate and practically adopt any part of it; and whatever he could not make a profit out of he would leave to us. My clients consider that it would not be advisable to accept that.

Mr. Kingswell: You only pay for what is delivered.

Mr. Cotter: But you would have the power of differentiating. I think the Board would be the best judges as to where and in what manner the dredging is to be done, and as to what should be done with the material; and I think the complication that at present exists so far as the river is concerned is quite bad enough without bringing another factor into it. In conclusion, I would like to say this—and in saying it I hope you will not think I am in any way trespassing on your jurisdiction—that a new body will require to be created, and that body will be dependent on the persons or local authorities whom you may decide should contribute to the first cost, and also to the annual maintenance. They consider that the area over which this body should have jurisdic-

tion to rate should be the watersheds of the Ohinemuri River and the Waihou River, extending, so far as the Waihou River is concerned, not any higher than Shaftesbury, and so far as the mouth of the Waihou River is concerned, they think it would be sufficient for the northern boundary to be placed where the Thames Harbour District and the Ohinemuri County join. As to the number of persons who should represent the particular bodies, my clients consider that to make an effective body it should be a very large one; but they consider that, whatever be the number composing that body, the Ohinemuri County Council should have a dominating voice—a small majority. I will give you the reason for that. Supposing it was ultimately decided that the Waihi Borough, the Ohinemuri County, the mining companies, and the Government——

The Chairman: You are leaving out any direct representation of the agricultural interests excepting through the County Council.

Mr. Cotter: Yes.

The Chairman: You are a composite body representing townspeople, miners, and agriculturists.

Mr. Cotter: Yes.

The Chairman: Should you not give specific representation to the farmers as well as the miners?

Mr. Cotter: We have no objection. The only difficulty is with regard to the creation of a new representative body. So far as we are concerned, we make no objection to that. We have no objection to such direct representation. Under ordinary circumstances it would be fair that each body paying should be represented in accordance with the amount they paid; but you will see this: that if it was put the other way, then it would mean that if the majority were always persons who paid they might practically emasculate any scheme, because they would have to pay for it, whereas the other persons would be suffering. Now comes the question of who are to pay. So far as we have considered the matter—as to the Ngararahi cut, that is a matter we have not considered, but that is going to be rather expensive; but outside of the Ngararahi cut, and outside of the Pereniki Bend cut, supposing those cuts were not to be made, but that the cutting of the willows takes place, and dredging, and with the assistance of the extraction company, we consider that £5,000 or £6,000 a year, not including continuous stop-banks, but stop-banks where necessary—that all might be done on a capital which, taking interest and sinking fund for a period of fifteen years to pay it off—all could be done for about £6,000 a year. Of course that would, as I have said, depend a good deal upon the Board constituted and upon the engineer appointed by that body. Now, with regard to providing the means to carry this out: My clients consider that the gold duty is the means by which all this work should be accomplished. They consider that the mines have produced such an amount as would have—assuming that a proper part thereof had been apportioned to this object—as would have provided sufficient to have prevented the accumulation of deposits on the river and the damage undoubtedly resulting therefrom. I am quoting the gold duty because it has been suggested to you that the Government should pay the whole amount. In that my clients do not agree. Assuming, however, that it is not considered fair that the gold duty should pay the whole of it, then my clients consider that a fair allocation would be, one-half in accordance with the provisions of the Gold Duty Act, one-sixth from the Ohinemuri County Council—and, of course, in that you understand I am including the farming community as part.

Mr. Mitchelson: What about the principal district—Waihi?

Mr. Cotter: That is my recommendation—that you should create a body with regard to these rivers and the waters of these rivers.

Mr. Mitchelson: What about a special rate?

Mr. Cotter: It would be a special rate. I am assuming that the Ohinemuri County is carrying on this work. Then there would be one-sixth by the Crown, and one-sixth by the mining companies, reckoned upon the tonnage that they put into the river. It seems to me that that is the fairest way.

The Chairman: If new mines started they might want to put mullock into the river, and that would mean some supervision in regard to that?

Mr. Cotter: There will be a difficulty there, but I do not see any other way unless you do it by means of the battery returns.

The Chairman: I think it would be better to take it by the battery returns alone.

Mr. Cotter: Yes, that would be the simplest method; and with regard to the apportionment of the gold duties between the Waihi Borough and the Ohinemuri County, that could be allocated in the same way by the tons of stuff put in by the batteries of the mines in the respective districts.

Mr. Myers: It would mean that you would both pay something out of your gold duty.

Mr. Cotter: Yes. We consider, looking at all interests, that that would be perfectly fair.

Mr. Myers: What about Waikino?

Mr. Cotter: Waikino would have to be considered as part of Waihi, of course, because it is the product of the mines at Waihi.

PIERCE GRACE examined. (No. 99.)

1. *Mr. Cotter.*] You are Chairman of the Ohinemuri County Council?—Yes.

2. And you have been so for how long?—About seventeen months.

3. Who was the previous Chairman?—Mr. William Niccol, who gave evidence before the Mines Committee.

4. And for how long prior to that were you a member of the Council?—Six years.

5. Will you tell us how many members comprise the Council?—Nine.

6. What are the ridings and who are the representatives—in order to give the Commission information in regard to the representation of the farming and mining interests?—Paeroa Riding, which includes Netherton, Paeroa, and Komata, has three members—namely, Samuel Loughlin, farmer, Netherton; Joseph Nathan, stationer, Paeroa; and George Crosby, boardinghouse-keeper, Paeroa. Waitoa Riding is represented by Frederick Strange, farmer. Karangahake Riding including Waikino, is represented by three members—Michael Marriman, secretary Miners' Union at Karangahake; Charles Lloyd, battery hand and treasurer of the Miners' Union; and Charles Franklin, farmer. Waitekauri Riding is represented by two members—Herbert Corbett, timber contractor, and myself. I am engaged in mining.

7. That means there are only three on the Council representing farming interests, there are two commercial men, and four miners?—Yes.

8. You produce the Waihi Borough accounts as supplied by Mr. Morpeth?—Yes. [Exhibit No. 88.] In his evidence he gave the amount of gold duty up to the 31st March, 1910, but there was some question as to whether some amount of gold duty had been actually paid but not handed in to the borough. This is what Mr. Morpeth gives me, showing £3,400. I asked also if Mr. Morpeth could give me any resolution on the books of the Waihi Borough showing the attitude the Waihi Borough were taking up in regard to the gold duty, and I now put this in. [Exhibit No. 87.] These are the accounts of the Ohinemuri County Council [Exhibit No. 88]. I have only been able to go back five years. We are not a very wealthy body, and are not able to publish these things, but I happen to have the accounts for the years 1908 and 1909 as published in the newspapers. I have here for the information of the Commission a manuscript copy of the accounts up to the 31st March, 1910. It is not yet audited, and I cannot therefore hand it in.

9. Will you just state what the rate is upon the county?—Yes. These are the rates struck in the Ohinemuri County for the periods as under: 1907, $\frac{5}{8}$d. in the pound on the capital value, £858; 1908, $\frac{3}{4}$d. in the pound on the capital value, £1,037; 1909, $\frac{3}{4}$d. in the pound on the capital value, £1,727; and 1910, $\frac{3}{4}$d. in the pound on the capital value, £1,871.

10. *Mr. Mitchelson.*] Are there any special rates for hospital and charitable aid?—No special rates. We pay the hospital and charitable-aid contributions out of the county funds.

11. *The Chairman.*] What is the reason of the large increase in 1909?—Revaluation.

12. *Mr. Cotter.*] Are there any special rates?—Yes. There is a special rate in the Waitoa Special-rating District for the construction of the Mangaiti Bridge and part of the road. We can rate up to 1d. in the pound, but we find that $\frac{7}{16}$d. is sufficient to pay interest and sinking fund. There is another special rate of $\frac{5}{16}$d. out of a possible penny for Paeroa Domain improvements and the grounds surrounding it. That is on a portion of the Paeroa Riding.

13. You seem to collect just the amount for interest and sinking fund?—Yes.

14. What amount of money do you contribute each year to the hospital and charitable-aid district?—Our contribution to the Thames District Hospital Board is £381, and to the Coromandel and Thames District Charitable Aid Board £418, making a total of £799. In the year 1908 these two items amounted to £539, and in 1909 to £687.

15. So it is increasing very rapidly?—Yes.

16. *Mr. Flatman.*] Why has the increase been made in regard to charitable aid? Has there been a greater demand?—No, I think it is caused by the increase in the valuations. The Hospital and Charitable Aid Board strikes a rate, and that rate is recoverable on the capital value of our county.

17. *Mr. Cotter.*] Reference was made to the question of Waikino coming into the Waihi Borough?—Yes.

18. You produce a copy of the only letter you received from the Waihi Borough and your reply thereto?—Yes. [Exhibit No. 89.]

19. You also produce a copy of the letter which was sent to the Hon. the Minister of Mines in regard to the vote for £1,000, and his reply thereto?—Yes. [Exhibit No. 90.]

20. What is the position of your county with regard to its rateable area?—Taking the Waihou as the centre line of the county from Hikutaia to Te Aroha, that portion of the county to the westward of the river contains about 165,000 acres, out of which amount 20,000 acres is rateable. There is no prospect of the remainder becoming rateable for many years. On the eastward side it is all in the mining district except a little land around Paeroa. The rateable area is extremely small. Taking the eastward side as containing 140,000 acres, it would give a total area of 305,000 acres for the county, as per Official Year-book, out of which 35,000 acres only is in grass and rateable. Therefore, barely one-ninth of the county is rateable.

21. Will you state why the County Council or River Board has not done anything with regard to these rivers?—I think you, Mr. Cotter, explained the matter very fully, and I can indorse what you said.

22. Will you just give us the names of the mining townships in your county?—We have Karangahake, Mackaytown, Waikino, and Waitekauri. I have not included Komata.

23. *The Chairman.*] Why not?—We really should have done so: that would make five mining townships.

24. *Mr. Cotter.*] Will you explain the position as regards keeping the roads to and from them?—Each involves a very considerable amount of expense to keep going.

25. But Mackaytown and Karangahake are close together, and the same road goes on to Waikino?—That is so far as the main roads are concerned, but I mean the access roads to residents in and around the townships, and the footpaths.

26. *The Chairman.*] And is it not the case wherever there is a likely piece of ground for mining, and it is taken up, your Council is either called upon to make altogether or to assist very materially in the making of an access road to that place?—As a rule that is so. The moment a mining property is taken up, if they get anything at all they at once apply to the county to make a track in, so that they can take in tools, and coal, and so forth.

27. *Mr. Cotter.*] But aid to prospecting is not so much for companies as for individuals?—That is so. More often this expenditure is asked where a company has started work and it requires a road.

28. So far as the county is concerned, from its revenue, excluding gold duty and Government grants, could it keep up the roads, and tracks, and other works necessary in the country?—It would be impossible.

29. Even with the gold duty coming from the mines within the county, could the county without the assistance of the Government overtake the work?—We know that we could not.

30. Originally this was all one county called the Thames County?—Yes.

31. Then the Ohinemuri County parted company with the Thames, and now Waihi has parted company from the Ohinemuri County?—Yes.

32. I should like you to state what it is that you, as representing the county, are particularly anxious about?—We are particularly anxious to see something done to get over the present difficulties.

33. *The Chairman.*] May we not take it that you entirely support what Mr. Cotter said in his opening address?—I fully indorse what he said.

34. *Mr. Cotter.*] I want you to say something in regard to the Ngararahi cut?—The only thing that has called by attention to this cut is this: that the scheme is probably going to be a very expensive one, involving a very great amount of compensation. That is the only thing that has been worrying me. I am not an engineer, and I do not know what effect it is going to have.

35. *The Chairman.*] Therefore you look at it askance?—Yes.

36. Well, would you rather have a continuing risk of floods or heavy compensation? What is the limit-line, in your estimation, to the amount of expenditure on works to prevent flooding?—That is a question the Council has never entered into; we have not had an opportunity of discussing the probable cost of these schemes.

37. *Mr. Cotter.*] So far your Council, as a council, has not had an opportunity of considering this Ngararahi cut?—No.

38. *Mr. McVeagh.*] You have given us the rating for the year 1907: have you the records of the rating prior to that year?—I think in 1906 we collected £499.

39. I believe you had a revaluation in the year 1909: when was there a revaluation prior to that?—I think, three years prior to that, in 1906.

40. *The Chairman.*] Four hundred and ninety-nine pounds seems a ridiculously small amount for a county to collect in one year: it would cost almost that to collect it: what do you pay your office staff?—We pay the Engineer something like £300 a year, and the Clerk £250, and the Assistant Clerk £130.

41. *Mr. McVeagh.*] Can you tell us what the rate was prior to 1907?—It was $\frac{5}{8}$d. in the pound.

42. For how long prior to 1907 was that the rate?—I cannot say.

43. You have no town districts or road districts in your county?—No.

44. Therefore you can rate up to 1½d.?—Yes.

45. And there is no separate rate except these two special rates you have referred to?—There is a Paeroa water-supply rate; I did not include that before.

46. Have these rates been well collected?—No, I cannot say they have.

47. Can you give any information as to the percentage of rates not recovered during these years?—I cannot very well. I thought, if that information were wanted, you would have called the Clerk in Paeroa.

48. I see the published balance-sheet for the year ending the 31st March, 1909, states that the arrears of rates prior to 1907–8 were £434 5s. 11d., and for the year 1907–8, £277 0s. 10d., and for 1908–9, £1,722 4s. 10d., and the whole rate was £1,727: can you explain how it was more rates had not been collected?—When I took charge I made an alteration. Out of £1,800 due last year we collected something over £1,500.

49. How many years can you go back to collect?—Two years.

50. So all these uncollected rates are uncollectable?—Yes: that is our difficulty. In a mining district, though people appear on the rolls, when we come to send out notices we find that they are either a duplication or that the names have been struck off.

51. But under your chairmanship you found it possible to effect a change, so it is possible to get the money in by a little effort?—Yes.

52. So you estimate £300 cannot be collected?—Some of it, possibly more.

53. *Mr. Mitchelson.*] Is that £300 a portion of the back rates?—I think some of it was outstanding.

54. *Mr. McVeagh.*] Looking at these accounts I find you make donations?—Yes.

55. Looking at the last published balance-sheet I find donations to the Paeroa Public Library, £10; Waikino Public Libary, £10; Waikino Domain Board, £55; Paeroa Domain Board, £50; Karangahake School of Mines, £75: is that correct?—Yes.

56. And there are some similar sums in previous balance-sheets?—Yes.

57. I notice also a tag on your accounts for two years in succession objecting to certain payments—one for £47 7s. 3d. for entertaining Ministers?—Yes.

58. Can you supply to the Commission a statement of the grants made by the Government from the year 1900 to date?—I suppose we can get it from the books.

59. *The Chairman.*] What right have you to pay the expenses of Councillors coming to meetings?—That is, travelling to meetings.

60. *Mr. McVeagh.*] Was the grant for the willows followed up?—No further than that when the Minister of Mines was through the district about two months ago I approached him again.

61. How long is it since your Council has recognized that these willows were a nuisance?—We have recognized it for some time.

62. Why did you not press for assistance from the Government for the removal of these willows?—We have done so. We have sent deputations to Wellington and pressed for it.

63. How often was that done?—Once to my knowledge. Mr. Niccol, the late Chairman, went down about three years ago.

64. You heard Mr. Cotter's remarks in regard to the proposed system of representation on the proposed River Board, by which it was indicated that your county desired to have a predominating vote: is that correct?—That is right.

65. If there are nine members, do you wish that five of these should be the nominees of the Ohinemuri County Council?—Four of them by the Ohinemuri County Council, and one elected by the special river district.

66. Do you mean that there should be a ballot by the ratepayers in the proposed river district for the purpose of electing one member?—If it is found to be necessary; we are prepared to support that.

The Chairman: Is it any use going on with this hypothetical scheme?

Mr. McVeagh: My position is this: I do not know whether you are going to hear addresses or not, but I should like to draw the attention of the Commission to the very unfair system of representation outlined by Mr. Cotter.

The Chairman: Surely Parliament is the final court in this matter.

Mr. McVeagh: Parliament would, no doubt, to a very large extent be guided by the recommendations of this Commission, and I do not want it to be said that any scheme of representation that was submitted was allowed to pass without comment. I think it is only proper that we should be in a position to traverse it, so that no one could hereafter say that we by our silence acquiesced in that portion of the scheme. Perhaps, having drawn attention to it, that is sufficient.

The Chairman: I think so.

67. *Mr. McVeagh* (to witness).] I want you to supply information as to the amount of aid to prospectors given in the last year out of ordinary revenue, or for new roads to mines out of ordinary revenue?—I cannot go any further than give you aid to prospecting out of ordinary revenue.

JAMES STEWART examined. (No. 100.)

1. *Mr. Moresby.*] You are a civil engineer?—Yes.

2. And have numerous qualifications?—That is so—M.I.C.E., &c.

3. I think you made a report on this river question in the year 1907?—I did. [Exhibit No. 91.]

4. Do you wish to modify that in any particular: I think you recently visited the river again?—Yes.

5. And had an opportunity of going over the whole ground again?—A good deal.

6. I think this report was made after the 1907 flood?—Yes; I examined the place in April or the end of March. I examined the river again rather less than a month ago.

7. In what way would you like to modify this report?—I assumed then there was likely to have been a rise in the bed of the Waihou River at that time from the amount that had gone in and the evidence of Captain Sullivan. I assumed that possibly it might have risen the 5 in. or 6 in. that Captain Sullivan hinted at. Now I am satisfied that that is not likely to be the case. I do not think there has been very much rise, if any at all, in the lower Waihou about Te Puke. Another circumstance modifying my opinion is the proposed action of the gold-extraction company, and their intention to practically clear out the Ohinemuri River. If that could be done quickly it would make a very vast difference, in my opinion, as to the effect of the silting-up.

8. I think the conditions of crushing have also altered a good deal?—That has largely modified my opinion as to the amount of silting-material going into the river. The amount of tailings going in, with the large annual increase, has proved much larger than I anticipated, but the fineness of the grinding has satisfied me that a large proportion—in fact, the whole—of the slimes that are ground so that they will become of the consistency of French chalk, or will pass through exceedingly fine sieves, will go out to sea.

9. That is to say, if the river is cleared?—If the river is cleared of willows. That is the first thing I think should be done.

10. Is there any other direction in which you wish to modify the report in any way?—I can hardly recall anything just now excepting that the last flood has been so very much stronger than the previous ones that there is more area of ground over which the tailings and slimes spread.

11. There have been two cuts mentioned—one at Pereniki's Bend, and one at Ngararahi. You know where the Ngararahi cut is?—Yes.

12. You have examined that place?—I have not been over the site, but I know both ends and the river between.

13. You have heard the evidence given in regard to that cut?—Yes.

14. Do you approve of that cut being made?—I do not.

15. For what reasons?—Because the whole affair can be done at much less expense and trouble, and the expense of that cut is likely to be an unknown quantity. The country could be protected by stop-banks with a certain known quantity of expense.

16. And if these stop-banks are erected you do not think that cut is necessary?—I certainly do not.

17. *Mr. Mitchelson.*] Do you mean stop-banks in particular places or all along the river?—Wherever required to bring the stop-banks at least 3 ft. above possible floods. I would not put the stop-banks 5 or 10 chains back from the river, as proposed.

18. *The Chairman.*] How far from the river would you put them?—I do not think that any of them hardly would require to be more than 50 ft. or a chain back from the river.

19. That would mean the bends too?—Yes.

20. *Mr. Moresby.*] You are taking into account that the willows will be cleared out and the river deepened?—I would cut the willows down first thing, but would not trouble to take the stumps out. If the shoots grow from them it will be an easy thing to go along with a knife and cut them down entirely. There is no necessity to root the willows out. It is the trunks that fall into the river and take root again that do the mischief.

21. Is that all you have to say in reference to that Ngararahi cut?—I think so, excepting in the manner of doing it. I would never think of cutting down to the level of the river and waiting for the river to scour it out.

22. How should that cut be made?—Principally by floating dredges from the lower end cutting away right up to the proper amount of flotation.

23. Would you first cut down to the water's edge?—Yes; that could be easily and cheaply done there.

24. Are you in favour of the Pereniki cut?—No. As I said before, one can hardly foresee the effect of these cuts, but the principal effect is the rearranging of the river to its own gradient which must take place after you cut off a large length and put that fall in a very short length.

25. I think you have had some experience of a similar cut?—I have seen in the Old Country several instances of that taking place, and one especially on the River Earn, where a mile was cut off by making a cut, if I remember rightly, of not more than 180 ft. This was done to save two bridges on the Caledonian Railway. The gradient of the river was so increased at that time that a great deal of damage occurred on the very spot, but it worked away backward for miles, increasing the flow. At one place it was so severe that it cut through a bend and left the landing of a ferry-boat on an island. I have seen other places affected on a smaller scale.

26. You do not approve of this cut?—I do not. I think the whole thing can be done without these risks and at less money.

27. That is, by stop-banks and removing the willows?—Cut the willows first and erect the stop-banks afterwards. A large amount of dredging would be necessary if it was not for this extraction company promising to pick up 500 tons daily, as I hope they will. They will very soon come to the end of that if there are 500 tons going in per day.

28. *Mr. Myers.*] I think that the fact that you have ascertained that these tailings are ground so fine also affects another part of your report: I refer to the question of returning the tailings into the stopes?—I never thought of returning anything but sand.

29. You never thought, even in your report, of returning anything but sand?—Nothing but that.

30. Seeing the fineness to which these tailings are ground, would you think any portion should be returned to the stopes?—Oh, yes! the sands could all be returned.

31. But there are practically no sands?—They are, no doubt, a very small item.

32. Not worth bothering about?—That I do not know.

33. Did you hear Mr. Fraser or any of the other witnesses giving evidence with regard to the question of removing these slimes to the Rotokohu Swamp?—Yes; and I went very carefully through their calculations at the request of Mr. Rhodes—three sets of them.

34. Can you say whether, in your opinion, they are fair?—Very fair, excepting in one thing which I think might be reduced, and that is the cost the Government charge for trucking on the Government lines—namely, 1s. 9d. I think the Government might very well consent to do that at very much less—that is, the fixed charge up to twelve miles.

35. You suggest the Government might possibly be somewhat benevolent?—I fancy if they could get over this trouble they would look at it in this light.

36. Have you considered the question of putting these slimes on the swamp?—I do not like a scheme that involves a vast amount of trouble and a good deal of risk.

37. *Mr. Mueller.*] You know that a great deal of damage has been done by the spread of these slimes over the grass and vegetation?—Yes.

38. The only way, then, to stop that damage being done is to confine the water to the river?—I would put up the stop-banks necessary to keep it from going over, with proper flood-gates, and where flood-gates were not sufficient I would run the stop-banks up the affluents.

39. You think, if the river is cleared of its present accumulations, the willows trimmed, and a little dredging done and stop-banks erected, that will be sufficient to keep the waters from overflowing?—I am quite sure of that.

40. This extraction company says that it can take these tailings out at the rate of 500 tons per day?—So I have heard.

41. It is calculated that at that rate it will take about thirteen or fourteen years to treat the accumulation that is there at the present time?—I think they are going to take their time about it.

42. But until these accumulations were treated there would be a liability to flooding?—I do not think there would be any liability to flooding if the stop-banks are properly designed and properly put up.

43. *Mr. Mitchelson.*] Even with that large accumulation of stuff there is now?—With the river as it is. The water that comes with these floods has very little current. It is no great factor in running off the water: it is where the current is in the river and between the present banks principally. The water that gets away back with the sluice at Cock's has very little motion.

44. Although you remember it was stated that the water was running over the bank at Netherton for a long time?—That is a different place. There is no accumulation in the Waihou except on the very edge of the river, where there is no current.

45. Have you considered the length or the cost of the stop-banks that would be required even while the present accumulations were allowed to remain?—I have not gone into anything relating to the cost at all.

46. Can you give us any idea as to the length of the stop-banks?—No; that is a matter of examination of the ground.

Mr. Cotter: I omitted previously to hand in this return. It is a summary from the Government blue-books of statistical tables relating to local-governing bodies. [Exhibit No. 92.]

The Chairman: Have you certain information that Mr. Bray was to have sent forward.

Mr. Cotter: No, but we have wired for it.

CLOSING ADDRESSES BY COUNSEL.

The Chairman: Before you begin, Mr. Hanna, there is one question I should like to put to you: Assuming that we cannot accept Mr. Kingswell's scheme, is your company prepared to accelerate its rate of working by more than 500 tons per day?

Mr. Hanna: Acceleration in any shape or form means a tremendous capital expenditure, and Mr. Kingswell's scheme involves borrowing £35,000 from the Government by means of loans to mining companies. There is express provision in the Mining Act for loans of this kind to be made, but unfortunately it is limited to £10,000. Probably that would be advanced at the rate of 4½ per cent., and would be repayable in a certain period by certain fixed amounts. In this case the idea was to double the capacity of the mill—that is, instead of treating 500 tons a day, to treat 1,000 tons per day. That is one of the essential parts of the scheme put in writing. That is really what the money is required for.

The Chairman: You can double the capacity of the mill for £35,000?

Mr. Hanna: Yes.

The Chairman: So that if £35,000 were found for you, subject to repayment in this way, you would take out 1,000 tons a day?

Mr. Hanna: That is what I understand.

Mr. Cotter: It says "repayable out of profits": that struck me as peculiar.

The Chairman: I presume, if they cannot make any profits they cannot repay.

Mr. Hanna: The stuff is there, and the assays are there.

Mr. Cotter: Why not fix a sum of £7,000 a year?

Mr. Hanna: If there are no profits, of course we cannot pay it back. The loan will be a first charge on the profits and on the whole assets of the company. There will be twenty or twenty-two tube mills of the most efficient kind to be obtained. All the companies are going in for tube mills now, and these assets will always be valuable.

The Chairman: I suppose you are not prepared to set aside the whole of your profits for the repayment of the £35,000?

Mr. Hanna: Mr. Kingswell is not here, and I am not in a position to answer you. As I have said, the scheme was got up very hurriedly in deference to the suggestion made by the Commissioners on Friday last, and Mr. Kingswell only put the finishing touches to it on his way down in the tram-car in the morning. I am authorized to state that one or two details to which exception has been taken can be given modified effect to if it is thought necessary. I am just going to remark very briefly on the effect of the evidence which has been placed before the Commission. It has clearly shown that every scheme brought forward apparently contemplates the operations of the extraction company—that is, that these operations will be of material assistance in taking these large accumulations away from the rivers. The second point is this: that even the Ohinemuri County Council and their witnesses are all absolutely in favour of these operations, and incorporate these operations of ours as part and parcel of their scheme. Mr. Stewart, C.E., in the evidence he has just given, is clear that, although the time that is likely to be occupied in dealing with this large quantity of tailings—of course, it is only an estimate when we fix the quantity at 2,000,000 tons—will be fourteen years, even with that period, and taking out 500 tons per day, Mr. Stewart is clearly of opinion that that will not materially affect whatever floods might come—that is, that the flooding there will not make the position worse for those below, provided proper stop-banks are erected. In fact, the whole of the evidence goes in favour of proper stop-banks. Of course, the main part of our scheme is to endeavour to shorten this long period of time by increasing the efficiency of our mills, and therefore that is the main reason why the suggestion was made that this £35,000 should be raised. And then the scheme goes on to provide that we shall install and equip dredges on the river and have them constantly employed. Mr. Kingswell tells me that the main point to be kept in view in connection with these dredges is the question of constant and continuous employment. Unless the work is continuous it cannot be as beneficial as it otherwise would be. I understood from the Council that they did not intend to go on continuously.

Mr. Cotter: No, no.

Mr. Hanna: I understood they simply want to put the material there as it is lifted up. In these circumstances the Council may provide for a receptacle for the dredged matter. There seems to be some doubt as to the impounding of this. I merely point out that the dredged matter will be more or less simply river-sand, and therefore the question of stacking or impounding that sand is a very serious matter. In regard to the right to treat any of the stuff commercially valuable, of course that is purely and simply put in from an economic point of view; but if there is any objection to that Mr. Kingswell says he will have no objection to a qualification. He wishes to say that any treated matter will not be paid for by the Council; it is only that discharged into the hoppers or receptacles that will be paid for. Of course, there will be a continuous quantity of tailings or sands and river *débris* generally coming down this river, and it is only by continuous work that this can be kept from causing any silting in the river. If the Commissioners would like at any time to have a conference with Mr. Kingswell in connection with his scheme, he will be only too glad to meet you.

Mr. McVeagh: What I wish briefly to deal with is the suggestion put forward by Mr. Cotter on behalf of the Ohinemuri County Council with regard to the constitution of the River Board and with regard to the powers to be vested in it. I might point out I am in this difficulty, and I do so in order that the members of the Commission may appreciate the impossibility of giving the matter very careful consideration: this scheme has just come before me for consideration. It was mentioned in a general way by Mr. Cotter last night privately, but the details of the scheme were not mentioned. They have only been placed before the Commission to-day, so that I find myself in the position of not having been able to consult my clients. Now, I shall have something to say presently about that, but at the very outset I wish to refer first of all to the claims of the farmers. I think, on the very first day I pointed out that if the Commission was going to consider the claims of the farmers, and if the Commission proposed to make any recommendation with regard to the losses they have sustained, that ought to be based on conditions as they existed in the year 1895, and not upon any enhanced values which these lands have acquired since 1895. Claims are put forward by farmers in respect of calves killed, and those calves were not in existence in 1895, nor was the grass sown; so it is important, I would suggest to the Commission, that that consideration should be attended to. In regard to the last statement put in by Mr. Cotter, I have had no time to consider it, but the observation I have been enabled to make in the short time at my disposal is this: that many of these places have been able to raise large sums of money. I find, for instance, that Devonport has a debt liability of £75,000; here is another, Newmarket, £25,000; here is another, New Plymouth, £113,000; and so on with a great many of them. That enforces the position that I wanted to make clear to you when I was opening the case for the Waihi Borough Council—I mean the difficulty that such a local body would have in raising money for the purpose of carrying on public works that are actually necessary. I allude particularly to the necessity for introducing a drainage system, and I urge it as a very important matter that requires attention in the Borough of Waihi. There are other places I can call to mind with a smaller population that have their drainage systems. Devonport, I should say, has a population that does not exceed Waihi, and it has a drainage system. The Borough of Onehunga, which I should say has a smaller population—a population of three or four thousand—is now inaugurating a system of drainage; and the expenditure in connection with that is estimated to amount to £40,000. I mention this with a view to showing that it is considered a very important matter that drainage should be undertaken, especially in this climate.

Mr. Mitchelson: Onehunga waited sixty years for theirs.

Mr. McVeagh: Onehunga has only a population of four thousand at the outside. I proceed now to deal particularly with the scheme outlined by Mr. Cotter: and the first very strong objection I raise to it is the unfairness of the system of representation which Mr. Cotter outlined. The reason Mr. Cotter gave—and he was uttering, I take it, the views of the Ohinemuri County Council—for the Ohinemuri County Council having a predominating interest depended upon this: that, unless they were given control of the voting-power it might possibly be that the representatives of the other interests would combine, and emasculate any scheme the Ohinemuri County Council brought forward. Well, that argument cuts both ways. I can say just as fairly that, unless a predominating vote is given to the representatives of the other bodies, the Ohinemuri County Council might combine to emasculate any scheme they might bring forward. Therefore I do say that the Commission ought to endeavour as nearly as possible to give reasonable and just voting-power to all the interests that may be concerned and represented upon the River Board that Mr. Cotter has outlined—assuming, of course, that the Commission is prepared to recommend the appointment of a River Board. I consider that is a matter of great importance. It is one of the first essentials of such a scheme as that. It would be very unfair that an interest should be conferred on one section of the community which would completely overshadow the others, and paralyze their efforts, however well-intentioned and however well-conceived they might be. I certainly urge that as far as possible equality of representation should be secured. With regard to the system of taxation which was outlined, I understood Mr. Cotter to advocate that three-sixths of the annual requirements, which included interest and sinking fund and annual cost, should be imputed to gold duty, that one-sixth should be imputed to the Government, that one-sixth should be imputed to the mines, and one-sixth to the Ohinemuri County Council.

Mr. Cotter: No; the River Board. The Ohinemuri County Council do not come into it at all, except that they pay a small portion of the gold duty.

Mr. McVeagh: It would be a very small portion of the gold duty too. The river is a matter of great importance to the Ohinemuri County Council, and I should consider they ought to pay more than that. But what I chiefly wish to refer to is this: that it appears to me that the amount proposed to be paid by the mining companies was not adequate having regard to the amount proposed to be paid by the other interests. I should say that if the gold duty should bear three-sixths, the mining companies should bear two-sixths at least; but the alternative I would suggest is this: impute, if you please, two-sixths to gold duty, and let the mining interests pay two-sixths, and the remaining two-sixths can be distributed between the river district and the Government.

The Chairman: Poor Government.

Mr. McVeagh: But the Government are somewhat to blame, because they created this trouble; and this should not be lost sight of. I say the Government are getting out of it well for two-sixths, for they have created this state of things.

The Chairman: Who has benefited by it?

Mr. McVeagh: The Government created it and brought it into existence.

The Chairman: You would not have got your gold duty but for that.

Mr. McVeagh: I am not sure about that. The possibility is that if this state of things had not been created the experts of the mining companies might have discovered some other scheme of

dealing with the matter. However, their machinery has been put in in the way it has been; they have adapted their machinery to the existing state of things. They were led to do so by the Government. These are the chief heads I wish to deal with arising out of the suggestions that have been made to-day. On behalf of the Waihi Borough Council I should be prepared to assent to Mr. Cotter's scheme with the modifications that I have suggested—a scheme which, I believe, so far as he can foresee at present, involves an annual outlay of £6,000.

Mr. Mitchelson: Does Waihi approve of the two cuts?

Mr. McVeagh: I understand that was no part of Mr. Cotter's scheme. As I pointed out some time previously, the Waihi Borough Council would not consider schemes at all. Schemes have been brought forward by the parties vitally interested in the matter, chiefly by the mining companies. Schemes certainly have been submitted by the Ohinemuri County Council; and if that scheme is an effective scheme—and we certainly have some expert testimony on the subject—the Waihi Borough Council is prepared to fall in with it on those lines. There was just one other consideration proposed that I might draw your attention to, and that is with reference to the suggestion that the mines do not appear to be fairly rated in the scheme outlined by Mr. Cotter. I understand that the output from the mines into the river at the present time is about 400,000 tons per year. A rate of 1d. on the ton would produce, I should say, without having calculated it, £2,000; it would perhaps be a great deal more. And I would draw attention to the smallness of the rate and to the greatness of the advantage which the mining companies would secure by having that river kept open for the discharge of their tailings.

Mr. Myers: Now that these local bodies have shown the position they take up, I find myself in a position to answer them. First of all, with regard to the Thames, the position that these local bodies take up is that they only want this Proclamation revoked as a last resort, and they say that they pin their faith to Mr. Storie's scheme. I am not going to discuss that scheme, because we were told during the progress of the inquiry that we need not bother any further about it. Consequently, so far as the Thames local bodies are concerned, the Proclamation presumably must remain. The Ohinemuri County Council takes up the same attitude, and, so far as I can gather from Mr. McVeagh's attitude during the course of the inquiry, the Waihi Borough Council takes up the same position, and I apprehend that the farmers take up exactly the same position. I have always assumed that they want the position remedied, but that they do not want it done at the expense of the mines; that if there is any other fairly effective remedy short of closing this river as a sludge-channel, they do not want the Proclamation revoked. We may take it, then, that no one wants the Proclamation revoked except as a last resort. Mr. Cotter when he was opening his case said that previously to the Proclamation the companies were working only high-grade ore. That is exactly what we say, and we say that it was only the Proclamation of these rivers as a sludge-channel that enabled the gold-mining companies to work their mines to anything like advantage. And who has had the advantage? Not only the gold-mining companies, but the Waihi Borough, which has been kept in luxury year after year and year in and year out by the duty which the gold-mining companies have been paying. I want to say just one word before I leave this subject of the revocation of the Proclamation. Whatever may be the legal position—and upon that Mr. Cotter and I apparently differ—there is the equitable position to be looked at; and I say, whether you look at the legal position or at the equitable position, if these rivers were closed as a sludge-channel, then the companies ought to be put in the same position as they are in at the present time—I mean, so far as the question of working-cost is concerned. In other words, the amount of compensation that they ought to get from somewhere—presumably from the General Government; and the gold duty would be very materially less—that sum would run into a figure which I venture to say would stagger the Government and Mr. McVeagh.

The Chairman: And the gold duty.

Mr. Myers: Yes. Now, a number of schemes have been suggested. There is this question of the deposition of the material in the Rotokohu Swamp by the various mines. We have contended, and I submit we have proved it by our evidence, that they are really not possible. There is the question of the extreme cost; then there is the doubtful effectiveness of these schemes, except the removal by railway-trucks; then there is the possibility and probability of breakdowns; and even with regard to transport by railway we say that the expense and difficulties are such as to make the scheme utterly impracticable; and for the reasons given in evidence we say the same in regard to the suggested scheme of depositing this material on the Waihi Beach. Mr. Pond's scheme of this morning is obviously attended with such enormous expense that nobody could hope to undertake it, except the Government itself, and, apart from that, it is really too nebulous for even the Government to think of undertaking without much more detail. It all comes back to the question, we say, of improving the river, and we say, and I venture to put it, that all the witnesses agreed that the improvements in the river will settle with reasonable effectiveness the existing difficulties.

The Chairman: It will not settle the slimes; they go out.

Mr. Myers: No, it will not settle the slimes, of course, but it will settle the difficulty which it is suggested arises from the slimes. Then comes the question of the allocation of the cost, assuming that the case outlined by myself when opening, and by Mr. Cotter, in regard to the question of river-improvements is adopted. Judging by the cross-examination by Mr. Cotter of Mr. McVeagh's witnesses, and by Mr. McVeagh of Mr. Cotter's witnesses, I should have thought that the imputation made by each one was that the other Council had been conducting its business extravagantly; and so great appears to be the extravagance, judging by the cross-examination, that I venture to suggest that the gold duty could well afford to pay the total cost of the improvements. But, joking aside, the way in which I put the matter to this Commission is this: that the mining companies are already paying some £30,000 or thereabouts per annum, and I put it to the Commission that they are entitled as a matter of fairness, and justice, and right to have kept clear the sludge-channel

which the Government has proclaimed, and I do submit that the gold duty ought to pay for keeping open the avenues by which these slimes are to escape. The mining companies consider, and I submit, that no imposition ought to be put upon them at all, and that the gold duty ought to pay the lot. But, if it is intended that anything should be paid by the mining companies at all, I venture to put it that Mr. Cotter's suggested proportion should be the maximum. It is quite clear that the residents of the district should pay something, because, quite apart from this question of slimes, it is obvious that sooner or later river-improvements will be necessary in order to protect their own lands; so they should pay something. It is equally clear that the Government should pay something, I submit, because, quite apart from the Government having been saved, or not having disbursed, compensation-moneys to the farmers in 1895, its railway will be protected from floods by these river-improvements. In addition to that, a very large area of Crown lands in the neighbourhood of this river will be protected from floods and made more valuable; and I understand that the Government also has a large tract of land upon the Hauraki Plains which I am informed will be largely benefited by any scheme of river-improvement. And, more than that, the Government will obtain a settlement of what has been to them, as it has been to all concerned, a very vexatious and worrying question. So my point is this: While I say that the gold duty should pay the lot, if anything is to be paid by the mining companies at all it should not be more than Mr. Cotter's suggestion, because the Government and the settlers should pay something substantial, for the reasons I have urged. There is one other point that has not been touched upon: There should be some statutory provision whereby the river authority shall be able not only to recover judgment against the Natives, but to collect the fruits of the judgment, and that, I submit, without the necessity of any recourse to the Native Minister, as is the case at the present time. The question of representation only concerns us in the event of the Commission recommending some arrangement such as Mr. Cotter has suggested. If the gold duty is to pay the lot, as I submit it should, then we are not interested. If, however, we are to make any payment at all, then I suggest that the question of representation needs some further consideration than that which Mr. Cotter has given to it, and that, while it is quite likely the Council or the inhabitants of the district should have more representatives than each of the other contributing bodies or persons, still no one body should have an absolutely controlling voice. Now, the only other question I think I want to deal with is the question which Mr. Cotter raised, and which I understand the Commission desires me to answer, and that is the question of the maximum coarseness of the slimes which are to go into the river. The present position is that all the companies, with the exception of the Crown Mining Company, are using tube mills.

Mr. Moresby: The Talisman is not yet.

Mr. Myers: In regard to the Talisman, we know the mills are erected and to all intents and purposes they will be ready to go on in the course of the next six weeks—probably by the time this Commission has made its report. We ask that there should be no fixed arbitrary regulation on this question of fineness, because we say that the companies may be depended upon to do their best with their tube mills to crush as finely as they possibly can. But if there is to be any regulation at all, then we suggest, having regard to the fact that the companies may be relied upon to do their best, and that they have been doing their best, that so long as not more than 10 per cent. is put into the river which will not pass a commercial 100-mesh screen, that will amply meet the case.

The Chairman: "Commercial" is a fresh phrase: what is meant by it?

Mr. Myers: It is difficult to speak of a standard-mesh screen: that is what I mean. I do not know whether there is an absolutely standard screen.

The Chairman: There is as regards cement—the screen is defined as being a screen formed of wire of a certain diameter and having so many meshes to the square inch. I presume there is something similar in mining matters. Of course, you could have a 100-mesh screen woven solid, with no opening at all.

Mr. Myers: Of course, I do not mean that.

The Chairman: I take it the diameter of the wire is equal to the diameter of the hole: that is the whole thing, is it not?

Mr. Grace: No, not at present. You might buy two commercial 100-mesh screens, and one will not agree with the other. They are introducing small standard screens, but they have not got down to the finer screens yet. I have not been able to get a standard 100-mesh screen.

Mr. Myers: We have put in a number of samples, and you will see from them the kind of screens that have been and are being used at the present time. That is what I refer to as a commercial 100-mesh screen.

The Chairman: Possibly Mr. Grace might send us a statement showing in regard to a 100-mesh screen what the diameter of the wire and the diameter of the holes is.

Mr. Grace: I can give it for my own and the Waihi Company. I will try and get the Talisman and Crown as well.

Mr. Myers: I just want to guard myself by saying that so far as the Crown Company is concerned I am not authorized to make any such suggestion as I have just now made; but on behalf of the other companies my suggestion is that there should be no arbitrary regulation, but, if there is, then that it should be upon the line which I have just indicated. Our submission is that that 10 per cent. which would not pass a 100-mesh screen would do no harm. There is still the question of *débris* apart from tailings, but we can offer no solution of the difficulties so far as that is concerned. However, I think we have put it in evidence that it is not an element that need be feared, because there is only a certain amount of stuff from the two mines at Karangahake which cannot be put anywhere else, and there is not likely to be any substantial quantity of mining *débris* other than tailings from the mines. As Mr. Cotter reminds me, where we are able to do it that will be put back into the stopes.

Mr. Mueller: I wish first to mention a matter that cropped up in Mr. Cotter's opening remarks. He stated that the mining representatives looked to both the mining and agricultural interests, and the farming representatives——

Mr. Cotter: I did not go into the internal working of the Ohinemuri County Council. A man is elected to a local body, and he is practically put on his honour to do his best for all interests. It is certainly not right to criticize or allow criticism of individuals. I did ask a question as to what the proportion of representation was, because one wanted to have an idea as to how far the farmers were running the whole show for their benefit or the miners were running the whole show for their benefit. I do not think it is wise to go further than that.

Mr. Mueller: What I wish to state is this: that the farmers whom I represent, all of them, I may say, have on many occasions expressed the opinion that they do not wish to unduly hamper any industry. If a solution of the difficulty can be found which will not unduly hamper the mining industry, they will be one of the most pleased in the district. They want no scheme which will unduly harass the mining industry if a better scheme can be suggested.

The Chairman: I understand you do not desire the Proclamation to be revoked except as a last extremity.

Mr. Mueller: No, I cannot say that, because in the opinion of the association, or a very large number of the members of the association, they cannot see how a complete remedy is going to be found so long as these slimes are allowed to go into the river. I wish to refer now to a legal point that cropped up in the opening remarks of Mr. McVeagh and Mr. Hanna. They both stated that when this Proclamation was issued in 1895 no compensation had accrued to lands which had been alienated subsequent to the 21st October, 1875, and they quoted a section of the Act in support of that contention. I wish to show that their contention is not correct, and I think that you will agree with me when I have quoted the section I refer to. The Proclamation was made under the Act of 1891, and section 152 is the section which was quoted by Mr. Cotter this morning. That gives power to make and withdraw the Proclamation. Section 53 is the section which relates to compensation, and there are numerous subsections stating how the claims are to be made and how the compensation is to be assessed, &c. Then section 154 goes on to state that "the provisions of the last preceding section shall have no effect in respect of any persons purchasing, leasing, occupying, or otherwise acquiring Crown lands within a mining district after the 23rd December, 1887": so that all who have acquired Crown lands prior to December, 1887, were entitled to compensation. But this section goes further. It says, "Crown lands within a mining district." Now, the mining district was constituted in 1889, but that mining district did not include the lands of Paeroa or to the north of Paeroa. The boundary then went across the divide about Mackaytown right away down towards the Thames. The Hauraki Mining District of that time did not include any of the flat lands. A further Proclamation was issued in August, 1905, altering the boundaries of the district, and that included the whole of the lands to the east of the Waihou River right down to the Firth of Thames. Therefore at the date of the Proclamation in March, 1895, the whole of the lands on the west of the Waihou River were outside the mining district, and the whole of the lands on the east of the Waihou River north of Mackaytown, excepting the high lands. So that the contention of my two friends is not quite correct: what they were referring to was a further section of the Act which states that land alienated subsequent to 1875 should have no right to the flow of water. The actual flow of water could be stopped without compensation, but if the owners of land applied for compensation for damages to the land they would be entitled to their compensation. While on these matters, as I have mentioned Mr. Hanna's name, I might just as well finish my remarks as regards the extraction company. The extraction company has taken up the position that it has a vested right in this river-bed, and that is the very position which was foreseen by the Silting Association and by the farmers in the district when these applications were before the Warden's Court on several occasions. I would just like to refer to a report of the proceedings in connection with the applications of this extraction company which appeared in the paper, dated 13th February, 1910, as follows: "There was a large number of objections to the applications. A. C. Hubbard objected as the representative of a public meeting held in Paeroa to consider these applications. . . . Amongst the grounds of the objection were . . . . that the grant of the application would render more difficult the efforts of the settlers to obtain relief from the damage caused by the silting-up of the rivers; that the grant of the application would hamper and prejudice the Royal Commission to be appointed to inquire into the best method of remedying the damage caused by the silting-up of the rivers." That was one of the grounds of objection, and that was made the ground of an application by Mr. Earl, counsel who appeared for the objectors, for an adjournment until this Royal Commission could sit. He quoted a letter from the Under-Secretary for Mines in which it was stated, "that a Royal Commission was to be appointed to sit during the recess. He suggested that this, therefore, was not an opportune time to go into these matters. The company could very well wait for a week or two until the date of the Royal Commission had been fixed. He suggested that the matter be allowed to stand over for a month." "Mr. Cotter in reply protested against the application for an adjournment at that stage of the proceedings. . . . What the Government may or may not do was not a matter to be considered by the Warden at all. Mr. Earl showed a belief in the promises of the Government that was not shared by other persons who had been given these promises, and which there was at times difficulty in carrying out." However, the Warden refused the application for an adjournment, and considered the matter. He stated that all he had to consider was the purely legal question, and he granted the applications. Therefore I wish just to remark that the association I represent actually foresaw the present awkward position of this Commission—that interests have been granted over certain stuff which almost every party before the Commission has agreed should be thrown out of the river as soon as possible.

Mr. Hanna: That is not correct. These licenses were issued long before that.

Mr. Mueller: So they were, before 1906; and what work has been done on the claims? The company has not complied with the labour conditions yet. In four years' time it has done no work at all, and it is now coming and asking for consideration. I say it is not entitled to half the consideration that the farming interest is entitled to. The extraction company has not come before this Commission with a clean sheet.

Mr. Hanna: There is no evidence of that. Why did you not examine on these points?

Mr. Mueller: You stated the licenses were issued in 1906.

Mr. Hanna: We had protection from the Court all the time. We applied for protection, and got it.

Mr. Mueller: As regards the general question of this inquiry, as in opening I stated, our case was simply a matter of proving clauses (1) and (2) of this commission; and I think it must be taken as conclusively proved that we have done that with the assistance of the witnesses produced by the Ohinemuri County. Mr. McVeagh stated that the damage should be measured as at the value in 1895. I suggest that is entirely wrong. The scope of the commission expressly states "whether any and what lands are injuriously affected by the operation of the Proclamation." It is not how they were affected in 1895, but the present position, and what is the remedy for the present position, and not the position in 1895. As regards the question of damage, it is practically admitted by all parties that damage has been done and that damage will continue unless there is some remedy; but I would urge especially in that connection the question of these slimes spreading over the ground. We are not complaining so much of the tailings that remain in the river—only we say they contribute to the flooding of the land; but we complain about the tailings and slimes coming over our land, and unless something is done to prevent these slimes coming over the land the damage will still continue. And the finer the grinding the more serious the damage will be, because the further the silt will travel and the easier it will travel over the land. As regards the question of the actual revocation of the Proclamation, there has been suggested a modification of the Proclamation, and it has been suggested that it should be modified as regards the upper Waihou River for the purpose of stopping future operations from using that river. If it should be modified as regards the upper Waihou River to that extent, why should it not be modified as regards the upper Ohinemuri River to the same extent? You are not injuring the present companies, but you are making provision that any future operations will have to provide for the altered circumstances. I think anything should be done which can in any way lessen the evil for the future. I also wish to mention this point in respect to the Komata Creek. There is no doubt that the intention of the Proclamation was that the Komata Creek should remain clear of sludge altogether. There were two creeks exempted—Tarariki and Komata—and through a mistake it is questionable whether the Komata Creek is a sludge-channel or not; but now is the time for that to be considered, and be a suggestion from such a Commission as this.

The Chairman: You do not suggest we should shut up the Komata Mine, do you, by asking the Government to declare that the creek was not intended to be a sludge-channel?

Mr. Mueller: There should either be that or there should be full compensation in respect to that creek at the present time.

Mr. Myers: From whom?

Mr. Mueller: From the Government certainly: it is the Government's mistake. As regards the scheme suggested by Mr. Cotter I just wish to make one or two remarks. If it should be thought fit to have any such scheme, then I would suggest that the river district, whatever it may be, should be cut up into ridings, so that the representation would be of the portions of the district, and that the representation should have the proportion as mentioned by Mr. Cotter, so that the part where the money is to be spent and where the damage has been done should have the balance of power. I also think the Board should have, as Mr. Myers mentioned, full legal authority to collect rates, so that all lands should pay rates. As regards the proportion of rating, I simply wish to ask why should the injured—the farmers—pay exactly in the same proportion as the injurers—the mining companies? The suggestion is one-sixth each. What would the raising of £1,000 mean to the farmers?

Mr. Myers: You are forgetting the gold duty.

Mr. Mueller: But even £1,000 would mean a 100-per-cent. increase on the gold duty. There is a matter which the mining companies have forgotten, and that is the benefit which was conferred by the Government upon the mining companies by buying out the cyanide rights.

Mr. Myers: The mining companies paid for it.

Mr. Mueller: They paid that money back certainly, but it was a cash payment of £15,000 made by the Government on behalf of the mining industry, and if the Government had not paid that sum, in all probability the mining companies would have had to pay considerably more to the patentees. I wish, in conclusion, simply to express to the Commission the thanks of my association for the very patient hearing given to the members of the association, and also to the other parties.

Mr. Cotter: I should just like to ask whether it is worth while also for the Commission to consider the advisability of recommending that a bonus should be offered for the bringing of silt or slime to a commercial value.

The Chairman: We will now consider the Commission closed, and all I have to do is to thank counsel and witnesses for the assistance they have given us.

APPENDIX.

SOME OF THE PRINCIPAL EXHIBITS.

[NOTE.—Some of the exhibits were samples of tailings, &c.; and some documentary exhibits are embodied in the evidence.]

EXHIBIT 6.

LETTER FROM STATE MINING ENGINEER, WESTERN AUSTRALIA, AS TO DISPOSAL OF TAILINGS IN THAT STATE.

SIR,— Mines Department, Office of the State Mining Engineer, Perth, 29th June, 1909.

In reply to your letter of the 13th ultimo, to the Hon. the Minister for Mines, I have the honour to inform you that, owing to the arid climatic conditions generally prevalent in the goldfields of this State, the disposal of tailings by running them into river-channels has almost always been impossible, and the use of natural watercourses as sludge-channels has therefore not required to be considered.

It is usual throughout this State to stack tailings in heaps and paddocks near the mills, and in the case of the large mines huge mounds of tailings have been so formed. At several of the large mines of Kalgoorlie, various systems of mechanically elevating the tailings have been employed; but, notwithstanding that the surface of these heaps becomes greatly crusted over with salts from the water with which they were moistened, they often become exceedingly troublesome in windy weather, clouds of fine sand flying from them, to the great detriment of passers-by and of any machinery exposed to it. The information given to you that the tailings were stacked in the vicinity of buildings "without any drawback arising from dust or otherwise" was not by any means entirely correct. Owing partly to the nuisance caused by the tailings-heaps and partly to want of space on the leases for increasing the heaps, most of the large Kalgoorlie mines are now sluicing away their residues, in as thick a sludge as possible, through pipes to an area of ground reserved for the purpose about a mile from the mines. Here they are being accumulated in huge dams on low-lying ground. The cost of removal by sluicing is about the same as in the best methods of mechanical handling.

The dried tailings in the big heaps, after exposure for a long time to the weather, so that all cyanides in them have been oxidized, are greatly used in this State for filling stopes underground, and are very excellent filling-material; but care has to be taken while putting them in the stopes to have good ventilation, in case there are still poisonous fumes of hydrocyanic acid given off by them. There is hardly ever any trouble in this respect if the tailings have been stacked in the weather for a few months.

One very great difference between the case of the mines in Western Australia and yours in Ohinemuri is that here there is almost always plenty of flat, low-lying land near the mills on which tailings may be stored, unlike the position at Waikino and Karangahake, where there is little or no space available for the purpose. Mills at Waihi itself might perhaps adopt the stacking method with some advantage, making use of the flat ground there.

I have, &c.,

A. MONTGOMERY,

E. W. Porritt, Esq., Paeroa, Ohinemuri County, N.Z. State Mining Engineer.

EXHIBIT 13.

REPORT OF HENRY H. METCALFE, C.E., AS TO SILTING-UP OF OHINEMURI AND WAIHOU RIVERS.

SIR,— Auckland, 3rd May, 1910.

On your instructions I have examined the Ohinemuri and Waihou Rivers with a view to remedying, if possible, the damage from the deposit of tailings caused by using these rivers as a sludge-channel.

The waterway of the river, contracted by this deposit, is insufficient to carry off a heavy rainfall, which since the bush has been extensively cleared runs off quicker than formerly; the swamp-drains in the low ground contribute to the quick discharge of rain-water; and the combined result is heavy floods, which deposit tailings on the adjacent country to the complete ruin of the land for agricultural purposes.

The damage, though more obvious to the casual observer on the Ohinemuri, where the coarse tailings are deposited close to the river-bank, is perhaps greatest on the Waihou, where the flat ground allows the finer tailings to spread a long way back from the river.

It is easier to recognize the damage than to devise a remedy: if the mines ceased discharging tailings into the river to-morrow, the accumulation already gathered would continue to block the channel, and every flood would still deposit silt on the land for years to come. The first need seems to be to lessen the extent and frequency of the floods as much as possible.

On taking soundings down the Waihou from the Junction to some distance below Hikutaia, and dredging samples from the bottom at intervals, especially on the shallow bars, I found the bottom to consist of clean Waihou River sand without tailings throughout, except at the Junction, while Mr. H. Charlton, who accompanied me, and has known the river for thirty years, considered the depth of water on every bar to be quite as much as formerly.

The sides, however, are much silted up: the willows and vegetation have caught the tailings, and made probably 30 ft. of ground on each side—a serious diminution of the waterway.

In the Ohinemuri the silting is much greater: sides and bottom have been silted up, while at the Junction a bad block has taken place. Willows in the Waihou, gathering tailings and mud, have formed an island: a groin from this has not improved matters, and a bank of tailings has formed just below it, impeding the outfall of the Ohinemuri, and causing the Waihou to overflow on to Netherton, above the Junction.

The relief of this point should be the first work undertaken. A flood-channel, say, 200 ft. wide, should be cut down to ordinary water-level from the bend about a mile above the Junction to the bend below Thorp's Bend, some 60 chains, as shown on plan; and the groin should be removed, when the river itself would scour out a channel to the west side of the Waihou.

This flood-water channel would shorten the course three miles; the first flood would probably scour it out to give a navigable channel as good as the present one, and the whole of the water could be turned down it at very small cost.

The next point is to relieve the Ohinemuri itself below Paeroa, which could be effected by cutting a channel from Pereniki's Bend to near the Junction, a distance of about 25 chains. This would shorten the distance by river from Paeroa to the Junction by three miles, and so increase the velocity as to lower the flood-level at the bridge.

When these cut-offs have scoured down to the full depth, the present channel of the Ohinemuri will be a backwater, as will also that of the Waihou between the proposed cut-off and the Junction, while the new junction will be below Thorp's Bend.

A result will be that some part of the tailings now blocking the Ohinemuri will be carried below the present junction and settle there, so that until the Waihou cut-off is made it would not be safe to cut the Ohinemuri.

It will then remain to widen the river where necessary—a work of time and expense.

When examining the deposits of tailings I did not find anywhere in the river distinct evidence of slimes; the deposits lower down seemed to be the finer particles from the stamp batteries, and I incline to think that the material passed through the tube mills will not deposit in the river; on the land, however, it was to be found in the form of a white coating on all vegetation. This coating does not seem to wash off with rain, but a tuft of dry grass gives off a small cloud of dust when plucked.

If 10 lb. or 20 lb. of damp grass were collected, the deposit washed off, dried, and weighed accurately, the amount of dust which must be consumed by cattle would be found, I think, considerable.

But I do not think that this fine stuff will affect the waterway to any appreciable extent, and if this is so the operations of the Gold-extraction Company at Paeroa may perhaps be beneficial in clearing the present deposit of tailings, while as the tendency seems to be to finer grinding in the mills, future deposits will probably travel further down the river, and must be dealt with as they occur.

A silt-laden river will inevitably leave deposit in the submerged mouths of drains and ditches which fall into it; there is no remedy for this but cleaning out the silt as occasion requires.

On parts of the river stop-banks may prove useful; but the river should be examined in heavy flood before such work is decided on. Stop-banks would generally need to be at least 10 chains back from the river, with tide-flaps on all drains crossing them. Ample room must be left for the river to spread, and the ground between the bank and the river would be useless for agriculture on the sludge-channel.

The willows on the banks should be destroyed by deep ringing, or boring with kerosene, and where the channel is much contracted the stumps must be grubbed out. This will take time and money, and will need a punt with a steam-winch.

If any permanent improvement is hoped for, the river from the boundary of the Thames Harbour Board upwards should be controlled by a Board appointed for that sole purpose, and all works should be carried out by this Board under skilled direction. The controlling body must, of course, have a revenue: how it is to be raised is not my business, but the gold duty is one obvious source. The amount required will vary from year to year, and at the outset a large sum is certainly needed, while various works will suggest themselves from time to time. The effect of all works must be watched as they progress; the regulation of the river and the establishment of a regimen cannot be done all at once.

The country, always subject to floods, is now more so than ever; and as clearing and draining extend, the floods will increase in severity. Exceptional floods will lay the country under water whatever is done, but if ordinary floods are prevented from carrying silt over the land, probably little harm will result. As it is at present, only the screen of swamp vegetation about Netherton prevents the silt being carried down the Awaiti Creek to the Piako and over the newly drained lands.

As to the suggestions that the tailings should be flumed and deposited on the flats, though not impossible, I do not consider this practicable; to keep even fine grindings in suspension would need, judging from the appearance of the stream, nearly its whole summer flow, and if the slimes were stacked and dried, I question whether the remedy would not be worse than the complaint, as the wind would carry the dust all over the country. If the river will carry the tailings to sea, it is best it should do so, though it involves compensating or buying out owners of land which may be affected in the process.

I do not think anything short of what I have proposed will be effective in lessening the floods, and the consequent spreading of the fine slimes over the whole plain. Half-measures are useless, and mere waste of money.

Above Paeroa little can be done; the cheapest way would be to buy out or compensate those damaged by the deposit—a matter for valuation. Only, if the cut-off lowers the flood-level at Paeroa sufficiently, a stop-bank might prevent the overflow across the railway below the two-mile post occurring again. This, however, will raise the flood-level at the township, and must not be done till the channel is improved below.

I estimate the cost of the flood-channel on the Waihou at £6,000, and the cut-off on the Ohinemuri at £1,500; clearing obstructions, willows, &c., £500—an initial expenditure of £8,000.

In addition, two bridges will probably be asked for, and land would have to be acquired.

Afterwards the annual expenditure of the River Board in maintaining, widening, and clearing the river may be put down at £4,000.

Recapitulation.

The Ohinemuri is choked with silt on bottom and sides. The Waihou is not appreciably shoaled on the shallows except at the Junction, but its width is much contracted by silt lodging in the willows.

Slimes have not lodged in the river to any great extent so far, but are spread over the land in floods, and spoil all vegetation.

The contraction of the waterway by silt, added to the quicker run-off of rainfall which now obtains, leads to more flooding than formerly, and with worse effects, because silt is now spread by every flood.

The only way to relieve the flooding is to steepen the grades of the rivers by shortening their courses. This may be effected by a cut-off 60 chains long on the Waihou, which will leave the present channel from the Junction to below Thorp's Bend for the Ohinemuri.

The Ohinemuri is to be shortened by a cut 25 chains long at Pereniki's Bend, which will so steepen the grade as to lower the flood-level at Paeroa materially.

All willows to be destroyed as soon as possible, and where necessary grubbed.

The control of the river should be vested in a specially constituted Board, which, out of a revenue to be provided, would execute these works, with such others as may seen necessary to improve the navigation, to maintain a free and sufficient channel for flood-water, protect the adjacent land from deposit as far as possible, clear the drain-outfalls of river-silt, and which would generally regulate the river from the Thames Harbour to Waihi, and also to, say, Waiorongomai if thought advisable.

Yours, &c.,

Henry H. Metcalfe, Mem.Inst.C.E.

The Chairman, Ohinemuri River-silting Association.

EXHIBIT 19.

FLOOD IN THE OHINEMURI RIVER, JUNE, 1908.

[Extract from the *New Zealand Herald*, Friday, 24th June, 1898.]

For some considerable time past there has been a great demand for water in the Ohinemuri district, the drought having diminished to a minimum the waters of the Ohinemuri and Waitawheta Rivers. Mining has consequently been retarded, and rain was undoubtedly very badly needed. Fine weather, however, continued until yesterday, when a heavy downpour took place. As night advanced it seemed as if the forces were gathering strength, and by midnight a fearful gale, accompanied by a perfect deluge, was raging. This continued until long after daylight this morning, and it was apparent to all that a serious flood was in prospect. These expectations have been realized to the fullest extent, as at the present time the country for miles round is simply submerged, the water in many portions of the place being fully 6 ft. and 7 ft. deep. At 8 o'clock this morning, Belmont Road, the main street of the town, was flooded by the heavy rain which had fallen during the night, and, though this completely paralyzed all business, it was feared that the water would be supplemented by a flow from the Ohinemuri River, which was rising very rapidly.

A Rescue Band.

In the lower township matters were very bad, and what is known as Rye Lane, a branch street from the Station Road, was submerged, water standing to a depth of about 4 ft. The occupiers of a large row of cottages were naturally greatly alarmed, and, as the waters seemed to be gaining in depth, furniture was piled up, and preparations made for a general exit. By this time, Mr. Woodbury (Stationmaster), Captain Scott (Salvation Army), Messrs. Towers, J. Edwards, and several others were looking round, and, seeing that the position of some of the inhabitants was rather critical, formed a rescue band, and, though wading waist-high in the water, they managed to clear all the houses of their tenants. Riders on horses, spring carts, and coaches were requisitioned, and very soon men, women, and children were rescued, thanks to the conveyances kindly lent by Messrs. Emmett, Dean, and Harwood. Quite a number of families rescued were taken to the boardinghouse of Mrs. Dryland, who did all she could to make them comfortable. The same remark applies to Messrs. Delaney, Lawless, and Bastings, of the Paeroa, Royal Mail, and Criterion Hotels respectively. At the junction of Puke Road the water was also very high, and several families were compelled to make a sudden exit.

THE RIVER-BANK SUBMERGED.

In the afternoon matters took a very serious turn for the upper township populace, as the river, which was then carrying a full complement of water, was backed up by the tide, and as a consequence overflowed its banks in several places. The first point where the water broke away was near the fine premises of Messrs. Porritt, Coote, and Cochrane, and in a very short time the newly laid-off grounds of Messrs. Coote and Porritt were entirely under water—in fact, boats were taken right across the Main Road. The river now rose very rapidly, and the noise of the angry torrent could be heard a long distance off. Soon the old wharf and the Railway Wharf were covered, and the river broke its banks at the Esplanade, and near Mr. Forrest's timber-yard, so that the town was completely flooded. Belmont Road, from the Royal Mail Hotel to the railway-station, and thence on to the Puke, was nothing but a vast sheet of water, its depth, as it rushed down each street, being from 12 in. up to about 3 ft. or 4 ft., that being the depth of water near the railway-station. Fences were washed away by the flood, and nice gardens destroyed, and, looking over Paeroa from the firebell tower and Primrose Hill, scenes of great devastation were to be witnessed everywhere. The Te Aroha Road was also visited by the flood, and this evening matters assumed such a serious aspect that the families of Messrs. Saunders, Knowles, and Bush had to be removed by means of a boat, and when it is stated that when Mr. Saunders's wife and family were being rescued from the house, the boat passed over the top rail of the fence, some idea may be gathered of the depth of water in that neighbourhood.

STREETS STILL UNDER WATER.

At the time of telegraphing the streets are all under water, and, though the river has gone down somewhat, grave fears are entertained that if the rain does not cease and the water in the river be materially reduced by the time the tide comes in again at midnight, some serious calamities will ensue. The position of many whose homes have been invaded by the flood, and whose places are completely surrounded, is somewhat critical, but it is earnestly hoped that when another day dawns affairs will assume a brighter aspect. There is nothing of a serious nature to record in connection with the flood, but several slight accidents occurred. It is, of course, very hard in some places to find the macadamized road, and horses with riders on them have fallen into the culverts. Mr. Phillips was thrown on one occasion as he was going home, and, though his horse rolled on him in the water, he escaped uninjured.

TRAIN STRUCK BY A TREE.

As Paeroa is still under water, it is hard to estimate the damage caused, but it will be something considerable. The railway formation has been washed away for about half a mile in length, and as a consequence the through train from Auckland to Paeroa was unable to reach here this evening. The train had a very narrow escape this morning when coming from Te Aroha. It had just crossed the railway-bridge when a large tree, blown over by the wind, caught the guard's van. Had the tree fallen just a second or so earlier, as the engine came up, there would have in all probability been a derailment and a serious accident.

TRAFFIC COMPLETELY STOPPED.

All the out-districts have been completely cut off, and none of the coaches arrived here to-day, with the exception of a buggy carrying mails from the Thames. The conveyance was pluckily driven through by Mr. A. Crowther, who had several narrow escapes along the road. Mr. F. Dryland also essayed to drive Mr. Short's big coach through to the Thames this morning, and eventually reached Puriri. He then saw that the bridges were simply floating, and in consequence he turned back. He informed me that Hikutaia was in a fearful state of flood, and the horses were almost swimming in front of Mr. Scott's farm. Mr. Scott's family were compelled to remove, and, with several other members of the Hikutaia community, sought refuge in Mr. Corbett's hotel. All the creeks along the road are flooded.

SERIOUS DAMAGE AT THE CROWN MINES.

News reached here this evening that the most serious damage occasioned at Karangahake had been caused to the New Zealand Crown Mines Company's works, and the report is that fully 1,500 pounds' worth of damage has resulted. The mine has been flooded by the Waitawheta River, and the water-race seriously injured. Mr. Daw, the general manager, is, however, doing all he can to repair the damage.

EXHIBIT 21.

CORRESPONDENCE RELATIVE TO PROPOSED FORMATION OF BOROUGH IN WAIHI.

MY LORD,— Paeroa, 17th December, 1901.

Having read the notice respecting the proposed Borough of Waihi, and that all persons affected are called upon to lodge written objections thereto, I feel sure it affects me very much, and therefore I, as one of the first settlers in Ohinemuri (since October, 1868), and one who has taken a great interest in the welfare of the whole district in general, must now beg to object to the above, and seek protection for the Paeroa Riding, its population, its township, and suburban and farming lands, and for the following reasons:—

At the end of 1894 a notice appeared in our local paper that the Government intended to make the Waihou and Ohinemuri Rivers, and their tributaries, into sludge-channels for mining

débris. I and the people of this riding were greatly affected by this notice. We did not sell our birthright; we did not seek compensation; and no one objected to it, as it was done for the welfare of the district in general, though to our detriment. Now, I feel sure, if we had been so selfish as to object to our river being polluted by this mining *débris*, then mining would have been retarded in this district, and the gold-returns would not be so great as they are. If it were not for the gold duty, there would be no borough-seekers for Waihi, and we in Paeroa would be better off. We should have a larger population in the township, our river deep and clear, our navigation not impeded, and our lands drainable. But what is the position? Our once beautiful river is nothing but mud, disgusting to look at. Our river, which is our main highway, and which did not cost the public one copper to form and maintain during all these years, and which is as yet a great saving to the consumers of the whole district, even from Kopu to Te Aroha, and in which Waihi particularly benefits, is now being ruined as a highway, and will cost thousands of pounds annually to keep open. Our fish, such as eels, and whitebait, and trout, are dead; and the mullet, which used to swarm the river in the months of November to April, are no more to be seen; our Natives and the farming population are in want of water to drink; and after every flood many acres of good land on the banks of the river are covered feet deep with silt, upon which no grass will grow.

Sir, should we have made such a great sacrifice for a Waihi Borough, and for them to get all the gold duty? What we have done is likely to drive us out of our homes. We were not selfish; we thought of the good that might be done to the whole county, and that this riding might get some benefit out of it.

And now to show you how some of us are affected by the silting-up of the river: I have a block of land, 455 acres, about two miles from a butter-factory; but I dare not spend any money on it. The land is of good quality, like many thousands of acres in our district, and the river, which was the main outlet-drain, has risen up about 3 ft. from the bottom, owing to the deposits of mining *débris;* and when the tide comes in it backs up the county drain to about 6 in. from the surface, and this is in an ordinary summer. In winter, of course, and after every flood it gets worse. Mr. Perham saw this drain I refer to.

If not seen to soon, and prevented from getting worse, this calamity will slowly but surely happen: that most or all of us will have to say good-bye to our homes which took us so many years to make.

Surely, all Acts are framed for the welfare of all; one industry is not to live upon the ruin of another. I seek only justice. If the Government wishes to grant a borough to Waihi, let them have all their own revenue; but the gold duty ought to go for the protection and clearing of the river. Let the gold duty, which comes from the industry that is ruining the river, go towards clearing the river. I trust the Cabinet, when they consider the matter, will put themselves in our unfortunate position, and I feel sure that they will do what is just to all, and let the gold duty go towards the clearing of the river, as I feel sure something will have to be done soon; and when the Waihi people see that they cannot get the gold duty, and that they will have to rate themselves to keep up a borough, the Government will not, I think, be troubled any more about it.

I must therefore repeat my objection to the granting of a borough at Waihi until the Government has decided upon some means for keeping the river open for navigation and drainage. The gold duty, I feel sure, ought to be spent in doing this, and, if not the whole, at any rate the greater portion of it.

I feel sure this letter would be indorsed by the majority in the Thames and Te Aroha Boroughs and Thames and Ohinemuri Counties—in fact, I am certain it would find great sympathy throughout the colony, and, as Your Excellency and your Ministry are the representatives of us all, I hope this letter will have your sympathy and attention.

I have, &c.,

His Excellency the Governor of New Zealand.

ASHER CASSRELS.

SIR,— Colonial Secretary's Office, Wellington, New Zealand, 24th December, 1901.

I have the honour to acknowledge the receipt of your letter of the date quoted in the margin [17th instant], objecting to the constitution of the proposed Borough of Waihi.

In reply, I am directed by the Colonial Secretary to inform you that your objection has been noted for consideration.

I have, &c.,

Asher Cassrels, Esq., Paeroa, Thames.

HUGH POLLEN.

SIR,— Paeroa, 14th February, 1903.

I understand that a deputation is to wait upon you from the Ohinemuri County Council and Waihi Borough Council with reference to the allocation of the gold duty and the Main Road.

On behalf of the settlers and farmers on the banks of the Ohinemuri and Waihou Rivers, I beg to point out that all the duty should not go to Waihi Borough, but that at least two-thirds should be allocated to the County Council to enable it to keep these rivers open for the draining of the land and for the navigation of the river. The water is rising to the edge of the land, owing to the *débris* deposited by the mines at Waihi, and the position of the farmers will soon be that mentioned in the Psalms: "Oh! help me, my Lord, as the water is up to my soul." It will be up to the farmers' souls from the mouth of the River Thames to as far as the water is navigable up the Ohinemuri River.

For your information I enclose a copy of the letter I sent to the Under-Secretary, Colonial Secretary's Department, before the borough was granted, and I also spoke to the Minister of Mines about reserving the gold duty, or portion of it, for the purpose of keeping the river open.

I have, &c.,

The Hon. the Premier, Auckland.

ASHER CASSRELS,

EXHIBIT 22.

PETITION FROM NATIVES OF THE OHINEMURI DISTRICT, POINTING OUT DAMAGE DONE TO RIVERS BY TAILINGS.

To the Honourable the Speaker and the Members of the House of Representatives for the Colony of New Zealand, in Parliament assembled.

THE humble petition of the Ngatitamatera Tribe of aboriginal Natives, residing near Paeroa, Ohinemuri, in the Provincial District of Auckland, in the Colony of New Zealand, sheweth:

1. That your petitioners were the original owners of the lands within the County of Ohinemuri which are now included in the proclaimed mining district.

2. That by a deed made in February, 1875, between the Native owners and the Crown, your petitioners ceded to the Governor the right to mine over all their lands in the County of Ohinemuri situated to the eastward of a line commencing at Okurere and running along the hills from there to the Komata Stream, and thence to the eastward boundary of the Taiwhakarewakauri Block, thence to the Aorangi Block, thence along the hills to the northern boundary of Mackaytown, thence crossing the Ohinemuri River and following its course upwards to the south-east boundary of the Raratu Block, thence turning in a south-westerly direction to Rotokohu, thence to Pukemokemoke, thence along the north-east boundary of the Pukemokemoke Block to its eastern angle, thence along the eastern boundaries of the Pukemokemoke, Waitoki, Te Maere, and Patuwhao Blocks to the northern boundary of Te Aroha Block at Trig. Station No. 562.

3. Your petitioners retained for themselves all their lands to the westward of the above-described line, and extending thence to the Waihou River. At the time the mining district was proclaimed, on the 3rd March, 1875, to be open to the public for mining purposes the division-lines between the mining district and the Maori land were defined on the ground by lines and actual survey.

4. Your petitioners then occupied and still occupy nine settlements on the banks of the Ohinemuri River, and their cultivations are on the flat lands adjacent to the river-banks.

5. When your petitioners ceded the land for mining purposes the Ohinemuri River contained pure clear water, and for the first few years it continued unpolluted, and was suitable for domestic and other purposes, and no injury was inflicted on your petitioners.

6. That, in consequence of the Proclamation in 1895 of the Ohinemuri and Waihou Rivers to be places of deposit for tailings, mining *débris*, and waste water from the mines, the river-water became contaminated and so polluted as to be unfit for use by man or beast.

7. That your petitioners represented these injuries and nuisances to the Right Hon. R. J. Seddon, then Premier of the colony, who forthwith promised to grant us a water-supply, and a sum of £1,000 was voted by Parliament for the purpose, and £1,160 was actually expended in providing it to our settlements, thus admitting our riparian rights to the Ohinemuri River where it passes through our lands.

8. Your petitioners never received any notification of the intention to proclaim the Ohinemuri and Waihou Rivers to be places for the deposit of tailings, mining *débris*, and waste water from the mines, and it was only after the Ohinemuri River water became polluted that they discovered the action which had been taken by the Mines Department in the matter. Hence the late Premier admitted our right to be supplied with proper water at our settlements in lieu of that of the river, of which we had been deprived in consequence of its defilement.

9. Your petitioners would most humbly and respectfully beg to draw attention to the fact that at the present time about 40,000 tons of quartz is crushed every month at the various reduction-mills in the district, the tailings, sludge, sand, *débris*, and waste water therefrom being deposited in the Ohinemuri River.

10. Your petitioners complain that, in consequence of the deposit of such mining tailings, sludge, sand, *débris*, and waste water in the Ohinemuri River, it is diminished in depth and width, and is incapable of carrying the same volume of storm-water as it did in former times, resulting in our cultivation-grounds being easier flooded than formerly was the case, and places not previously submerged within the memory of our old people are now reached by the flood-waters.

11. That a very slight covering of water will destroy growing potatoes, and many of your petitioners have lost the whole of their crops by such floods. The sludge and sand deposited on our cultivations is also of an infertile and injurious nature, and damages grass paddocks.

12. Your petitioners would most respectfully beg to draw the attention of your honourable House to the fact that by the deed of cession for mining purposes the Crown acquired no rights whatsoever over our lands to the westward of the line hereinbefore described, and the Right Hon. R. J. Seddon admitted that the Crown or the Mines Department had no right to pollute the waters of the Ohinemuri River, which intersects our properties. By a parity of reasoning we consider that the Mines Department has no right to cause damage to our cultivations and lands by filling up one of the natural drainage-channels of the country.

13. Your petitioners would humbly submit that the Ohinemuri River was a good eel and whitebait fishing-place, and these fish were part of our sustenance and food-supply; but the deposit of cyanide sludge has killed all the fish in the river. This appears to us to be a breach of the Treaty of Waitangi, as our fisheries were by it specially reserved for our use and enjoyment.

14. Your petitioners greatly fear that, if the deposit of such mining tailings, sludge, sand, *débris*, and waste water is not stopped forthwith, the whole of our lands on both banks of the Ohinemuri River will within a very short period be rendered useless for the purposes of cultivation, which will become a matter of ruination and starvation for us. We have very little dry land of any kind left to us, as nearly all the hill country we owned was included in the area ceded for mining purposes.

15. Your petitioners have every confidence that your honourable House will give this our humble petition your careful consideration. We have no desire to injure or hamper the mining industry, but the gravity of the situation fills us with dismay, and we most humbly pray you to grant to us such a measure of relief as will conserve to us the lands of our ancestors, and prevent further injury being done to them; or to take such other action as to you in your wisdom shall seem fit.

And your petitioners will ever pray.

EXHIBITS 23 AND 90.

CORRESPONDENCE RELATIVE TO £1,000 PLACED ON SUPPLEMENTARY ESTIMATES FOR DESTRUCTION OF WILLOWS.

DEAR SIR,— Ohinemuri River Board, Paeroa, 17th September, 1909.

I am instructed to thank you for your letter of the 27th ultimo, enclosing portion of Mr. Breakell's report upon the Ohinemuri and Waihou Rivers, and to inform you that application has been made to the Minister of Mines to authorize the expenditure of the £1,000 which appeared on the last supplementary estimates in the destruction of willows on the Ohinemuri River.

Yours, &c.,
R. W. EVANS,
County Clerk.

W. Niccol, Esq., Hon. Secretary, Ohinemuri River-silting Association.

SIR,— Ohinemuri River Board, Paeroa, 13th September, 1909.

I have the honour, by instruction of the Board, to ask that the sum of £1,000 which appeared on the last supplementary estimates for "Ohinemuri River silting" may be expended in clearing, as far as possible, the willows from the river and its banks.

As you, sir, are no doubt aware, Mr. Breakell, in his report upon the Thames and Ohinemuri Rivers, refers to the willows as a considerable factor in the formation of the silt-banks, and he considers their removal would materially assist in clearing the channel of the river. The Board would therefore respectfully urge the expenditure of the £1,000 referred to in this direction.

I have, &c.,
R. W. EVANS,
Clerk, Ohinemuri River Board.

The Hon. the Minister of Mines, Wellington.

SIR,— Office of the Minister of Mines, Wellington, 16th September, 1909.

I have the honour to acknowledge the receipt of your letter of the 13th instant, asking that the sum of £1,000 appearing on last year's appropriations for Ohinemuri River silting be expended in clearing, as far as possible, the willows from the river and its banks.

In reply, I may inform you that your Board's request will receive consideration when the question of revoting the unexpended votes and balances of votes is being dealt with in connection with the compilation of the public-works estimates.

I have, &c.,
R. MCKENZIE,
Minister of Mines.

R. W. Evans, Clerk, Ohinemuri River Board, Paeroa.

EXHIBIT 24

MEMORANDUM FROM UNDER-SECRETARY, PUBLIC WORKS DEPARTMENT.

25th January, 1908.

Re *Silting of Ohinemuri and Waihou Rivers.*

The Right Hon. the Prime Minister, Wellington.

IN accordance with verbal directions received from you in Auckland, I visited Paeroa on the 5th December last, and heard the representations of the members of the Silting Association, and also examined the bulk of the affected portion of the two rivers referred to, both by walking along their banks and also by going down the streams in a launch for several miles. Certain members of the association accompanied me in these examinations, and I also had with me Mr. J. A. Wilson, District Engineer of this Department in Auckland, who was familiar with the matter, having reported upon the question himself as recently as July last.

There is no doubt whatever that silting to a considerable extent has taken place, and that further silting will take place in the future if nothing is done to prevent it. It is impossible that the result could be otherwise if, as stated by the association, nearly 2,000 tons of tailings is deposited in the river every working-day. Doubtless a large portion of the material is carried down to the sea and deposited in the Firth of Thames, but in my opinion the larger portion is deposited in the bed or on the banks of the two rivers affected.

The association complains of damage under two heads,—(1) Silting, and probable ultimate closing, of the river as a navigable channel for steamers and other coastal vessels; (2) injury to, and probable ultimate destruction of, valuable arable and pastoral lands.

To the first of these complaints I am unable to attach as much weight as the majority of the local business people do. Paeroa has excellent railway communication with the Ports of Auckland, Onehunga, and Thames, and it seems to me to be scarcely reasonable to look to the State (which owns the railways) to provide the means of improving and keeping open the river-channel to enable the river to compete with the railways for the carriage of goods and passengers. No doubt some shoaling has taken place, but fair-sized vessels still get up as far as Puke Wharf (about three miles from Paeroa); but dredging will probably be necessary in the future to maintain a channel if the deposit of tailings is to continue.

As to the injury to certain lands, this is undoubted, though the area affected is not very great at present. The injured land (some of which is totally destroyed as grazing-land by being covered by unfertile sand to a depth of, in some instances, 3 ft. or 4 ft.) lies principally within the outer banks of the river. The Ohinemuri, like many other rivers, has in some places two banks on each side, the upper bank at some distance further back from the river than the lower bank. The flats between the inner and outer banks are stated to have been rich river-terraces carrying excellent feed, and these have for the most part been destroyed. On Mr. Cock's property I saw about 14 or 15 acres of land entirely covered with silt, some of it stated to be 8 ft deep. He told me he had shifted his fence back twice to prevent it being buried, and some of the posts on the last previous line were still standing in their original position when I was there, and the tops were just visible above the silt. Not much of the land beyond the outer banks of the river is seriously affected at present, though I saw evidences that high floods do deposit a thin coating of silt even on the higher lands at times. I think all the lower terraces on the Ohinemuri not already destroyed are probably doomed to destruction if no remedial measures are devised, and that it is only a question of time when the higher-lying lands will be seriously affected too.

The farming land around Paeroa is fairly extensive and of good quality, and in the interests of this land, and of the large area of low-lying Government land on the further side of the Waihou River which may ultimately suffer, I think some remedy for the existing state of things is called for.

The only thoroughly effectual remedy is to prevent the further deposit of tailings in the river; but, if this proposition cannot be entertained on account of the injury that might thereby be inflicted on the mining industry, the next best remedy would probably be dredging. This, however, would entail continual expense, and there would probably be some little difficulty in finding a suitable place for depositing the dredgings, so as to insure the material not being either washed or blown back into the river again.

The cancellation of the Proclamation declaring the river a sludge-channel would not, of course, put a stop to mining operations, though it would involve the mining companies in additional expense in disposing of their tailings, as they would either have to construct suitable flumes to carry the sludge away to some low-lying area near Paeroa, which they could acquire for the purpose of a tailings-site, or else transport the tailings in a solid form by railway to the waste of comparatively valueless land between Waihi and Katikati.

I have heard of a scheme of utilizing the silt for making bricks, and also of a proposition to work it over again for the gold that it might yield, but I hardly think that either of these proposals would prevent the silting that is going on. The quantity of material to be dealt with (2,000 tons a day) is too large for either proposition.

If it is decided that the Ohinemuri must remain a sludge-channel, I would suggest the setting-up of a River Board to deal with the silting difficulty, the Board to have power to rate the whole district from Waihi to the Puke.

Probably the bulk of such rate would fall on the mining companies who are causing the difficulty and the Waihi Borough, which subsists on and profits by the mining; the balance would fall on the Township of Paeroa, which would benefit by the dredging, and on the settlers around, whose properties would be saved from damage and possible destruction.

H. J. H. Blow,
Under-Secretary, Public Works.

EXHIBIT 25.

REPORT OF MR. WILLIAM C. BREAKELL, C.E.

Auckland, 23rd October, 1908.

Re *Obstructions, Thames and Ohinemuri Rivers.*

Memo. for Under-Secretary for Lands, Wellington.

In compliance with your instructions in memo. dated the 10th September, No. 57129, and memo. dated the 12th September, as to requests made to the Hon. the Minister of Lands by the Hon. Mr. McGowan and Mr. Poland, M.P., I have the honour to inform you that I have visited and inspected the Thames River from its mouth to its junction with the Ohinemuri River, and the Ohinemuri River as far as the bridge at Paeroa.

Although your above-mentioned memos. are for different information, I consider it better generally to deal with the various matters in one report.

There are some points which I think should not be used as general information. Therefore, will you oblige by abstracting from this report such information as you may deem fit, and reply to the requests made by the Hon. Mr. McGowan and Mr. Poland.

Willows.—As to the willows, they, with few exceptions, cause comparatively little obstruction below the Puke Landing, but above this point they are becoming a very serious question.

They (the willows) are mostly weeping willows, and their tops and branches are taking root in the silt, which has formed considerable banks on each side of the river. The banks have been caused by the silt being checked and detained by the said willows. In places where the floods have scoured the silt-banks, say, a foot deep, a perfect mass of fibrous willow-roots is visible, all from the tops and branches taking root.

There is little doubt, to my mind, that if the willows were properly dealt with the scour of the river would prevent the increase of the silt-banks, and very probably materially decrease them.

As to dealing with the willows, the first action to be taken—and this should be undertaken without any delay—is to lop off every willow-branch whose top has contact with (or is likely to have) the silt-banks, care being taken that the said branches are after conveyed clear of the river-banks, and no portion allowed to drift or sink in the river; also, all loose branches in the river should be immediately removed. After this is done, all willows in any way affecting or interfering with the scour of the river should be bodily removed, root and branch. This latter work can only be done with approved gear.

Some action has been taken, I presume, by the County Council, as to the willows by felling and lopping, but no attempt seems to have been taken to uproot them. The effect of the willows, more especially the branches, holding the silt, is that it is now almost impracticable to take a launch (even during the showery weather) drawing 2 ft. 6 in. as far as the Paeroa Bridge.

I was informed that at places where there is now only 2 ft. of water there was previously from 15 ft. to 20 ft., and this I am quite prepared to believe. Evidence is strong, else why was the wharf at Paeroa erected? And it is an accepted fact that steamers once navigated the river beyond Paeroa easier than they now do to Puke Landing.

Of course, if there had been no tailings, &c., deposited in the river, the willows would have caused comparatively little damage; but if there had been no willows the greater portion of the silt-banks would not have formed.

Silt.—Very little silt (tailings) seems to have reached below Hikutaia, and I am of opinion that if the willows and other obstructions were removed a very large percentage of the silt would be carried out to sea.

Above Hikutaia, and especially above Puke, the river is practically choked and blocked, and its sectional area so reduced that twenty-four hours' rain causes a flood which overflows the banks of the river and more or less inundates the adjacent country, causing not only temporary loss to the settlers and to the country generally, but in many cases causes permanent injury.

To deal with the silt or the tailings now in the rivers, and that daily brought down the said rivers (or, rather, such as does not wash out to sea), was at first a very difficult problem. The matter of removing the spoil was simple enough, but the question was where to deposit the spoil. It was financially impracticable to convey it to deep water, the distance being too great, and to deposit the spoil on the banks was impracticable, as the quantity daily delivered is so enormous that it would destroy so much of the ground now occupied by settlers, or shortly to be opened for settlement.

There is one way of depositing the spoil (silt, &c.) without undue expense, without damage to the adjoining lands, and the material dredged can be profitably utilized: The proposed railway from Paeroa to Pokeno will require an enormous quantity of spoil for the embankments across the Hauraki Plains, and I apprehend that nothing like the quantity required will be obtainable from borrow-pits for the purpose of raising the embankments to the required heights; and if material has to be borrowed for the purpose of raising the embankments to the required heights the material proposed to be dredged from the river can be as economically delivered as any other material obtainable.

Further, there will be many miles of road to be formed on the Hauraki Plains. It will be difficult and expensive to obtain suitable material for their proper formation, and the cost of hauling will be excessive.

In my opinion, no better material is obtainable, and at less expense than the deposits in the Thames and Ohinemuri Rivers. The procedure would be to obtain sufficient land at a reasonable distance from the Thames River as a depot whereon to deposit the dredged material, which will be delivered there by suction dredge; then run a light line along the route proposed for railway or along one or more of the proposed roads, forming same as the rails are laid; then along this line or lines have depots for depositing the material required for other roads, to be delivered by tram or dray as circumstances require.

I will not trouble you with too many details now, but the works would have to be continually progressive, and the pile of dredged material would practically have to be removed as deposited.

This is a big scheme, but if you kindly give it your consideration you will appreciate the fact that eventually, if carried out, it will be an immense saving to the Dominion, and a very material benefit to the district. Further, it will settle the question of perpetual flooding of large areas of land, Crown and otherwise. And, again, it makes possible the easy navigation of the Thames River, also the practicability of water-carriage to Paeroa.

Although I believe that if the willows were removed, and the bed of the rivers relieved of snags and logs, a large quantity of the silt would wash out to sea, yet I consider that, when so much material will be eventually required for railway and roads across the Hauraki Plains, it is not economy to allow such desirable material to go to waste. Again, I think that, even if a large percentage were washed to sea, besides damage to the foreshore at the Thames, there would in time be so much remaining in the rivers that eventually their beds would be so high that their banks would be too low to allow satisfactory drainage for the lands adjoining.

I have little doubt that if the steamer traffic were suspended the accumulation of silt would materially increase, as the action of their propellers tends to a certain extent to keep a certain portion of the silt in solution. I may inform you that the silt sets quite hard when dry.

Logs.—There is one very serious matter which seems to have obtained very little attention, and yet it is owing to this, to a very great extent, that the natural scour of the river has been destroyed. Of course, naturally, there are many snags which it appears concern nobody, but there are hundreds of kahikatea logs in the bed of the river which are there illegitimately, and until those logs are removed the navigation of the rivers will certainly not improve, and the flooding of the lands, to a greater or less extent, will still continue. And, further, if the accumulated silt higher up the river is allowed to wash down before these logs are removed, the silt will be lodged around them, and the steamer-traffic will be in time naturally suspended. Even now the channel is so narrow and so devious that it is impossible to take even a launch drawing 2 ft. 6 in. of water as far as the Puke Landing at half-tide without having an experienced pilot.

I was informed by the Chairman, also by the Engineer, of the Ohinemuri County Council that there was a vote of £1,000 granted for treating these rivers; and, referring to the estimates, I find this to be correct. They were of opinion that I was to give instructions as to the procedure respecting the necessary works. I told them that I had received no instructions further than to report to you.

I hope this will afford you sufficient information for the purpose you require. I could, of course, report at further length, but I apprehend that you will gather from this report all that is now required.

I would, however, strongly advise that immediate notice be given to the sawmillers to remove all sunken logs, in terms of the Floating Act.

I have, &c.,

WILLIAM C. BREAKELL.

EXHIBIT 26.

REPORT OF MR. JAMES STEWART, C.E., TO THE OHINEMURI COUNTY COUNCIL.

[Report received by Council at meeting, 2nd May, 1907.]

In compliance with instructions that I would examine the Waihou and Ohinemuri Rivers from the northern boundary of the county at Hikutaia to Waihi, with a view to reporting on the damage caused by the discharge of mining tailings into the Ohinemuri River, I have the honour to report as follows:—

I have carefully perused the previous reports and correspondence on this subject, and examined the rivers and lands as far north as Turua, at all the positions offering evidence in the investigation of the alleged damage to the interests of navigation or agriculture.

I have found the subject by no means an easy one to deal with, as any detail data is very meagre, and only general conclusions can be arrived at. By this I refer to the fact that, prior to the advent of the mining activity, no record of soundings or marine survey of any kind existed of the Ohinemuri.

THE SHIFTING OF THE SILT.

The cross-sections of the rivers on record in your office—six between Paeroa and the Junction, and six extending from the Junction to a short distance below Hape Creek—are very instructive, as they show the changes which take place in the river-beds, but are of no assistance towards any computation of the amount of deposit. The first set, those of the Ohinemuri, were taken on the 31st May, 1901, just about six years ago, and were reobserved in 1902, 1904, 1906, and lastly in February of this year, after the great flood of the previous month. These observations show a most erratic state of things. Heavy deposits on and elevations of the bed, which are shown on one section in September last year, are entirely swept away, and appear in the records of February this year on another section lower down.

The second set of sections at and below the Junction show the same irregularity, but in the latest observations indicate a rise of bed of from 1 ft. to 4 ft., and in one case a bank appears 7 ft. and another 9 ft. 6 in. high. In other parts depressions or scourings-out are shown to the extent of from a few inches to 4 ft.

MR. PERHAM'S REPORT.

On the 2nd July, 1901, a report, accompanied by two plans (copies of which are on record in your office), was submitted to the Government by the late Mr. Thomas Perham, A.M.Inst.C.E. One of these plans is a somewhat elaborate magnetic survey of the confluence of the rivers, and extending to about 500 ft. downwards to the Hape Creek; but, from the same reasons of shifting deposits mentioned above, very little information as to quantities can be gathered from it. The other plan is an official lithograph of part of the county, embracing on a 4-in.-to-the-mile scale the rivers from Mackaytown to about seven miles below the Junction. On this map Mr. Perham has indicated the then accumulations of tailings in the bends of the Ohinemuri, and shows a length of the Waihou of about two miles below the Junction as requiring to be dredged. On the Ohinemuri he has marked the depths of water at nearly fifty places, the lowest depth being 3 ft. But these soundings, as a record for future comparison, are again, from the continuous shifting of the shoals before referred to, of very little value. They are further complicated by a serious error in position. The sand island at Mr. Cock's property, referred to by Mr. Perham, is placed on the map just three-quarters of a mile too far up the river. Notwithstanding, Mr. Perham had given the investigation much time and thought. With many of his conclusions I agree, but from others I differ. On these points I will endeavour to be more specific later on.

The Difference in the River.

Failing to procure from previous surveys any absolute information as to the extent to which the river has been raised by accumulations of battery tailings, I naturally had recourse to statements respecting the former state of the river by those who have been resident in the district during the last thirty years, contrasting these with the evidence of its present condition. We have also the published categorical statements of ore treated at the reduction-works of Waihi and Karangahake, from which we know the total amount of tailings discharged into the river during the last fifteen years, the amount so discharged last year, and the yearly rate of increase during the period mentioned.

It thus appears that thirty-one years ago the head of the navigation of the Ohinemuri for heavy freight was at Tarariki Creek, nearly opposite Mr. Cock's homestead, two miles below Mackaytown. Mr. Cock informs me that in 1876 cutters drawing 7 ft. 6 in. of water could and did come up to that point, at which heavy machinery and building material were landed. It requires no detail or elaborate survey or soundings to show the striking contrast the present state of the river presents to these former possibilities. At the time of my inspection there was about 1 ft. of flood in the river, but between Mackaytown and far below Tarariki Creek it presented the appearance of a succession of shallows, with from 2 ft. to 3 ft. of water, the whole stream being thick with flowing sand and slimes.

The Amount of Silt deposited.

From the published mining statements we find that in the reduction-works of Waihi alone were treated during the last fifteen years 1,921,142 tons, discharging practically that quantity of tailings into the river. Of this amount nearly three-fourths, or 1,457,510 tons, were treated during the last six years, with an average yearly increase during that time of 36,000 tons. Making all allowances, the present yearly discharge into the river at and above Karangahake cannot be taken at less than 330,000 tons. The weight of tailings will run about 1·5 tons per cubic yard, which goes to show that 220,000 cubic yards of solids is the present annual rate of discharge into the river, with an average increase per annum of 24,000 cubic yards.

Now, what becomes of this enormous amount of sand and mud? The velocity of current in the river between Waihi and Mackaytown precludes all but a trifling quantity, as may be seen in a few places on the banks and in eddies of the current from being deposited there. Practically the whole amount is passed on beyond Mackaytown and deposited in the beds of the rivers in position and amount as determined by the currents and ebb and flow of the tide. These accumulations and shoals become altered in volume and location by every flood, as alluded to in dealing with the cross-sections and soundings. No doubt some portion of the finer sands and muddy tailings are carried out to sea, but the great bulk seems to remain in the rivers, gradually raising their beds and forming shoals and side banks.

Some Interesting Figures.

The Ohinemuri, from Mackaytown to the Junction, may be estimated to have an area of river-bed of about 485,000 square yards. From Mackaytown to the county-boundary the area may be taken at about 3,105,000 square yards. Below the county-boundary the estuary is 12½ miles long, with an additional area of about 9,680,000 square yards, or a total of, from Mackaytown, say, 12,785,000 square yards. If the influx of 222,000 cubic yards were deposited uniformly in the Ohinemuri only it would raise the bed 9⅓ in. If the deposit extended to the county-boundary the rise, if uniform, would be 2½ in. And in like manner, if distributed over the whole area to Opau Point, the annual rise would be little less than $\frac{6}{10}$ in. These figures apply to one year's deposit at the present rate, with the yearly increase of 24,000 cubic yards on that rate. But, taking the returns for the last six years from the Waihi Mine, we find that 1,457,510 tons, or 971,673 cubic yards of tailings were discharged into the river—enough to raise the beds of the several lengths as above to the Junction 40 in., to the county-boundary 11 in., and to Opau Point 2¾ in. And the first nine years of the Waihi workings, amounting to more than one-third of the above computations, are not therein included. There is, however, no such thing as a uniform distribution over any given area, but the heavier matter is deposited in the upper parts, the lighter finding its way to the estuary and even out to sea.

How Navigation is affected.

As the navigation of the Waihou has been an important factor of commerce since the opening of the Ohinemuri goldfields, I naturally sought information regarding any presumed change in the river from Captain Sullivan, who has had seventeen years' experience in the present line of steamers. That gentleman refers to the well-known fact that the steamer-traffic has had to recede from the old landing at Paeroa Wharf, first to the Junction, and now to Te Puke. He informs me that the main river below Te Puke does not appear to have shallowed more than 6 in., if quite as much. He finds the bar at the mouth somewhat increased, but thinks that may be partly due to the tailings from the Thames workings.

Considering that the tailings, during their passage down the rivers, are nowhere deposited with any approach to regularity, but are thrown up by eddy currents at every bend, to be washed down again by floods, and that they have a general tendency to be rather steeply banked up on the sides of the rivers, the figures I have deduced above are quite consistent with Captain Sullivan's experience. Taking his statement of rise of bed, "not more than 6 in., if quite as much," to mean, say, 5 in., this must have resulted in great part during the last six years, in which time 971,676, or nearly one million, cubic yards of sand and silt were discharged from the Waihi alone,

with the average yearly increase, it must be remembered, of 24,000 cubic yards. This enormous quantity, although extremely satisfactory from a mining point of view, cannot but be the cause of well-founded alarm on the part of the general public, who are dependent on the prosperity of agriculture and interested in the navigation of the Waihou. We have only to look to the experience of the past to judge of the future in this case, and as the landing for this district has had to recede to Te Puke it is only a matter of time when that in turn must be abandoned.

Increase in the Deposits.

Referring again to Mr. Perham's report: So far as matters of observation are concerned, his statements seem founded on a careful and correct view of the conditions at the time. But it must be kept in mind that that was six years ago. Up to that time little over 300,000 cubic yards of tailings had been discharged from the Waihi works during a period of more than nine years, as contrasted with the 220,000 cubic yards of last year, and the annual increase of 24,000 cubic yards. Yet even six years ago Mr. Perham remarked, "Of course the deposit is going steadily on, and if action is not taken to clear the lower Waihou of the obstructions rapidly forming navigation to the Paeroa Junction Wharf will be still more impeded, if not (except by light-draught flat-bottomed boats) have to cease entirely." This contingency is exactly what has happened. Mr. Perham's report also states that, while admitting the fine quartz sand "has tended to raise and narrow the river-bed, it is not so serious as is generally represented by the farming interests." I admit that at the time in question the actual result to the farming interests may not have been serious—that is, compared with the condition of things now, which it must be admitted is very serious. Mr. Perham found no deposits of quartz silt on grass farm land except in the low depressions on the river-banks, and there only from 10 ft. to 20 ft. from the water's edge. On Mr. Cock's property I saw a deposit of sand sufficient to all but completely cover a wire fence, and extending 5 to 6 chains from the water's edge, while the meadow lands inland were showing signs of a thin layer of tailings more than 15 chains from the river. And this is not a solitary case: the same things were in evidence from Mackaytown downward on both sides of the river. But no purpose would be served by an enumeration of them.

The Damage to Netherton.

In the district of Netherton I traced quartz tailings and slimes 10 to 20 chains from the river, and on every farm saw evidences of ruined crops, many fields remaining, as the waters had left them, covered with sand; others, where the owners had ploughed it in. I thoroughly agree with Mr. Perham's conclusion that the farmers have reason to complain of the "gradual but sure" raising of the river-bed, and so reducing the fall for their drainage, but I must take exception to the statement in his report to the effect that the artificial drainage of swampy low country tends to materially raise the beds of the rivers by the deposit of alluvial soil and vegetable *débris*. This cannot take place in any of the lands in question. It has occurred in the purely pumiceous and sandy alluvial flats of the Waikato, but in every such case the land was for a great width swept bodily into the river. The ditches of Netherton do not drain an alluvium of sand, but that of a rich heavy soil, and, as evidenced by the colour of the water, to some extent of deeper raupo swamps. In neither case can any *débris* be discharged enough to affect the river-bed.

It is incidentally stated in Mr. Perham's report that the Ohinemuri discharges, at the confluence, more than double the quantity of water as compared with the Waihou. If this were the case the Ohinemuri would not be choked as we see it to be. But, although no actual measurements of current and volume are available, the Ohinemuri, from the respective drainage areas of the rivers, cannot discharge more than, if as much as, one-third of that flowing in the Waihou above the confluence.

Mr. Reed's Report.

I have perused with some astonishment the report of Mr. F. Reed, Inspecting Engineer of Mines, of date 27th August last. It is therein stated that no further silting of the river between Paeroa and Netherton had apparently taken place since the visit of Mr. Perham. Only one month after the above date the cross-sections were reobserved by the County Engineer, and the first one below the Paeroa Bridge then showed an extreme rise of bed of 20 ft. over that of the section taken twenty-one months previously, and a total accumulation—showing 5 ft. above low water at one place—of 3,696 cubic yards per chain in length of bank. If Mr. Reed's statement is correct that enormous accumulation must have been the work of one month. That this is unlikely is apparent on the face of it. It is much more probable that, as stated by the County Engineer, he confused the sections, or, as it appears likely, made no effort to examine the river very minutely, or with the time and care demanded by the importance of the case. Mr. Reed's statement that the only risk of serious damage to the lands below Mackaytown "would be the event of a tremendous flood, descending in the form of a wall of water above the main banks of the rivers," is too grotesque for serious comment. And his contention that otherwise a gradual rising of the river would prevent the tailings being left on the land has unfortunately, to the great loss of the farmers, been disproved.

Mr. Stewart's Conclusions.

The conclusions which are evident to me from my study of the whole case may be summed up as under:—

(*a.*) Prior to about ten years ago comparatively little harm or damage to the rivers or to the farming interests has taken place; but shortly after that period it became evident to those more immediately interested that the evil results of the river being a sludge-channel was a growing and

serious menace to the district. In consequence, early in 1901 the attention of the Government was called to the matter.

(*b.*) The report of Mr. Perham, deputed to examine the case, confirmed in many important respects the allegations of damage to the rivers and lands. But it is very evident that, had he ever thought it likely that an increase of the deposits from the mines to an extent of nearly three-fold would take place during the next six years, with a monthly increment of increase of 2,000 cubic yards, he would have supported them on all points.

(*c.*) The beds of the rivers from Mackaytown downwards show a serious rise on the whole, but not uniformly, and the shoals formed are shifting downwards with every flood, and gradually damaging the main river.

(*d.*) That the rise of the bed in the Ohinemuri was the cause of the unprecedented level of the flood in January last, resulting in much damage to the adjacent lands by the deposit of sand and otherwise.

(*e.*) That the outlet-drains get choked by sand, and, although they are afterwards more or less scoured out by their own impounded water, obstruction to the drainage of the lands must follow.

(*f.*) That the successive deposits on the broad meadow lands of even thin layers of fine quartz sand (which has about the same fertility as that of broken glass) will, if continued, effect their destruction as grazing-lands, and convert them into wastes of blowing sand.

What is the Remedy.

It must be seen that the above conclusions, at which I have arrived after a very careful view of the whole case, present a serious indictment against the discharge into the Ohinemuri of the enormous amount of tailings at present going on. And the question naturally arises, is any remedy possible? Mr. Perham suggests that catchment-weirs might be placed between Waihi and Mackaytown, and the removal of the sand as intercepted by them. But a little observation of the weir at the principal intake at the gorge would have shown him the futility of such a scheme, even if it could otherwise be economically possible. Dredging the shoals, and more or less of the general bed of the Waihou, is further recommended by Mr. Perham, and also by Mr. Reed. It seems to me, however, that to put tailings into the rivers and then lift them out again would involve more expense by far than the disposing of them otherwise than by discharge into the river. I am fully aware that the latter alternative is held by the mining magnates to be impracticable, but it is quite certain that at the time when it was proposed to proclaim the Ohinemuri a sludge-channel, if it could have been foreseen that a quarter of a million cubic yards of sand and mud would yearly be discharged into a navigable river, no such Proclamation would ever have been issued. And it is equally certain that in that case mining in the district would have been continued, and be just as it is at present. The want of depositing-ground is stated as an obstacle, but it seems to be overlooked that the dredgings would also require depositing-grounds, which would often be procured only at great expense.

I agree that the alternative of returning the *whole* of the tailings to refill the stopes in the mines is impracticable, but in part not so, as it seems to me quite possible that at least one-half might be passed down with the other fillings without danger either to the stability or salubrity of the mines. All this will no doubt be held by some to amount to a proposal to seriously obstruct the mining industry; but it is only a question of expense between the mine-owners and the general community if forced to the work of dredging. I am aware also that by many the mining industry is held to be paramount. That is a question which I must leave to others. But at a time when it is seriously proposed to commence the arterial drainage on the great low lands in the Thames and Piako Valley, it seems anomalous that a system should be continued which would to a large extent render nugatory a scheme of such importance from a national point of view.

EXHIBIT 28.

PETITION FROM RESIDENTS OF WAIHI AND SURROUNDING DISTRICT.

The Honourable the Speaker and Members of the House of the Representatives in Parliament assembled.

The petition of the undersigned inhabitants of the Borough of Waihi and the surrounding district humbly showeth,—

1. That the petitioners are vitally interested in the gold-mining industry carried on by the various companies in Waihi and Karangahake, their livelihood being entirely dependent thereon.

2. That previous to the establishment of this industry the country around was totally unoccupied, being from its bareness quite unfitted for agricultural or pastoral holdings.

3. That in the year 1895, it being apparent that mining would be carried on for many years to come, His Excellency the Governor was advised by his Executive Council to proclaim the Ohinemuri and Waihou or Thames Rivers watercourses into which tailings and other mining *débris* might be discharged; which, after due notice according to law being given, was done, no objection having been raised. (See *New Zealand Gazette*, 4th April, 1895.)

4. At the time this was gazetted, the number of farms fronting on the Ohinemuri River did not exceed six.

5. Since this Proclamation a large amount of tailings has been deposited in the river by the gold-mining companies at Waihi and Karangahake, and a right to recover this material and retreat it for the percentage of gold therein has been granted by the Warden to a company established

for this object. The title to this privilege is as good as the tenure of the Waihi or any other company to its holding, and could not be cancelled without the payment of heavy compensation.

6. That during the month of January, 1907, owing to an unprecedented downfall of rain in the Provincial District of Auckland, large tracts of land throughout the county were flooded to a greater extent than known since the foundation of the colony, traffic on portions of the Waikato Railway being wholly suspended for weeks, and parts of the country laid under water for the first time since the line was built, over thirty years ago.

7. That the low-lying Thames Valley, through which the Ohinemuri and Waihou Rivers find their way to the sea, was also flooded by the overflow of the upper portions of the Waihou River and Awaiti Creek, farms fronting the left bank of the Ohinemuri River being thus placed under water.

8. That it is now sought to be proved that the deposition of tailings in the said river was the cause of these farms being flooded, whereas the natural conditions are such that had the handiwork of man never been in the country the land in question would have been under water when such weather-conditions prevailed, as the past history of the district abundantly proves.

9. Should the proclamation of the river as a sludge-channel be revoked, it would prove a very serious blow to the mining industry: quantities of low-grade ore now worked at a small profit would be left untouched, and numbers of men thrown out of employment, forced to leave the district, and compete for work in other centres of the colony.

10. Your petitioners therefore pray that no steps be taken to prevent the gold-mining companies from exercising their legal rights in depositing mining *débris* in the Ohinemuri River, and that a Commission of inquiry be set up to take sworn evidence on the prevailing conditions.

And your petitioners will, as in duty bound, ever pray, &c.

EXHIBIT 29.

COMPLAINTS FROM NORTHERN STEAMSHIP COMPANY AS TO CONDITION OF RIVERS.

DEAR SIR,— Northern Steamship Company (Limited), Auckland, 26th November, 1901.

I have to call your attention to the difficulties of navigation in the Thames River with which our captains have had to contend for some time past. The silting-up at different points between the Puke and Junction wharves is obstructing the navigation of our steamers, and if something is not done very soon to remove the obstruction, it is a question of only a short time when their passage to the Junction Wharf will be stopped altogether.

As this is a very serious matter to the district, and may involve business people in extra charges on their consignments, it is of importance that steps with that object in view should be taken without delay in the interests of all concerned.

I shall be glad to hear from you as early as convenient.

Yours, &c.,
For the NORTHERN STEAMSHIP COMPANY (LIMITED):
CHARLES RANSON, Manager.

The Chairman, Ohinemuri County Council, Paeroa.

DEAR SIR,— Northern Steamship Company (Limited), Auckland, 18th December, 1902.

I have to call your attention to the fact that owing to the shallowness of the Ohinemuri River our steamers have for some time discharged and loaded at the Puke Wharf.

As this will lead to constant heavy traffic on the road leading from the Puke Wharf to Paeroa, my Board respectfully request that your Council will give special attention to this road, and keep it in good order and repair.

Yours, &c.,
For the NORTHERN STEAMSHIP COMPANY (LIMITED):
CHARLES RANSON, Manager.

Secretary, Ohinemuri County Council, Paeroa.

EXHIBIT 31.

ANALYSES OF SAMPLES OF DETRITUS FROM WHAREPOA AND CRYER'S LANDING, THAMES COUNTY, BY W. H. BAKER, B.Sc.

DEAR SIR,— Thames School of Mines, Thames, 5th October, 1909.

I have examined the samples of river-deposits forwarded by you, with the following results:—

No. 1 Sample consisted of fine river-silt with a small proportion of organic matter.

Practically the whole product passed through a sieve of 150-mesh. With a hand-lens no quartz-particles were discernible, but with a gravity-settling test the presence of quartz sand is apparent. Without a very careful elutriation test it would be impossible to segregate this fine sand.

An assay made of the sample showed without doubt the presence of gold and silver, to the extent of 6 dwt. silver and 3 gr. gold per ton.

No. 2 Sample.—The same remarks apply as to the previous sample.

No. 3 Sample.—Blackish mud, but with same characteristics as previous samples, with exception of slightly more organic matter.

With each of the three samples a test was made to prove the settling effect of sea-water on these products held in suspension in water. Many colloidal substances, of which clay and hydrated silica are examples, lose their colloidal nature in the presence of various salts, and, instead of being held in suspension, are precipitated. The addition of salt water to these samples had an almost immediate effect in causing the particles previously held in suspension to deposit, and there is no doubt that the influx of the sea-water has a considerable effect on the deposition of fine sand and mud in the river.

No. 4 Sample consisted of pumiceous grits, gravel, sands, and iron-oxide.

A grading test gave the following results: On 40-mesh, 9 per cent.; through 40-mesh, 46 per cent.; through 60-mesh, 34 per cent.; through 90-mesh, 6 per cent.; through 150-mesh, 5 per cent.

An assay of the coarse material gave only a trace of gold and silver, and of the finest material 10 dwt. of silver and 12 gr. of gold.

For your information I forward samples of material graded from the samples supplied.

I am, &c.,
W. H. Baker, B.Sc.,
Director, Thames School of Mines.

The Engineer, County Council, Thames.

EXHIBIT 34.

REPORT BY MR. T. PERHAM, C.E.

Mines Department, Wellington, 2nd July, 1901.

Sir,— *The Silting-up of the Waihou and Ohinemuri Rivers.*

According to your instructions, I have lately visited and made an exhaustive examination of the locality, and collected all available and reliable evidence on the subject, and now forward my report, together with two plans—No. 1, a compass survey of the junction of the two rivers, with the depths at low water, and the shoals or banks complained of; and No. 2, a lithograph plan of Block XII, Waihou Survey District, and Block XIII, Ohinemuri Survey District, embracing the localities most injuriously affected, and showing the soundings in red, the result of a time survey from the Junction up the Ohinemuri River to Mr. Cock's place, about a mile and a quarter below Mackaytown.

There is no record in existence of the depth of water in either river previous to the advent of the miner of Karangahake, Waitekauri, and Waihi; so that no comparison can be made. I deemed it advisable, therefore, to survey the junction from Hape Creek up the Ohinemuri River to the wharf, and, as far as considered necessary, up the Waihou. This data can be used hereafter for determining in what degree the beds of the rivers have become raised by natural deposit of the tailings, &c., brought down from the mines.

The water in the Waihou is perfectly clear, but in every flood brings down large quantities of coarse pumice sand, which, mixing with the very fine quartz sand (from the batteries up the Ohinemuri) and natural mud, forms a hard bottom close in against the right bank of both rivers. It might be observed that the water shoals up on the left bank, and that in the Waihou two small islands have been formed, with a long spit tailing away down stream. The end of this spit is only from 6 in. to 1 ft. below normal low water, and about 4 ft. at normal high water, and it is consequently the main obstruction to navigation about the wharf. That the finer portion of the quartz tailings is carried in suspension down the Ohinemuri far beyond this point into the Waihou is evident, for, standing on the bank at Hape Creek Bridge, it is plainly seen mixing with the clear water of the Waihou.

It will be noticed that the Ohinemuri is very much deeper than the Waihou, and discharges at the confluence more than double the quantity of water, which banks back the Waihou water in flood-time, inundating the surrounding low country between and beyond the confluence of the two rivers. Mainly this can be attributed to natural causes, and not to any great extent to the discharge of tailings from the mines of Karangahake and Waihi. This question will be dealt with hereafter. Below the Junction for two miles the river is very much obstructed by bars and shoals, but particularly just below the rectangular bend at Te Tawa Stream. For purposes of navigation the whole portion tinted red on the lithograph No. 2 requires dredging, and in several places between Komata Creek and Mr. Moore's place, about the seventh mile from the Junction.

Evidences of the fine-quartz-sand deposit appear on the lower portions of the Waihou banks below the Junction as far as Netherton, and even beyond the seventh mile. But I may here state that the farmers do not so much object to the deposit of this silt on their land as to the gradual but sure rising of the river-bed (so they assert) since the commencement of mining operations above the Ohinemuri; for now, after every flood, the river-bed, being so raised, gives them so much less fall for their drains to carry the flood-waters off their land. The reason is this: that also at the same time there can be no doubt that the artificial draining of the surrounding swampy low country, both into the Ohinemuri and Waihou, goes to materially raise the beds of both rivers by the deposit of alluvial soils and vegetable *débris*.

In both rivers the nuclei for small islands, bars, and shoals are formed by neglected branches of willows and other *débris* holding both the mineral and vegetable silt, materially contributing to narrowing the channels and raising the river-beds.

This navigable portion of the Waihou is beyond the jurisdiction of the Thames Harbour Board, and the Ohinemuri County Council, which is also a River Board, takes no steps to remedy this evil. A very small outlay, judiciously expended in snagging annually, would be highly beneficial

to navigation, and conduce to a freer flow of the current and more even distribution of the deposits in the river-beds.

Dealing now with the Ohinemuri from its confluence with the Waihou up to Mr. Cock's, within about a mile of Mackaytown, the water is fairly even and deep until the railway-bridge is passed. Above that point to the road-bridge the river is obstructed by a rapidly growing island formed in the manner before described; from thence to Mackaytown the bed is fairly even, but on the banks, and especially in the bends, there are large and deep deposits of unmistakable fine quartz sand. At Mr. Cock's another island almost fills the river-bed, and is collecting the fine silt rapidly.

From Mackaytown to the Junction the river-bed has very little fall—probably not more than 6 in. to the mile; but above Mackaytown to Karangahake the fall is much greater—in some places even rapid. The result is that the heavier portions of the mining *débris* discharged into the river are arrested in their passage down among the boulders in the bends, and the finer portions deposited in the length of flat river-bed between Mackaytown and the Junction. As proof of this, in sounding with the pole the bottom was found to be quite hard and cemented. That a quantity of still finer quartz sand in suspension mixes with the clear water of the Waihou at the Junction, and is carried and deposited in the bed and on the banks of that river for at least seven or eight miles, there can be no doubt, and, in conjunction with the pumice sand and alluvial mud before mentioned, forms the shoals, bars, and islets impeding navigation.

Heavy floods in both rivers occurred in 1896 and 1898, and the 30th March, 1899, when the Waihou at high water was banked up by the Ohinemuri, and the surrounding country, which is everywhere low-lying, was inundated for many miles in the neighbourhood of the two rivers. In no case, however, have I discovered or heard of the fine quartz silt being deposited on the grass farm lands, except in the low depressions on the river-banks—speaking generally, say, from 10 ft. to 20 ft. in from the water's edge.

In conclusion, I am of opinion that, although the continual and gradual deposit of the fine quartz sand from the mines, in a decreasing ratio from Karangahake to a considerable distance below the Junction, as before indicated, has tended to both raise and narrow the river-beds, it is not so serious as is generally represented by the farming interests.

Of course, the deposit is going steadily on, and, if action is not taken to clear the lower Waihou of the obstructions rapidly forming, navigation to the Paeroa Junction Wharf will be still more impeded, if it does not (except by light-draught flat-bottomed boats) have to cease entirely.

The rivers having been declared channels for the deposit of mining tailings, the time appears to be not very far distant when in the interest of the farming community a remedy will have to be devised to mitigate the evil attending this rapidly accumulating deposit, which at present is inconsiderable compared with the gold-mining industry. I would therefore offer the suggestion that the main body of the tailings should be trapped by means of a series of low, strong timber weirs in suitable places above Mackaytown, the finer portion being allowed to flow over the weirs. It has been represented to me that the retained tailings could be profitably treated again, and if such is the case it may be worth consideration.

To create tailings-grounds, as advocated locally, by means of fluming direct from the mines and clear of the river would be an undertaking too expensive and unnecessary, even if land of sufficient area required could be obtained for the purpose.

I have, &c.,

T. Perham, A.M.Inst.C.E.,
Engineer Water Conservation.

The Under-Secretary.

EXHIBIT 38.

PROPOSED FORMATION OF WAIHI BOROUGH.—OBJECTION FORWARDED TO THE GOVERNOR BY OHINEMURI COUNTY COUNCIL.

To His Excellency the Right Honourable Uchter, Earl of Ranfurly, Knight Grand Cross of the Most Distinguished Order of St. Michael and St. George, Governor and Commander-in-Chief in and over His Majesty's Colony of New Zealand and its Dependencies.

May it please Your Excellency:

In compliance with the notice published in the *New Zealand Gazette* of the 28th November, 1901, No. 101, page 2262, this Council desires hereby to notify its objection to the granting of a borough to the district described in such notice, it being a portion of the County of Ohinemuri.

Under the provisions of section 22 of the Financial Arrangements Act, 1876, and section 4 of the Gold Duties Act Amendment Act, 1882, all the gold duty is allocated to the district from which it is won. At present the bulk of such duty payable to the Ohinemuri County Council is derived from the mines at Waihi within the boundaries of the proposed borough, and the whole of this would, on the formation of a Waihi Borough, become part of the borough revenue, and not one penny of it would be available for necessary county goldfields roads within the county except at the good will of the proposed borough.

It is necessary here to point out that a large portion of the Waihi Gold-mining Company's works are situated at Waikino, outside the proposed borough, and all the persons employed in these large works will be debarred from the benefits accruing from the duty on the gold turned out from these works, and, living outside the borough, will look to the county and not the borough for their local requirements.

It is a matter of fact that at least four-fifths of the traffic on the main roads from the head of the navigation at Paeroa out to Waihi, and practically the whole of the traffic from Waihi to the county-boundary on the Tauranga Road, is for the benefit of Waihi, and the cost of those roads from September, 1899, to September, 1901, amounted to over £11,000, of which amount four-fifths at least should be chargeable against Waihi gold duty.

In addition to the above, the Waihi Mining Company get their mining-timber from several different places in the county, and the cost of maintaining these roads is not included in above-mentioned sum of £11,000, and, as is well known, the haulage of large timber over roads is very severe on them.

The Municipal Corporations Act, 1900, provides that a borough "may" expend revenue on the construction and maintenance of roads in which it has an interest beyond its boundaries. This clause being permissive only, the Ohinemuri County Council have no remedy if the proposed borough declines to contribute towards the necessary cost of repairs of Main Road, or, what is more likely, votes a sum quite disproportionate to its use of and interest in said roads.

The petitioners for the Waihi Borough lay considerable stress on section 8 of the Public Works Act Amendment Act, 1900, as enabling the county to secure repayment of an equitable share of the county's expenditure on works affecting the borough. It seems scarcely necessary to point out that, though the provisions of this Act might apply to some one or two works of magnitude decided on mutually beforehand, and arranged for, on which a dispute as to cost has arisen, yet the bulk of the work will be maintenance requiring immediate outlay amounting to thousands in a year. And before the cumbrous provisions of the Act could be complied with, the expenditure entailed would have to be met out of county revenue, and months elapse before a refund could be made, practically driving the county into bankruptcy.

Could some fair scheme of compulsory allocation of gold duty be enforced under statute, one objection would be removed, but even then the Council considers that the granting of a borough to Waihi would be detrimental to the interest of both county and borough. It appears, however, that without fresh legislation no such compulsory allocation can be made between local bodies, and it therefore only remains for the Council to respectfully beg Your Excellency to refuse the prayer of the Waihi Borough petitioners.

Should Your Excellency, however, think proper to grant the petition, this Council would desire to point out that their funds (under those circumstances) would be quite inadequate to maintain the main roads in question, and they would be compelled either to allow them to fall into disrepair or to establish heavy and vexatious tolls on such roads, and such tolls would press most heavily on the mining companies in Waihi already paying the gold duty which was intended to be devoted to the maintenance of these roads.

Again, the Council wishes to point out that this petition for the formation of a borough at Waihi is made under entirely exceptional circumstances. In ordinary cases such application means that a certain section of the community, having the necessary legal qualifications, desire to have the extended powers given under the Municipal Corporations Act, 1900, to tax themselves, and also to have the power to expend such taxation on ordinary urban works, such as water, drainage, gas, library, fire-prevention, &c.; and such districts, as a rule, have a rateable value of property within their boundaries sufficient to supply the necessary revenue and to raise loans.

In the case of Waihi this does not hold good, as the rateable value of the whole riding only amounts to £91,341, as against the rateable value of the rest of the county, £290,833; so that if Waihi had to depend upon its rateable value only it could not even pay salaries. As regards borrowing, it is true that loans could be raised under the Local Bodies' Goldfields Public Works and Loans Act, 1901, but in that case the mining properties which are already taxed by gold duty will be again further taxed for local requirements of the district in which they are situated.

The petitioners cannot say that they have been unfairly treated by the Council, for out of a total annual revenue from all sources of about £20,000, approximately £5,500 was spent on main roads principally used for Waihi, and £4,750 was spent in Waihi itself, exclusive of main roads.

The Council feels convinced that if it had not been for the circumstance that the wealthiest mine in the district happened to be within the boundaries of the proposed borough there would have been no such application, and the cry raised that Waihi should have the right to expend their own revenue (presumably raised by themselves) is a false cry. Their rates at present amount to about £240, and the increased revenue they expect to get is from the gold duty, which falls not on ordinary ratepayers, but on the mining properties.

The gold duty was originally intended for expenditure over the whole field, to open up roads and develop the mining industry; it was never intended to be used for the benefit of each individual mine producing it.

The Council holds that to allow a comparatively small urban community thus to absorb the bulk of the gold duty for local requirements will be a cruel injustice to the rest of the mining district; and it is further to be considered that the mining industry is a fluctuating one—that what holds good for Waihi to-day may to-morrow apply to Karangahake or Waitekauri, and the position be reversed.

Finally, the Government has seen the necessity of so amending the Counties Act as to enable certain portions of the counties to be brought under some of the provisions of the Municipal Corporations Act without adding another to the many local bodies already in existence; and when the Act is passed, Waihi, if then desiring municipal privileges, can claim to come under these provisions.

I have, &c.,

H. POLAND,

Chairman, Ohinemuri County Council,

For and on behalf of eight out of the nine Councillors of the Ohinemuri County Council.

Council Chambers, Paeroa, 20th December, 1901.

EXHIBIT 44.

REPORT BY A. H. V. MORGAN, M.A., ON SAMPLES OF SEDIMENT FROM WAIHOU RIVER.

Received: 16th April, 4th May, 7th May, 1910.
Reported: 21st May, 1910.
Sender: Waihi Borough Council.
Locality: Waihou River.
Description: Samples of sediment for determination of proportion of tailing.

THIRTY-TWO samples altogether were examined, of which fourteen (Nos. 1 to 14) were taken from the bed and banks of the Waihou River on the 14th April, 1910, about a fortnight after a heavy flood in the river, and nine (3/2 to 12/2) were taken from the bed of the Waihou about a fortnight later. Nearly all these samples were taken below the junction of the Ohinemuri with the Waihou, and were examined with the object of separating them as far as possible into natural river-sediment and tailing from the various batteries discharging into the Ohinemuri River. The remaining nine samples (1/3 to 12/3) were taken from the Waihou River and its tributaries above Te Aroha for the purpose of comparison with the samples taken from the Waihou below its junction with the Ohinemuri.

The samples were dried, and separated into grades of varying fineness by means of sieves having respectively 30, 60, and 90 holes to the lineal inch. Four grades were thus obtained, the percentage of material in each grade being shown in the accompanying table. Each grade was then examined microscopically in order to ascertain its composition.

The figures shown in column (*a*) are the percentages of the samples which remained on a 30-mesh sieve. This portion consists of comparatively large particles of pumice, quartz, &c., and is obviously a natural product, as none of the batteries have at any time discharged material of such a degree of coarseness. As will be seen from the table, it constitutes a considerable proportion of the sediment in the bed of the Waihou River.

The figures in column (*b*) give the percentage of material which is fine enough to pass a 30-mesh sieve (having 900 holes per square inch), but is too coarse to pass a 60-mesh sieve (3,600 holes per square inch). This portion consists of more or less rounded and waterworn particles of clear and milky quartz, together with a large proportion of brown and black grains, giving the whole a brownish appearance. I have no hesitation in saying that practically the whole of this grade is natural river-sediment. It is quite similar in composition to the material of the same grade obtained from the Waihou River above Te Aroha, where there could not possibly be any mining tailing, and contains a considerable proportion of minerals entirely absent from the Ohinemuri mining tailing. Moreover, the percentage of sand too coarse to pass a 60-mesh sieve discharged by the various batteries in the Ohinemuri district was never great, and at the present time is, I believe, nil.

Combining the figures in columns (*a*) and (*b*), the percentage of material which it is improbable contains an appreciable quantity of tailing is obtained. This is given in the column headed "(*a*) + (*b*)," and it will be observed that it comprises the bulk of the sample in every case where it was taken from midstream in the Waihou River below the Junction. In the second series of samples, obtained after the flood had subsided and normal conditions obtained in the river, over 90 per cent. of each of the midstream samples consists probably of natural river-sediment.

In column (*c*) is given the percentage of material which will pass a 60-mesh sieve but remain on a 90-mesh (8,100 holes per square inch). This is much whiter in appearance than the previous grades, and consists principally of transparent and milky grains of quartz, with some grains stained brown and yellow with oxides of iron. This portion is quite similar, both to the naked eye and under the microscope, to battery tailing, of which no doubt the greater part consists. It is probable, however, that a portion is natural sediment brought down by the river from its upper reaches, as the material of the same grade collected above Te Aroha contains many identical particles.

Column (*d*) gives the percentage of material fine enough to pass through the 90-mesh sieve. This is similar in appearance to grade (*c*), but perhaps more angular. The bulk of it also probably consists of battery tailing.

The sum of the figures in columns (*c*) and (*d*) is given in the column headed "(*c*) + (*d*)," and shows the amount of material in the samples that is fine enough to consist of tailing discharged from the batteries. It is identical in composition with the genuine tailing, and no doubt is mainly composed of it, but probably a small proportion is also derived by the action of natural agencies from the upper reaches of the Waihou River.

By a comparison of the two columns (*a*) + (*b*) and (*c*) + (*d*), the approximate proportion of natural sediment and battery tailing composing the bed of the river at the points where the samples were taken is obtained. From this it will be seen that, though tailing is undoubtedly present in the bed of the river below the Junction, the amount in the channel, where the current is strongest, is comparatively small, and that towards the banks, where the current is more sluggish, the amount increases considerably.

Samples 1, 2, and 7, which were taken from land on the banks of the Waihou River, consist of extremely fine particles of quartz and other minerals, all easily passing the 90-mesh sieve. They are similar in composition to grade (*d*) of the other samples, but I am unable to say what proportion might consist of tailing and what of natural sediment.

Analyses.

Sample.	Remained on 30-mesh. (a.)	Remained on 60-mesh. (b.)	Remained on 90-mesh. (c.)	Passed 90-mesh. (d.)	Improbable Tailing. (a) + (b).	Possible Tailing. (c) + d).	Sample.	Locality.
	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.		
1	..	..	..	100·0	..	100·0	1	Land 2 chains from north bank of Waihou, above Junction, west of Section 4744.
2	..	..	..	100·0	..	100·0	2	Land 1 chain west from Waihou, above Junction, north of Section 3472.
3	37·9	50·3	6·1	5·7	88·2	11·8	3	Midstream, Waihou River, near Morrison's.
4	45·8	36·4	7·15	10·65	82·2	17·8	4	,, ,, opposite Dennerley's.
5	36·2	39·0	12·95	11·85	75·2	24·8	5	,, ,, Rangiora Road.
6	15·2	79·2	3·5	2·1	94·4	5·6	6	,, ,, Puke Wharf.
7	..	..	..	100·0	..	100·0	7	Log 20 chains west of Waihou, south of Section 8, Block XII.
8	49·3	26·5	13·5	10·7	75·8	24·2	8	Towards west side of Waihou River, Thorp's Bend.
9	28·6	51·7	11·55	8·15	80·3	19·7	9	Half a chain from west side of Waihou, opposite Kenny's, line of sandbank.
10	47·1	29·6	15·95	7·35	76·7	23·3	10	Midstream, Waihou River, opposite Kenny's, in line of sandbank.
11	35·6	17·4	17·6	29·4	53·0	47·0	11	Half a chain from west bank, Waihou River, still water, near Forrest's mill.
12	82·7	16·7	0·5	0·1	99·4	0·6	12	Midstream, Waihou River, Forrest's mill.
13	62·8	13·8	3·5	19·9	76·6	23·4	13	Sandbank, Waihou River, near Forrest's mill, depth of 7½ ft.
14	37·8	52·5	8·0	1·7	90·3	9·7	14	Sandbank, Waihou River, near Hikutaia.
3/2	35·2	59·2	4·0	1·6	94·4	5·6	3/2	Same as No. 3 above, taken about two weeks later.
4/2	46·1	50·1	1·9	1·9	96·2	3·8	4/2	,, No. 4 ,, ,,
5/2	53·3	39·7	3·5	3·5	93·0	7·0	5/2	,, No. 5 ,, ,,
6/2	29·3	68·6	1·25	0·85	97·9	2·1	6/2	,, No. 6 ,, ,,
8/2	39·4	24·0	28·7	7·9	63·4	36·6	8/2	,, No. 8 ,, ,,
9/2	34·6	46·6	11·3	7·5	81·2	18·8	9/2	,, No. 9 ,, .
10/2	86·1	11·8	1·3	0·8	97·9	2·1	10/2	,, No. 10 ,, ,,
11/2	38·6	24·2	13·3	23·9	62·8	37·2	11/2	,, No. 11 ,, ,,
12/2	57·3	37·9	2·6	2·2	95·2	4·8	12/2	,, No. 12 ,, ,,
1/3	9·4	74·2	2·9	13·5	83·6	16·4	1/3	Bank at Te Aroha.
5/3	25·0	60·2	13·1	1·7	85·2	14·8	5/3	Bridge over Waihou, Manawaru.
6/3	2·1	20·8	22·8	54·3	22·9	77·1	6/3	Coleman's Creek, Manawaru, outlet of drain to Waihou.
7/3	38·0	50·5	7·4	4·1	88·5	11·5	7/3	Waiorongomai Creek, at bridge.
8/3	47·3	41·4	8·2	3·1	88·7	11·3	8/3	Wairaka Creek, flowing into Waihou.
9/3	69·8	28·3	1·0	0·9	98·1	1·9	9/3	Bridge over Waihou, Shaftesbury.
10/3	60·4	32·2	5·3	2·1	92·6	7·4	10/3	,, Gordon.
11/3	19·6	30·2	17·8	32·4	49·8	50·2	11/3	Bank of creek at Gordon Bridge.
12/3	6·5	22·7	16·8	54·0	29·2	70·8	12/3	Wash-out on road just past Gordon Bridge.

Waihi School of Mines, 21st May, 1910. A. H. V. Morgan, M.A., Director.

EXHIBIT 47.

MONTHLY RAINFALLS AT WAIHI FOR ELEVEN YEARS, 1899–1909, AND FOR THREE MONTHS, 1910.

Month.	1899.	1900.	1901.	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.	1910.
	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.
January ..	4·62	0·41	3·73	5·70	8·02	3·53	2·12	3·12	24·90	0·00	4·06	4·95
February ..	6·59	1·60	5·78	3·82	2·85	6·38	1·60	2·93	10·24	1·80	0·21	13·34
March	9·11	5·20	8·35	9·33	2·13	10·82	1·59	4·78	5·78	20·49	20·00	19·44
April	2·98	7·09	1·51	10·27	4·77	5·29	4·25	2·79	12·24	6·58	5·25	..
May	5·47	16·19	1·11	11·23	8·13	1·46	7·59	7·32	8·81	9·62	6·87	..
June	11·86	7·25	7·70	10·40	3·65	7·95	7·37	2·85	6·71	7·18	5·72	..
July	4·45	7·76	18·70	2·67	6·15	8·13	9·46	13·37	11·12	15·34	16·59	..
August	6·08	17·43	6·38	4·51	5·25	6·52	8·53	7·10	14·32	7·51	16·57	..
September ..	2·45	10·44	5·36	11·61	9·31	8·03	6·30	7·25	6·75	3·01	15·63	..
October	9·41	11·55	2·41	4·95	11·95	13·03	9·49	1·63	6·73	6·97	5·24	..
November	4·52	2·62	0·78	0·65	11·01	5·04	4·20	8·24	5·97	2·32	5·05	..
December	0·56	7·65	6·26	3·41	9·66	6·86	3·00	3·74	5·78	7·50	3·26	..
Totals ..	68·10	95·19	68·07	78·55	82·88	83·04	65·50	65·12	119·35	88·32	104·45	..

Mean annual average for eleven years, 83·5063 in.

H. B. Devereux, F.R. Met. Soc., observer.

Rainfall to date for 1910, 52·72 in. = 129 per cent. of Auckland's annual average.
Rates of fall on the 29th March, 1910:—

	Inches.		Inches per Hour.
6.30 p.m. to 10.15 p.m.	1·94	=	0·60
10.15 p.m. to midnight	2·44	=	1·40
Midnight to 1 a.m.	2·19	=	2·19
1 a.m. (30th) to 4 a.m.	3·83	=	1·27
4 a.m. to 7 a.m.	1·75	=	0·58
Fall in 12½ hours	12·15	=	0·97

EXHIBIT 48.

ANALYSES AND MICROSCOPICAL EXAMINATIONS OF SILTS, BY J. A. POND, F.C.S.

SIR,— 27th May, 1910.

On the 27th ultimo I received from Mr. E. Martin a box containing samples of silt forwarded by your association, as detailed below. In accordance with your request I have made analyses of these samples, and microscopical examination of them, with the results now submitted.

Samples.

(A.) Envelope marked, "Trace about 4 chains from river, near E. Bay, nearer lake," &c.
(B.) Card box marked, "Nicholl's Bdg., Waihou, filtration, trees," &c.
(C.) Bottle marked, "I, 15½ chains from river."
(D.) " "II, Buchanan's far garden, S. of road."
(E.) " "III, 3" (Barrett's).
(F.) " "IV, A. J. Thorp, Te Aroha Road."
(G.) " "V, G. Crosby's, Mill Road."
(H.) " "VI" (J. Bertelsen's).
(I.) " "VII" (J. Bertelsen's).
(J.) " "VIII, Blacke's old shop, Main Street."
(K.) " "W. Marsh, depth 6 in. to 9 in., area 10 acres."
(L.) " "W. Marsh, depth 12 ft., area 20 acres."
(M.) A sample of pumice silt obtained from a wash-out which is being carried into the Waihou near Okoroire.

I obtained the last sample for purposes of comparison, chemically and microscopically, with the samples submitted by your association.

The letters in parentheses are laboratory attachments for convenience.

The (B) sample, being wrapped up with (A), has not been examined.

Portions of each sample were taken by core from the bottles, leaving the balance in the same condition as received for any further examination which may be required.

The portion drawn was in each case dried and mixed: the part required for analysis was incinerated, thus removing moisture and organic matter.

Analyses.

Sample.	Silica.	Iron-peroxide and Alumina.	Lime.	Total. Per Cent.
(A.)	80·6	17·4	1·0	99·0
(C.) I	78·2	20·2	1·0	99·4
(D.) II	86·6	10·2	1·0	97·8
(E.) III	86·8	10·8	0·8	98·4
(F.) IV	86·8	10·6	1·2	98·6
(G.) V	91·8	6·6	0·6	99·0
(H.) VI	91·6	6·8	0·8	99·2
(I.) VII	85·6	11·4	0·8	97·8
(J.) VIII	83·8	12·6	1·0	97·4
(K.) Marsh	79·2	17·2	1·2	97·6
(L.)	86·2	10·8	0·4	97·4
(M.) Pumice	72·8	13·7	0·3	86·8

From the above it will be seen that the silts, excluding A, C, and K, contain upwards of 83 per cent. of silica, the alumina in these being present in little more than a trace.

In the pumice silt the silica is below 73 per cent., and the iron is only present as a trace. This is in accordance with analyses of pumice generally, and closely agrees with one reported by myself in Transactions of the New Zealand Institute, Vol. xxxii, page 233 *et seq.*

Microscopical Examination.

(A.) Chiefly composed of rough quadratic and rounded siliceous particles, intermingled with siliceous plates like pumice, and containing clayey matter.

(C) I. Chiefly rough quadratic and rounded granules of silica, with ferruginous quartz and a small number of siliceous plates and fibrous mineral.

(D) II. Coarser particles of quartz, some being ferruginous, all showing conchoidal fracture, being fragments of broken quartz.
(E) III. Same appearance as (D), but coarser.
(F) IV. Similar to (D), with crystals of silica and some clayey matter.
(G) V. Similar to (E).
(H) VI. Similar to (F).
(I) VII. Similar to (D).
(J) VIII. Similar to (C).
(K) Marsh: Similar to (C).
(L) Marsh: Similar to (F).
(M) Pumice from Okoroire: Sharp, flattened siliceous flakes and fibrous particles, with a small amount of white clayey deposit.

From the results now given I am of opinion that samples II, III, IV, V, VI, VII, VIII, (L), are practically composed of quartz tailings, and that (A), (C) I, and (K) are chiefly quartz tailings intermingled with clay and pumice drift.

I have, &c.,
J. A. Pond, F.C.S.,
Late Government Analyst.

The Chairman, Ohinemuri Silting Association.

EXHIBIT 53.

SCREEN TESTS OF TAILINGS BY PROFESSOR JARMAN.

Dear Mr. Rhodes,— School of Mines, University College, Auckland, 6th May, 1910.

Please find attached my estimate of the percentages of *possible* (not probable) tailings quartz in the samples received recently from Mr. E. F. Adams, of Thames.

Of the material which passed the 80-mesh screen, I assumed that all quartz could be tailing quartz excepting that which showed distinct crystal faces with no signs of abrasion on the edges, and then allowed for a proportion of iron-stained material equal to the proportion present in the quartz from the battery and deducted the rest. These are the only deductions I could make, and I have been careful not to overestimate them.

I have not examined the material passed through the 40 and caught upon the 80-mesh, since you are not discharging any material of that size, if we except 0·08 per cent.

Yours, &c.,
A. Jarman.

Charles Rhodes, Esq., the Waihi Gold-mining Company (Limited).

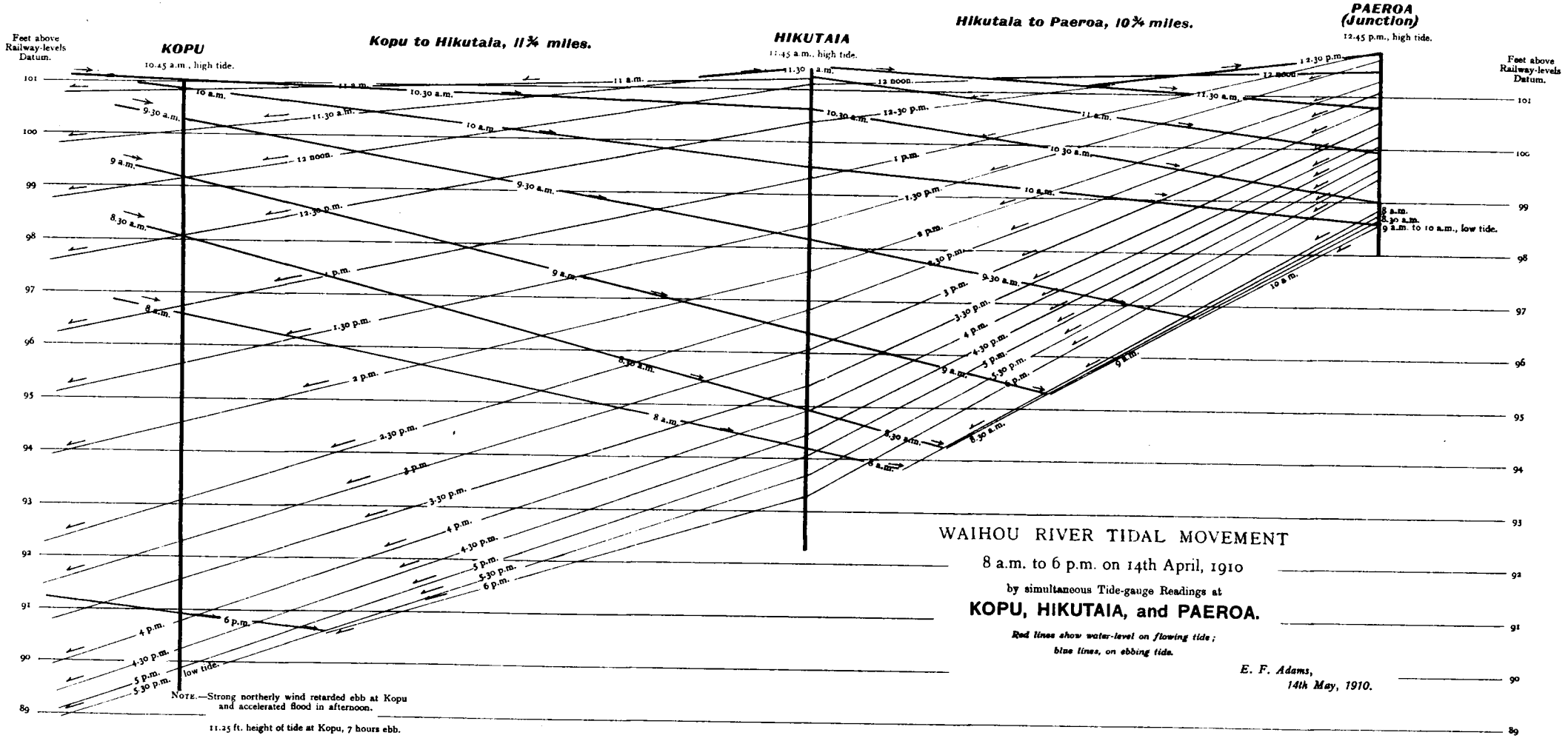
Screen Tests of Samples 1 to 18.

Number of Sample.	Weight used, Grams.	Percentage retained upon			Percentage through 80-mesh.	Possible Percentage of Tailings in this.	Ultimate Percentage of Tailings possible.
		20-mesh.	40-mesh.	80-mesh.			
1	1,078	57·6	41·5	0·72	0·18	30	0·05
2	1,129	23·55	63·9	12·0	0·55	25	0·14
3	1,039	30·8	18·8	26·7	23·7	95	22·5
4	804	73·6	24·2	1·62	0·56	70	0·4
5	1,082	19·1	14·2	40·3	26·5	90	23·8
6	1,053	75·9	21·73	1·66	0·71	60	0·4
7	1,193	79·8	18·57	1·17	0·46	70	0·3
8	806	15·7	55·8	21·4	7·1	85	6·0
9	1,081	71·6	24·9	3·0	0·5	75	0·4
10	1,015	61·5	34·1	4·0	0·4	45	0·2
11	1,076	46·7	44·5	7·6	1·2	75	0·9
12	1,126	52·1	38·0	8·1	1·9	70	1·3
13	883	26·9	55·4	16·0	1·8	80	1·4
14	908	72·8	10·5	52·4	29·9	90	26·9
15	927	25·4	54·9	16·9	2·8	75	2·1
16	1,092	19·4	57·6	20·1	2·9	85	2·5
17	573	25·8	62·2	11·6	0·4	10	0·04
18	543·3	0·6	54·5	44·0	0·9	20	0·2
Tailings, 170·13	..	..	60-mesh. 0·5 fibre, &c.	0·08	99·6		

6th May, 1910.

A. Jarman.

EXHIBIT 52.



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EXHIBIT 54.

COMPARISON OF RAINFALL, AUCKLAND AND WAIHI, FOR ELEVEN YEARS, 1899–1909.

Month and Locality.	1899.	1900.	1901.	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.
	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.
January—											
Auckland ..	3·64	0·84	3·22	1·58	7·13	0·82	2·79	1·17	7·45	0·45	1·88
Waihi	4·62	0·41	3·73	5·70	8·02	3·53	2·12	3·12	24·90	..	4·06
February—											
Auckland ..	1·86	1·60	3·98	0·44	2·08	3·71	0·56	2·25	5·79	0·54	
Waihi	6·59	1·60	5·78	3·82	2·85	6·38	1·60	2·93	10·24	1·80	0·21
March—											
Auckland ..	2·20	1·52	5·11	3·34	1·38	7·33	2·54	1·80	0·97	8·12	4·04
Waihi	9·11	5·20	8·35	9·33	2·13	10·82	1·59	4·78	5·78	20·49	20·00
April—											
Auckland ..	2·41	1·94	1·12	6·27	2·66	5·33	3·20	3·10	2·94	3·37	1·20
Waihi	2·98	7·09	1·51	10·27	4·77	5·29	4·25	2·79	12·24	6·58	5·25
May—											
Auckland ..	2·98	7·98	0·98	6·30	6·09	1·01	2·29	4·60	3·97	5·88	4·72
Waihi	5·47	16·19	1·11	11·23	8·13	1·46	7·59	7·32	8·81	9·62	6·87
June—											
Auckland ..	4·76	3·10	2·75	3·22	3·20	6·07	6·00	1·54	3·61	3·79	3·24
Waihi	11·86	7·25	7·70	10·40	3·65	7·95	7·37	2·85	6·71	7·18	5·72
July—											
Auckland ..	5·32	3·68	9·14	2·14	3·46	2·24	3·88	6·80	6·33	5·63	5·46
Waihi	4·45	7·76	18·70	2·67	6·15	8·13	9·46	13·37	11·12	15·34	16·59
August—											
Auckland ..	2·78	3·91	3·22	2·33	3·37	3·57	3·05	1·76	6·44	3·78	7·13
Waihi	6·08	17·43	6·38	4·51	5·25	6·52	8·52	7·10	14·32	7·51	16·57
September—											
Auckland ..	1·31	5·19	0·85	6·21	2·40	3·91	4·48	4·32	5·42	2·19	3·53
Waihi	2·45	10·44	5·36	11·61	9·31	8·03	6·30	7·25	6·75	3·01	15·63
October—											
Auckland ..	4·79	5·08	3·11	2·74	3·27	3·80	5·87	0·97	5·02	4·02	3·68
Waihi	9·41	11·55	2·41	4·95	11·95	13·03	9·49	1·63	6·73	6·97	5·24
November—											
Auckland ..	2·05	1·98	1·44	0·88	6·83	4·35	2·20	5·62	1·09	1·95	3·44
Waihi	4·52	2·62	0·78	0·65	11·01	5·04	4·20	8·24	5·97	2·32	5·05
December—											
Auckland ..	0·34	2·33	3·57	2·83	3·26	3·56	2·96	1·77	5·15	4·49	0·79
Waihi	0·56	7·65	6·26	3·41	9·66	6·86	3·00	3·74	5·78	7·50	3·26
Total—											
Auckland ..	34·44	39·15	38·49	38·28	45·13	45·70	39·82	35·70	54·18	44·21	39·11
Waihi	68·10	95·19	68·07½	78·55	82·88	83·04	65·50	65·12	119·35	88·32	104·45

Mean for eleven years, Auckland, 41·29 in. Mean for eleven years, Waihi, 83·51 in.

The above are from records of Waihi forwarded to me by Mr. H. B. Devereux, the observer there, and from the original monthly sheets of Mr. T. F. Cheeseman, Curator, Auckland Museum.

May, 1910.

E. F. Adams.

EXHIBIT 55.

TABLES SHOWING FINENESS OF TAILINGS DISCHARGED FROM WAIHI GRAND JUNCTION'S REDUCTION-WORKS.

The Waihi Grand Junction Company (Limited).—Tons Milled and Fineness of Finished Product (*i.e.*, Tailings discharged into Sludge-channel).

Period.	Tons of 2,000 lb.	Per Cent. Fineness. On 60-mesh.	On 80-mesh.	On 100-mesh.	On 120-mesh.	On 140-mesh.	On 150-mesh.	On 200-mesh.	Through 200-mesh.
1906, August to December (*a*) ..	8,141	11·2	12·6	10·9	..	8·7	..	12·9	43·7
1907, January to December (*b*) ..	40,220	..	..	0·8	2·6	2·6	..	21·3	72·7
1908, January to April (*c*) ..	13,056	..	..	4·2	7·5	5·3	..	21·5	61·5
,, April to December ..	35,421	..	..	4·1	..	..	16·2	10·2	69·5
,, last four months	15,489	..	..	0·7	..	..	7·8	8·8	82·7
1909, January to December ..	59,147	..	..	1·3	..	..	9·2	3·6	85·9
1910, January to 16th April ..	22,616	..	..	..	..	..	1·1	3·8	95·1

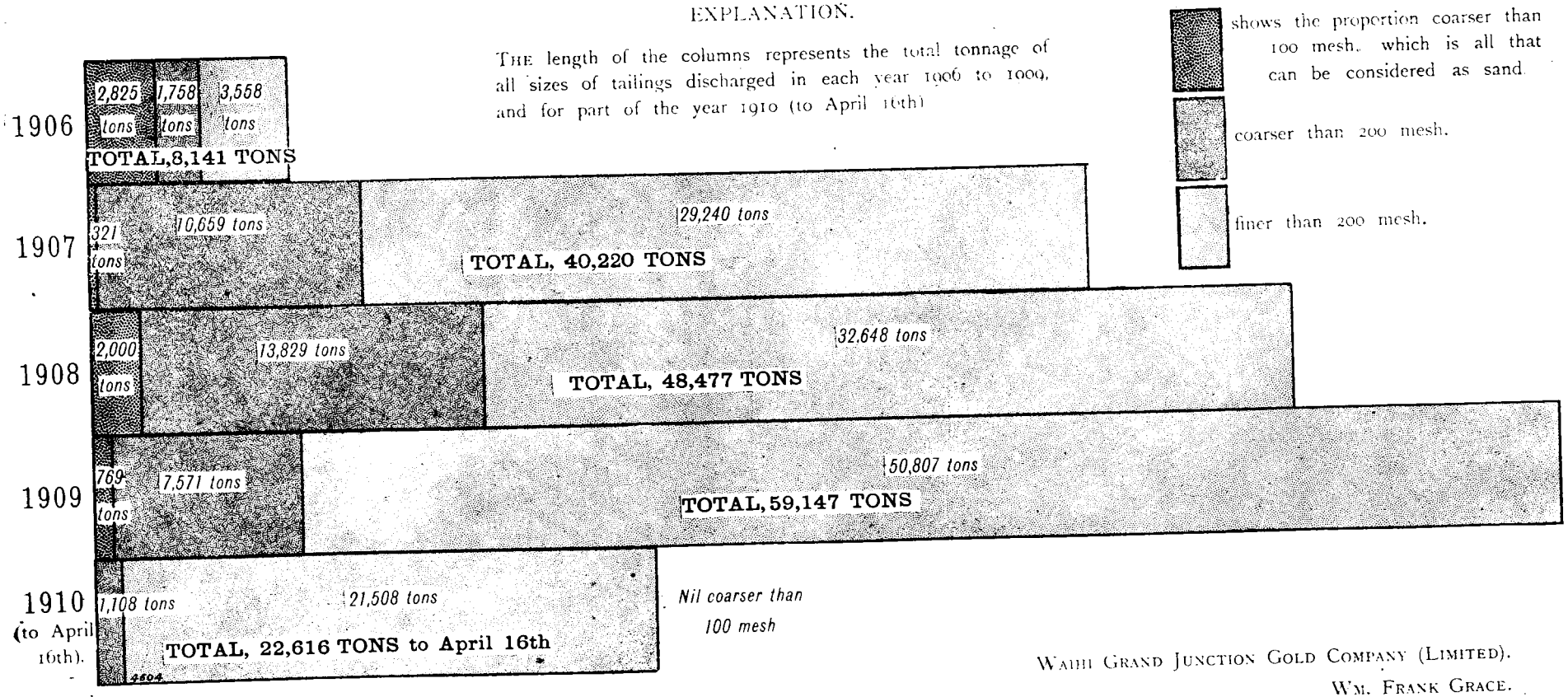
"Mesh" = holes to linear inch.

Memos.

(*a.*) The record kept of tonnage in company's books varies between the figure given above and 9,035 tons, which latter, I believe, includes all ore crushed, but at the end of year part was still under treatment and not discharged into sludge-channel that year. Sizing-tests only taken during the last three months of the year, on 6,195 tons ore. Mill started in August.

(*b.*) Sizing-tests not taken during early months of year; last three months sized.

(*c.*) In April 120-mesh sieve abandoned, and 150-mesh substituted for 140-mesh.



Waihi Grand Junction Gold Company (Limited).
Wm. Frank Grace.

Waihi, 24th May, 1910.

EXHIBITS 56 AND 70.

ESTIMATES FOR DEALING WITH SLIMES, BY W. F. GRACE, MANAGER, WAIHI GRAND JUNCTION COMPANY.

SCHEME 1.—DEALING WITH RESIDUES FROM WAIKINO.

Material to be transferred: Solids, 1,000 tons; water, 15,000 tons—16,000 tons, per day.
Distance of transmission: Seven miles.
Number of wheels on a basis of 2-per-cent. fall: Twenty-one wheels.
Diameter of wheels: 45 ft. Effective lift: 35 ft.

	£
Cost of wheels erected—£900 each, twenty-one wheels	18,900
Fluming: 1 chain, section of flume, 32 in. by 18 in., 2,116 ft., at £1 5s. per hundred erected, £26 9s. per chain	14,812
Motive power: Twenty-one 35 b.h.p., 2,200 volts, A.C. three-phase motors, twenty-five fitted with starters, &c., £200 each	4,200
Generating-station,—	
1,000 b.h.p. (in two units of 500 b.h.p. each), 2,200 volts, A.C. generators, at £3 per b.h.p. each	3,000
Two 500 b.h.p. gas-producers; two 500 b.h.p. gas-engines, with buildings, foundations, &c., erected, at £18 per b.h.p.	18,000
Main switchboard and leads	300
Transmission-line from Waikino to Paeroa: 2,200 volts A.C. line, 30 tons copper, at £100 per ton, £3,000; 320 posts erected, at £4 each, £1,280; 1,000 insulators, at 7s. 6d. each, £375; erecting wires, £100. Add 10 per cent. contingencies, £500	5,255
Dumping-ground at Paeroa: One square mile (640 acres), at £20 per acre	12,800
Workmen's dwellings at dumping-site: Six cottages, at £200 each	1,200
	£78,467

Labour and Running-costs.

	£
At generating-station, Waikino, 1,000 b.h.p., at £10 per b.h.p. per annum	10,000
Supervision at twenty-one substations: Twenty-four men (each man to look after three stations), at £150 per annum each	3,600
Stores, belting, repairs, &c., to motors, wheels, and fluming	4,500
Labour at dumping end: Six men, at £125	750
Interest and depreciation on capital cost	16,478
	£35,328

Summary.

	£
Capital outlay by Waihi Company,—	
Wheels	18,900
Fluming	14,812
Motors	4,200
Generating-station, Waikino	18,000
Electric generators, switchboards, &c.	3,300
Transmission-line	5,255
Dumping-ground, Paeroa	12,800
Workmen's cottages	1,200
	£78,467
Interest, 6 per cent.; depreciation, 15 per cent.	£16,478

On a basis of 300,000 tons per annum this method of handling Waikino tailings would cost 2s. 4·26d. per ton.

SCHEME 2.—LOADING TAILINGS INTO GOVERNMENT WAGONS; RAILAGE TO PAEROA; DISINTEGRATING, AND PUMPING ON TO SITE.

Two classes of material to be dealt with, sands and slimes. Quantity of sands to be handled daily, 250 tons.

Capital Expenditure by Waihi Company at Waikino.

		£
Two 30 in. belt conveyers, each 300 ft. long, at 3s. per foot erected		1,800
Two 30 in. cross conveyers, each 50 ft. long, at 3s. per foot erected		300
Two 15 b.h.p. motors, erected, £100 each		200
One locomotive for shunting		1,500
Siding for Government trucks	£400	
Turntable for Government trucks	200	
		600
		£4,400

Labour handling Sands at Waikino, and Transport Charges.

		£	s.	d.
Six men daily shovelling sands, at 8s. per day, at £120		720	0	0
Two men daily working turntable and trucks, at £120		240	0	0
Labour shunting: 1 driver, 10s.; 1 fireman, 8s.; coal, 10 cwt., 17s. 6d.; cleaner, 7s. 6d.; stores, 5s. per day, £2 8s.		720	0	0
Power required for motors 15 b.h.p.		131	5	0
Repairs to conveyers, &c.: Replacing conveyer-belts every two years, at 12s. per foot		840	0	0
Shovels, stores, belts for motors, &c.		25	0	0
Transit charges to Paeroa,—				
Dry sands, per annum	75,000 short tons of 2,000 lb.			
Plus 23 per cent. moisture	17,250 ,, ,,			
Wet short tons	92,250 of 2,000 lb.			
Wet long tons	82,366 at 1s. 9d. per ton	7,207	0	6
		£9,883	5	6

Handling Slimes at Waikino, Loading direct from Baskets into Government Wagons.

Capital Expenditure by Waihi Company.

		£
Two turntables to take 20-ton wagons (gross weight about 42 tons), with, say, 17 ft. 6 in. centres of bogie carriages and 5 ft. centres of bogie-wheels. Diameter of turntable necessary, 27 ft.		
Cost of ironwork for same	£700	
,, concrete pit and runner	150	
,, erection	100	
		950
Siding approach to turntable, with a fall of 1 in 90 from Government rail-level to turntable; bridge over tail-race, &c.		1,000
One locomotive for shunting		1,500
		£3,450

Labour handling Slimes at Waikino, and Transport Charges.

		£	s.	d.
Locomotive shunting: 3 drivers at 10s.; 3 firemen at 8s.; fuel, 30 cwt., £2 12s. 6d.; stores, 10s.; cleaner, 7s. 6d.; repairs, 5s., £6 9s.		1,935	0	0
Labour handling trucks to and from baskets: Nine men, at 8s. per day		1,080	0	0
Transit charges to Paeroa,—				
Dry slimes per annum	225,000 short tons of 2,000 lb.			
Plus 30 per cent. moisture	67,500 ,, ,,			
Wet short tons	292,500			
Wet long tons	261,160 at 1s. 9d. per ton	22,851	10	0
		£25,866	10	0

Handling Slimes and Sands, Paeroa End.

Capital Expenditure by Waihi Company at Waikino:

		£
Two three-throw hydraulic pumps, 10 in. cylinders, 12 in. stroke, motor-driven, capacity 500 gallons per minute at 100 ft. head; cost landed, £1,000 each		2,000
Two 12 in. centrifugal pumps, electrically driven, capacity 2,250 gallons per minute, with 25 b.h.p. motors attached; each £450 landed		900
Foundations for installing pumps		300
Two sluicing-pits from trucks to centrifugals		400
Water-supply to three-throw pumps		300
Half-mile of delivery-pipe from centrifugal pumps to dump, at 5s. per foot		660
One 100 b.h.p. gas suction plant	£400	
One 100 b.h.p. engine and generator	1,150	
Landing-charges	95	
Plant in duplicate	£1,645	3,290
Erection of plant, buildings, switchboard, and wiring		1,500
Workmen's dwellings: Ten at £200 each		2,000
Workshop, fitted with tools, forge, &c.		400
Electric-light installation		100
Land for dumping at Paeroa: One square mile, 640 acres, at £20 per acre		12,800
		£24,650

Labour Charges, Paeroa End.

Power required for driving plant.
Three-throw pumps, 55 b.h.p.; centrifugal, 25 b.h.p.; light, 20 b.h.p.

	£
Fuel and stores, £800; wages, £450, per annum	1,250
One electrician and two mechanics on pumps	450
Six sluicers, at 8s. per day	720
Two men at dump, at 8s. per day	240
	£2,660

Summary on Scheme 2.

	£
Capital expenditure, sands, Waikino	4,400
,, slimes, Waikino	3,450
,, tailings, Paeroa	24,650
	£32,500
Interest at 6 per cent., £1,950; depreciation at 15 per cent., £4,875	£6,825

Annual labour expenditure,—

	£	s.	d.
Sands, Waikino	9,883	5	6
Slimes, Waikino	25,866	10	0
Tailings, Paeroa	2,660	0	0
Interest and depreciation charges	6,825	0	0
	£45,234	15	6

On a basis of 300,000 short dry tons per annum, this method would cost 3s. 0·1d. per ton.
The Government outlay for railway and rolling-stock would be, approximately:—

	£
To deal with sands: Thirty-five 8-ton wagons, at, say, £150 each	5,250
To deal with slimes: Forty 20-ton wagons, at, say, £400 each	16,000
Haulage: Two locomotives, at, say, £2,500 each	5,000
Extension of railway to dumping-site at Paeroa, say, three miles at £4,000 per mile	12,000
	£38,250

SCHEME 3.—ESTIMATES FOR PUMPING SLIMES FROM WAIKINO TO PAEROA.

Duty: To pump 750 tons of slimes per twenty-four hours.

Capital Expenditure.

Power-station—		
Two gas-engine units, each 400-horse-power capacity, at £18 per horse-power erected complete with buildings	£14,400	
Two 250-k.w. three-phase generators, at £5 per kilowatt erected complete	2,500	
Switchboard, cables in engine-house, lightning-arresters, &c.	1,000	
		17,900
Transmission-line—		
320 posts, at £4, £1,280; 1,000 insulators, at 10s. each, £500; 12 tons copper, at £100, £1,200; erection of line, £150	£3,130	
Telephones, lines, and erection	150	
		3,280
Pumping-stations—		
One tank and disintegrator	£600	
Ten three-throw pumps, at £650	6,500	
Ten 50-horse-power induction motors with starters, at £4 per horse-power	2,000	
Ten sets of transformers, at £1 10s. per horse-power	750	
Ten sets of pipe-lines, with bends, stand, pipes, and valves	1,200	
Five pumping-houses, and foundations for ten pumps and motors, and erection	1,500	
		12,550
Fluming—		
Launders, trestling, and collar launders for pump-discharge, 560 chains, at £25 per chain complete		14,000
Dumping-site—		
640 acres, at £20 per acre	£12,800	
Six workmen's cottages, at £200	1,200	
		14,000
		£61,730

Running-costs.

			£
Power-station costs—			
400-horse power, at £12 per horse-power per annum, inclusive	...	...	4,800
Pumping-stations—			
Five stations; one man per shift per station: Fifteen men, at £150	...	£2,250	
Repairs and renewals to pumps and motors, including oil and stores	...	1,850	
Two fitters, at £150; two labourers, at £125	... ...	550	
			4,650
Fluming—			
Four carpenters, at £150	... ...	£600	
Timber and cartage	... ...	400	
			1,000
Transmission-line—			
One electrician, £150; one labourer, £125	... ...		275
Dumping-site—			
Six men, at £125	... ...		750
			11,475
Interest, 5 per cent.: depreciation, 15 per cent. on £61,730	... ...		12,346
Total	... ...		£23,821

Cost per ton on basis of handling 225,000 tons per annum, 2s. 1·4d.

SCHEME 4.—LOADING TAILINGS INTO WAGONS; RAILAGE TO WAIHI OVER GOVERNMENT LINE; CONSTRUCTION OF 3 FT. 6 IN. GAUGE FROM WAIHI TO BEACH; AND DEPOSITING RESIDUES ON SEASHORE.

Capital Expenditure.

				£
Plant for handling sands, Waikino (as per scheme 2)	... ...			4,400
,, slimes, Waikino (as per scheme 2)	... ...			3,450
,, slimes, Waihi Mill, Grand Junction Company, and Union Mill, say	...			7,850
Railway, 3 ft. 6 in. gauge, from Waihi to foot of Beach Hills, with sidings into Waihi Mill, Grand Junction and Union Mills, say, seven miles, at £10,000 per mile	... ...			70,000
Tunnelling, about 40 chains; section of tunnel, say, 14 ft. by 10 ft., bricked throughout, at per foot—				
Driving, 7 yards, at 10s.	... ...		£3 10 0	
Bricks, 560 per foot, at £4 10s. per thousand	... ...		2 10 6	
Mortar and cement; labour setting at £1 5s. per thousand	...		1 4 6	
Rails, 52 lb.; fishplates and spikes, per chain	... ...	£7 0 0		
Sleepers, thirty-three per chain, at 4s. 6d. each	...	7 8 6		
Ballast, 33 yards, at 4s. per yard	... ...	6 12 0		
Labour, laying and ballasting	... ...	1 10 0		
Cost per chain	... ...	£22 10 6		
Cost per foot	... ...		0 6 10	
			7 11 10	
Contingencies	... ...		0 3 2	
			7 15 0	
Cost of tunnel complete, about 2,640 ft.	... ...			£20,460
Rolling-stock—				
To deal with Waikino sands—thirty-five 8-ton wagons, at £150 each	...			5,250
,, ,, slimes—forty 20-ton wagons, at £400 each..	.. ..			16,000
,, Waihi, Junction, and Union residues	... ...			21,250
Three locomotives, at £2,500 each	... ...			7,500
Discharging arrangements at beach end—				
Three three-throw hydraulic pumps, 10 in. cylinders, 12 in. stroke, motor-driven; capacity 500 gallons, at 200 ft.; £1,000 each	.. ..			3,000
100 b.h.p. gas plant, engine, and generator, each £1,645, in duplicate	... ...			3,290
Reservoir 100 ft. above point of discharge, for sluicing water pumped from beach	...			220
Piping from pumps to reservoir and sluicing-pits	... ...			150
Erection of plant, buildings, foundations, switchboard, and wiring	... ...			1,500
Electric-light equipment	... ...			100
Workshop, with tools and outfit	... ...			400
Workmen's dwellings: Ten at £200 each	... ...			2,000
Total capital expenditure	... ...			£166,820
Interest at 6 per cent., £10,009: depreciation at 15 per cent., £25,023	...			£35,032

Labour Charges per Annum on Scheme 4.

		£
Loading residues at Waikino (as per scheme 2)		5,691
,, Waihi Mill, Junction, and Union, say		6,000
Haulage over Government line to Waihi of Waikino residues: 300,000 tons, at 3d. per ton (allowance to Government for use of line)		3,750
Haulage of 300,000 tons from Waikino to beach, at 9d. per ton		11,250
,, ,, Waihi Mills to beach, at 6d. per ton		7,500
Sluicing at beach, 600,000 tons per annum—		
Six men at 8s. per day	£720	
Two drivers and electricians	450	
Power, pumping, fuel, and stores	800	
Wages	450	
	——	2,420
Repairs and maintenance to rolling-stock, say, £150 per month		1,800
Interest and depreciation		35,032
		£73,443

On a basis of 600,000 tons per annum, cost would be 2s. 5·3d. per ton.

EXHIBIT 57.

ANALYSIS OF SAMPLE OF RIVER-MUD FROM THAMES HARBOUR BY W. H. BAKER, B.Sc

Sample forwarded by Mr. A. Bruce consisted of gravel, sand, and mud set to solid cake. Sample dried, and sifted while dry into various grades, as follows:—

	Per Cent.	Silver.	Gold.
A. On 30-mesh	14·1	Trace	Trace.
B. Through 30, on 60	25·1	1 dwt.	Trace.
C. Through 60, on 90	15·2	1 dwt.	4 gr.
D. Through 90, on 150	3·1	Sample too small to estimate gold-values.	
E. Through 150	42·5	4 dwt.	12 gr.

As there was considerable difficulty in separating the clayey material from the granular, a sampled portion was then washed, and graded while wet.

	Per Cent.	Silver.	Gold.
W.A. On 30-mesh	19·8	Trace	..
W.B. Through 30, on 60	14·4	Trace	..
W.C. Through 60, on 90	·8·0	1 dwt.	3 gr.
W.D. Through 90, on 150	4·2	4 dwt.	10 gr.
W.E. Through 150	53·6	4½ dwt.	12 gr.

A contains pumiceous and rhyolitic grits, with crystalline quartz.
B contains the same in a finer state
C contains the same in a finer state.
D. Too fine to determine exactly the mineral composition, but contains quartz particles.
E. Too fine to determine.

W. H. Baker, B.Sc.,
Director, Thames School of Mines.

EXHIBIT 60.

ESTIMATES OF AREAS IN OHINEMURI COUNTY DESTROYED OR AFFECTED BY MINING SILT OR SLIMES DEPOSITED BY FLOODS.

(Made by C. R. Bellingham for Ohinemuri County Council.)

Survey Block.		Total Area of Holdings.			Total Area destroyed.			Total Area affected.		
		A.	R.	P.	A.	R.	P.	A.	R.	P.
Waihou,	VII and VIII	2,139	2	0	..			1,779	2	0
,,	XI and XII	843	0	0	..			843	0	0
,,	XII	3,324	0	0	137	0	0	2,955	0	0
,,	XV	1,266	2	0	110	2	0	1,070	0	0
Ohinemuri,	IX	518	0	0	..			518	0	0
,,	XIII	1,886	1	7	124	2	7	342	3	0
		99,77	1	7	372	0	7	7,508	1	0

STATEMENT GIVING NAME OF OWNER OR OCCUPIER AND AREA OF LAND DESTROYED OR AFFECTED BY MINING SLIMES AND SILT.

Owner or Occupier.	Survey Block.	Area of Holding.	Area destroyed.	Area affected.
		Acres.		Acres.
Alexander, A. R.	Waihou, VIII	150	..	150
Young, A.	,, ,,	164	..	60
Murdock, —	,, ,,	178	..	50
Vowles, G.	,, ,,	98	..	90
Bagnall Bros.	,, ,,	213	..	213
Fisher, Amos	,, ,,	182	..	182
Fisher, Bros.	,, ,,	174	..	174
Fisher, Joel	,, ,,	174	..	174
Fisher, S. ..	,, ,,	198	..	198
Adolph, E.	,, ,, and VII	126	..	126
Stock, R. ..	,, ,,	215	..	195
Vedder, C. J.	,, ,,	117½	..	117½
Morrison, J.	,, ,,	150	..	50
		2,139½	..	1,779½
Moore, W., sen.	Waihou, XI and XII	183	..	183
Johnston, J.	,, ,,	185	..	185
Morrison, J.	,, ,,	178	..	178
Paul, Mrs.	,, XI	97	..	97
Adamson, F.	,, ,,	200	..	200
		843	..	843
Thorp, J. W.	Waihou, XII	82	40	42
Kennedy, A. P.	,, ,,	23	4	19
Whitmore, C.	,, ,,	24	4	20
Brunskill, H.	,, ,,	86	..	20
Brunskill and Hunt	,, ,,	110	10	100
McKee, James	,, ,,	445	72	373
Laughlin, S. J.	,, ,,	42	..	42
Laughlin, Mrs.	,, ,,	162½	..	162½
Moore, W., jun.	,, ,,	162½	..	162½
Johnston, J. E.	,, ,,	134	..	134
Paul, G. ..	,, ,,	107	..	107
Innes, F. M.	,, ,,	108	..	108
Gillard, H. B.	,, ,,	96	..	96
Reid, J. ..	,, ,,	87	..	87
Morrison, M.	,, ,,	149	..	60
Robinson, T. J. and A. R.	,, ,,	332	7	325*
Wight, A. A.	,, ,,	340	..	330
Thompson, J.	,, ,,	135	..	135
Rae, F. ..	,, ,,	117	..	50
Tukekino ..	,, ,,	220	..	220
Paul, W. J.	,, ,,	111	..	111
Handly, J.	,, ,,	251	..	251
		3,324	137	2,955
Shaw, Edward	Waihou, XVI	10	Nil	10
Chamberlain, C.	,, ,,	14	..	14
Tetley, Mrs.	,, ,,	200	7	193
Crawford, D.	,, ,,	58	Nil	58
Goonan, M.	,, ,,	60	,,	25
Hampton, T., sen.	,, ,,	3½	,,	†3½
Ming (Native)	,, ,,	20	10	10
Nicholls, Mrs. W. G.	,, ,,	3	3	..
Clark (Native)	,, ,,	14	14	..
Hampton, —, jun.	,, ,,	26	20	6
Cooper, George	,, ,,	246	15	200
Haora Tareranui	,, ,,	80	..	80
Handly, James	,, ,,	130	..	110
Crosby, George	,, ,,	31	10	21
Moore, F.	,, ,,	248	..	248
Hone Hemera	,, ,,	85	..	85
Tuati te Patu	,, ,,	30	30	..
Wight, W.	,, ,,	8	1½	6½
		1,266½	110½	1,070

* Very badly. † Crops destroyed.

STATEMENT GIVING NAME OR OCCUPIER AND AREA OF LAND DESTROYED OR AFFECTED BY MINING SLIMES AND SILT—*continued.*

Owner or Occupier.	Survey Block.	Area of Holding.	Area destroyed	Area affected.
Hubbard Bros.	Ohinemuri, IX ..	Acres, 518	Acres. ..	Acres. 518
		A. R. P.	A. R. P.	
Coote, James M.	Ohinemuri, XIII ..	1 1 0	..	1¼
Vincent, Mrs.	,, ,, ..	0 3 0	..	0¾
Thorp, A. J.	,, ,, ..	1,556 0 0	..	200
Praati (Native)	,, ,, ..	14 0 0	14 0 0	..
Wina Rapa	,, ,, ..	13 0 0	13 0 0	..
Raru	,, ,, ..	9 0 0	..	9
Hone Hereki	,, ,, ..	7 0 0	..	7
Barratt, James	,, ,, ..	39 3 0	20 0 0	9¾
Buchanan, G.	,, ,, ..	40 0 0	5 0 0	12*
Marsh, W.	,, ,, ..	94 0 0	30 0 0	34
Tetley, Joshua	,, ,, ..	14 0 0	3 0 0	11
Wight, Albert	,, ,, ..	6 0 0	6 0 0	..
Crosby, G.	,, ,, ..	6 0 0	3 0 0	3
Cock, F.	,, ,, ..	85 0 0	30 0 0	55
Snodgrass, D.	,, ,, ..	0 2 7	0 2 7	..
		1,886 1 7	124 2 7	342¾

* Badly.

EXHIBIT 61.

SOUNDINGS TAKEN BY MR. E. SHAW BETWEEN THE CONFLUENCE OF THE OHINEMURI AND WAIHOU RIVERS.

	Ft.	in.
Opposite old wharf at above point	18	0
,, coal-hopper	12	9
,, Nicholl's launch	13	0
,, Horgan's house	11	9
At Tapu Point	22	0
At Suck-in Bay	16	0
At Sarah Hunia's hut	13	0
Opposite Karaka's hut in reach	10	0
,, T. Shaw's in bend	21	0
Four chains below willow in river at old mill	9	9
Between the two willows	5	0
Opposite Gold-extraction Company's office	10	6
,, Crosby's hay-shed in reach	9	6
,, Cooper's house	8	0
Immediately below Cooper's drain	4	9
Opposite mouth of Cooper's drain...	7	0
,, Kuaoiti Creek	10	0
,, Grant's house	21	0
,, Gambling's house	10	0
In bend above Gambling's	9	0
Opposite Evans's house	6	0
All the way up reach at Evans's	6	0
For 10 chains below Pereniki's Bend, average	4	6
In bend 1 chain below willow	17	0
One chain above willow	11	0

Soundings round the bend for a length of 5 chains are 3 ft. to 4 ft.
Average soundings from bend to Railway Wharf are 4 ft. 9 in.

All the above soundings were taken in the bends and deepest parts of the river unless otherwise mentioned, and on the top of the tide.

E. SHAW.

EXHIBIT 64.

REPORT AND ANALYSES BY DR. J. S. MACLAURIN, D.Sc., F.C.S., ON RIVER-BANK DEPOSITS.

Dominion Laboratory (Department of Internal Affairs), Wellington, N.Z., 28th May, 1910.
Report on Specimens Nos. A 401, 1–13, and A 497, 1–5.
Forwarded by the County Engineer, Ohinemuri County Council, Paeroa.
Particulars: River-bank deposits.

Samples No. 401, 1–13, were numbered as received, no description being given. There was no No. 3.

Samples No. 497, 1–5, were described as follows:—

No. 1, marked "A," was taken some distance above the Mataura Dam, on the Ohinemuri River, well above all mining operations.

No. 2, marked "B," was taken some distance below sample A on the same river, but still above all mining-works.

No. 3, marked "C," taken of tailings as discharged from the Junction battery. No sand tailings. Filtered on vacuum filter, left damp. Solution filtered off quite clear.

No. 4, marked "D": Sample of slimes as supplied by the Talisman Company.

No. 5, marked "E": Sample of sand from Waitawheta Stream above the battery.

The samples were dried and sifted, with the following results:—

No.	Retained by 30-mesh. (1.)	60-mesh. (2.)	90-mesh. (3.)	120-mesh. (4.)	200-mesh. (5.)	Passed 200. (6.)	Total passed 120. (7.)
	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.
401–1	Nil	0·08	0·64	12·57	63·97	22·74	86·71
2	0·14	0·76	0·63	4·34	31·46	62·67	94·13
4	0·10	4·51	0·46	8·25	49·84	36·84	86·68
5	0·09	4·68	0·64	23·61	32·31	38·67	70·98
6	Nil	3·62	0·47	1·33	44·89	49·69	94·58
7	1·21	39·45	39·66	11·46	6·59	1·63	8·22
8	Nil	0·09	2·09	31·52	47·95	18·35	66·30
9	Nil	0·22	0·40	1·80	12·09	85·49	97·58
10	Nil	0·16	0·08	0·16	19·76	79·84	99·60
11	0·66	0·32	0·18	0·07	10·69	88·08	98·77
12	0·49	0·44	0·37	5·29	40·70	52·71	93·41
13	0·10	0·28	0·16	0·28	17·07	82·11	99·18
497–1	49·12	42·54	5·42	0·63	0·67	1·62	2·29
2	26·41	53·87	8·40	1·67	3·80	5·85	9·65
3	Nil	0·16	0·22	1·47	21·45	76·70	98·15
4	Nil	0·15	0·20	0·20	0·80	98·65	99·45
5	61·00	26·61	4·37	1·52	1·43	5·07	6·50

It will be seen that in the samples of genuine river-sands (497, 1, 2, and 5) the percentage passing 120-mesh is under 10, while in genuine tailings and slimes (497, 3 and 4) it is over 98. Now, in the remaining samples, with the exception of No. 7, the percentage of fines passing 120-mesh is in every case over 66. These samples therefore consist largely of tailings and slimes.

Much more conclusive proof of this is, however, obtained when the percentage of silica in the various samples is considered. This will be apparent from the following table:—

Percentages of Silica.

No.	In Portion retained by 120-mesh. (Column 4, Table 1.)	In Total passing 120-mesh. (Column 7, Table 1.)	In Unsifted Sample.
401–1	89·10	89·47	Undetermined.
2	88·50	81·10	..
4	89·85	82·62	..
5	88·05	87·22	..
6	Undetermined	75·63	..
7	86·10	86·80	..
8	90·50	89·15	..
9	Undetermined	75·05	..
10	..	84·07	..
11	..	79·25	..
12	5·29	84·58	..
13	Undetermined	84·60	..
497–1	..	53·45	61·60
2	..	54·57	59·25
3	..	71·63	Undetermined.
4	..	77·72	..
5	..	57·00	61·20
Waihi tailings	..	Undetermined	88·00

That portion of 401, 7, retained by the 90-mesh sieve was also analysed, giving 73 per cent. of silica.

It will be seen that the average percentage of silica in the genuine river-sands (No. 497, 1, 2, and 5) is approximately 61 per cent., while in samples of tailings and slimes (497, 3 and 4) from Grand Junction and Talisman respectively it is 71·6 and 77·7 per cent., and in Waihi tailings 88 per cent. From these figures it is possible to calculate the percentages of river-sands and tailings in the samples (401, 1–13) under consideration. This has been done, and the results embodied in the following table, taking 61 per cent. of silica as representing river-sands and 88 per cent. as representing tailings and slimes:—

No.	Percentage of Tailings and Slimes.	Percentage of River-sands.	No.	Percentage of Tailings and Slimes.	Percentage of River-sands.
401–1	99·3	0·7	401–8	97·8	2·2
2	74·0	26·0	9	50·6	49·4
4	77·6	22·4	10	85·2	14·8
5	92·5	7·5	11	66·6	33·4
6	51·1	48·9	12	86·9	13·1
7	36·1	63·9	13	86·6	13·4

In this table the percentages shown for tailings and slimes must in several cases be considerably below the truth, since some of these samples are, no doubt, composed in part of Grand Junction or Talisman tailings and slimes, which, as already noted, have a much lower percentage of silica than those (Waihi tailings) taken as a basis of calculation.

Samples No. 401, 1–13, are described as follows:—

No. 1. Netherton Wharf, below high-water level.
No. 2. ,, above high-water level.
No. 4. At Alexander's Wharf, at about high water.
No. 5. ,, below high-water level.
No. 6. ,, above high-water level.
No. 7. From bed of river, about 30 ft. from Alexander's Wharf.
No. 8. At Robinson's Wharf.
No. 9. ,,
No. 10. From timber stacked about 50 ft. from Robinson's Wharf.
No. 11. From Thorp's orchard, near east fence.
No. 12. From bank of river, 33 ft. from water's edge, at upper end of Thorp's orchard.
No. 13. From water's edge at upper end of Thorp's orchard.

J. S. Maclaurin, D.Sc., F.C.S.,
Dominion Analyst.

EXHIBIT 68.

APPROXIMATE TONNAGE OF GOODS CARRIED IN THE RIVERS TRADE BY NORTHERN STEAMSHIP COMPANY.

List of Tonnage of Cargo carried to and from Auckland for Six Months ending 31st March, 1910.

	Tons.	Tons.
Inward,—		
Waihi	2,100	
Waikino	1,200	
Karangahake	1,200	
Paeroa and river	3,600	
		8,100
Outwards for six months ending 31st May		1,092
Te Aroha, Waitoa, Morrinsville, Hamilton, Frankton, Ngaroto, Te Awamutu, Cambridge, and way stations; Rotorua and way stations; for six months ending 31st May, 1910		2,400
Ex p.s. "Kopu": Coal, bricks, timber, from Auckland for six months ending 31st May, 1910		1,200

Not including shipments of bacon, lard, skins and hides, &c., from Te Aroha to Auckland; also, this does not include bullion-shipments from here nor coal to this port by other vessels.

M. Silcock, Acting-Agent.

LIST OF APPROXIMATE TONNAGE OF GOODS CARRIED BY STEAMERS TO AND FROM AUCKLAND.

Inward.	Tons per Month.	Tons.
Waihi	350	
Waikino	200	
Karangahake	200	
Paeroa and river	600	
	—	1,350
Te Aroha, Waitoa, Morrinsville, Hamilton, Frankton, Ngaroto, Te Awamutu, Cambridge, and way stations; Rotorua and way stations; per month	400	
Ex "Kopu": Coal, bricks, timber, &c., per month	200	
	—	600
Total inwards		1,950

Outward.	Tons.	Tons per Month.
Paeroa, &c., to Auckland		182
Inwards	1,950	
Outwards	182	
Total per month	2,132	

Not including shipments of bacon, lard, skins and hides, &c., from Te Aroha to Auckland; also, this does not include bullion-shipments from here nor coal to this port by other vessels.

EXHIBIT 69.

TABLE SHOWING TONS CRUSHED AND GRADE OF SAME, AT KOMATA REEFS REDUCTION-WORKS.

Total Tons crushed.			Grade.			
Totals.	Sands.	Slimes.	On 60-mesh, per Cent.	On 90-mesh, per Cent.	On 200-mesh, per Cent.	Passed 200-mesh, per Cent.
Period before Tube-milling (1898 *to end of* 1905).						
77,660	49,700	27,960	19	15	30	36
			34		66	
Period since Tube-milling (1906 *to May*, 1910).						
96,050	44,220	51,830	Nil	20	26	54
					80	
Period since Formation of Company (1898 *to May*, 1910).						
173,710	93,920	79,790	8	18	28	46
			26		74	

NOTE.—The term "slimes" is applied to all material which passes a 200-mesh sieve, and the term "sands" to all that remains on a 200-mesh sieve.

S. D. MCMIKEN, Manager.

EXHIBIT 72.

ESTIMATE OF COST OF PERENIKI CUT, BY MR. E. F. ADAMS, SURVEYOR AND MINING ENGINEER, THAMES.

SIR,— Thames, 5th June, 1910.

In reply to your telegram of the 4th instant, requiring the cost of the Pereniki cut, I beg to reply that in my opinion the cost of the cut also implies other works on the river entailed by the cut.

	Approximate Length in Chains.
Approaches in Ohinemuri River to Pereniki cut	7
Pereniki cut through Kakanui and Ouekaharau No. II Blocks	28
Old river-bed of Ohinemuri and Waihou, requiring part securing ...	68
New cut, Opukeko Block	20
Securing final train of river	5
Total length affected, excluding new cut for Waihou confluence (approximate)	128

The minimum cost for the work I estimate as £40,665.

The Opukeko cut is not charged as lined.

No allowance is made for compensation or land-acquisition, or for drainage, Te Tawa Stream, old confluence, Ohinemuri meander, and Thorp's Bend.

The Waihou cut, at confluence, would be a further charge of £4,000.

Dredging would be required after floods.

The work is not overestimated, in my opinion, in any particular.

The quantities of Pereniki cut are worked from Mr. Bray's (County Engineer, Paeroa) levels, based on a minimum cross-section of 2,160 sq. ft. passing 15,000 cub. ft. per second.

The cut through Opukeko Block has not been levelled, and the quantities are therefore purely assumption, but on the safe side.

	£
Filling approaches, Ohinemuri, giving 30 ft. width road on right bank of cut—15,000 cubic yards at 1s. 6d.	1,125
Pereniki cut—181,000 cubic yards at 1s.	9,050
Lining: Total length of lining, 8,000 ft.; piles, 12 in. by 12 in., 25 ft. long, 8 ft. centres, 300,000 sup. ft., heart of totara; planking, 3 in., 441,000 sup. ft., heart of totara; walings, 6 in. by 8 in., seven = 224,000 sup. ft.: Total, 965,000 sup. ft. timber. Cost timber, working, packing plants, &c.	14,475
Bolts for walings, 1 in., 18 in. long, 10,000 at 6·4 lb. = 64,000 lb. at 6d.	1,600
Anchor piles every second pile, 500 at £2	1,000
Tie-rods to anchor piles, 6 ft. long, 1 in. bolts, at 18 lb. = 9,000 lb. at 6d.	225
Filling old Waihou confluence, to give backing to lining, 450 ft. at 15 cubic yards per foot = 6,750 cubic yards at 1s.	340
Lining Waihou River, near Te Tawa Stream, and securing new confluence, 1,510 ft. at £2 10s.	3,775
Filling at back, 1,200 ft. long, by 32 cubic yards per foot, 38,400 cubic yards at 1s.	1,920
Opukeko cut (assumed), 120,000 cubic yards	6,000
Lining river below Opukeko cut, 350 ft. at £2 10s.	875
Filling at back, 350 ft. at 16 cubic yards = 5,600 cubic yards at 1s. ...	280
Total	£40,665

The lining allows for a height of 18 ft. The piles are driven 7 ft. below bottom. The planking is carried 3 ft. below bottom, is packed behind with rough stone, is vertical and nearly flush with face of piles; held in position by the walings and packing.

I have, &c.,
E. F. ADAMS.

Andrew Hanna, Esq., Solicitor, Waihi-Paeroa Gold-extraction Company.

EXHIBIT 73.

SOUNDINGS TAKEN ON THE 21ST MAY, 1910, BY R. M. AITKEN, ON OHINEMURI AND WAIHOU RIVERS,

FROM WAIHI-PAEROA GOLD-EXTRACTION COMPANY'S PLANT-SITE TO THE PUKE WHARF.

(Tracing of Rivers attached and Position of each Depth shown.)

No.	Depth of Water.		No.	Depth of Water.	
1	.. 14 ft.	5 ft. tailings.	24	.. 16 ft.	Rough bottom.
2	.. 15 ft.	No tailings.	25	.. 20 ft.	,,
3	.. 14 ft.	1 ft. coarse sand.	26	.. 6 ft.	Rough gravel.
4	.. 14 ft.	2 ft. coarse sand.	27	.. 3 ft. to 5 ft.	Rough sand.
5	.. 14 ft.	Hard bottom.	28, 29, 30	.. 8 ft.	,,
6	.. 20 ft.	Not bottomed.	31	.. 9 ft.	,,
7	.. 16 ft.	Hard bottom.	32	.. 7 ft. 6 in.	,,
8	.. 16 ft.	1 ft. gravel.	33	.. 8 ft.	,,
9	.. 14 ft.	18 in. rough sand.	34	.. 9 ft.	,,
10	.. 16 ft.	2 ft. rough sand.	35	.. 10 ft.	,,
11	.. 16 ft.	Hard bottom.	36, 37, 38	.. 9 ft.	,,
12	.. 12 ft.	,,	39, 40	.. 8 ft.	,,
13	.. 18 ft.	2 ft. coarse sand.	41	.. 10 ft.	,,
14	.. 16 ft.	Hard bottom.	42, 43	.. 8 ft.	,,
15	.. 14 ft.	2 ft. rough sand.	44, 45	.. 9 ft.	,,
16	.. 16 ft.	,,	46	.. 18 ft.	,,
17	.. 14 ft.	Hard bottom.	47, 48, 49	.. 9 ft.	,,
18	.. 12 ft.	30 in. rough sand.	50, 51	.. 10 ft.	,,
19	.. 12 ft.	Hard bottom.	52, 53	.. 8 ft.	,,
20, 21	.. 10 ft.	,,	54, 55, 56	.. 12, ft.	,,
22	.. 11 ft.	Rough bottom.	57, 58	.. 10 ft.	,,
23	.. 12 ft.	,,	59, 60	.. 12 ft.	,,

EXHIBIT 75.

BORINGS BY MR. C. A. BANKS AT PROPOSED PERENIKI-JUNCTION CUT.

DEAR SIR,— Paeroa, 3rd June, 1910.

As instructed by you, I have to-day put down a borehole, 11 ft. deep and about 9 in. diameter, on the course of the proposed Pereniki-Junction cut, on the Ohinemuri River, at a point about 2 chains from Pereniki's Bend, with the following results:—

The first 6 in. was good dark soil; then came 4 ft. of brown and very sandy soil; and then 5 ft. 6 in. of very sandy clay. This makes a total depth of 10 ft., and at this point I came on to a stiff blue bog, into which I bored only 1 ft. Water was met with in the borehole at a depth of 6 ft. from surface.

I do not consider, taking into account the increased velocity of the water caused by additional fall, that this sandy class of soil would stand well on the banks of the proposed cut. Hoping this is all the information you require.

Yours, &c.,

P. N. Kingswell, Esq., Auckland. C. A. BANKS.

EXHIBIT 76.

PROPOSAL BY MR. P. N. KINGSWELL FOR CLEARING SILT FROM RIVERS

SIR,— Swanson Street, Auckland, 7th June, 1910.

As an effective remedy for clearing the Ohinemuri and Waihou Rivers of mining and river silt, I beg to submit the following proposals on behalf of the above company, which I trust will be favourably considered by your Commission:—

This company has now treated 32,800 tons of the coarse sands from their Waihi claims on the Ohinemuri River, and, as you are no doubt aware, are now erecting large works at Paeroa. These are to cost over £40,000, and will be capable of treating 500 tons per day, ground to all pass a 250-mesh screen, and should be in active operation within eighteen months from date.

This company would be quite prepared to double the capacity of the plant, at an estimated cost of £35,000, provided that the Government, or any local body, would advance this sum to this company, on the security of the whole of the plant and property, say, at 4½ per cent. interest per annum, repayable out of profits at the rate of £7,000 per year: and provided, further, that nothing is done as a remedial measure that is likely to wash away any of the coarse sand out of the Ohinemuri River, such as the killing of willows in that river, or interference with its present course in any way.

In addition to this and to work in conjunction with it, this company is prepared to enter into a contract for five or ten years, as may be agreed upon, with any local Board or authority for the dredging of the Waihou River anywhere between Netherton and a point five miles above the Junction, on the following terms and conditions:—

Company is to find all plant and material, such as dredges, barges, elevators, and everything necessary to dredge and deliver the material on to any site or hoppers on banks of river, both of which are to be provided by and at the cost of the Government or controlling body.

The material will be delivered into a chute at any height required, but not exceeding 20 ft. above water-level, and can then be conveyed either into hoppers or on to land as desired, at the cost of the controlling body. Such hoppers or sites must be so situated that the dredge will never at any time be more than one mile up stream from the nearest site or hopper. Controlling body must either take delivery at the elevation mentioned or provide sufficient storage to assure constant working of dredge.

The dredge will be capable of lifting any desired quantity from any depth not exceeding 25 ft. below water-level, but material to be lifted is to be similar in all respects to what is known as Waihou River sand, mining tailings, or slimes, down to main or original bottom.

As our system of dredging closely resembles that of suction, it is to be distinctly understood that we will not lift any material that will not pass a half-inch hole, or dredge in any place where, through snags or other material, a suction dredge could not efficiently operate, or where the alluvial deposit of silt or slime is not over 3 ft. in depth above original or main bottom of river.

For a five years' contract, and for any quantity up to 5,000 cubic yards per week, delivered as hereinbefore mentioned, the price to be 6d. per cubic yard; over 5,000 cubic yards per week and up to 10,000, 5d. per cubic yard; over 10,000 cubic yards per week, 4½d. per cubic yard.

At the end of five years the whole of the plant to be taken over by the controlling body at 40 per cent. below cost-price. For a ten-years contract all plant and material will be handed over free of cost to the controlling body, but prices per cubic yard to be the same as for five years.

Company is to have the right to separate and to treat any sands that may in their opinion be profitable or saleable.

As we have a dredge and most of the material on hand, we can undertake within four months to commence lifting 5,000 cubic yards per week, and within ten months 10,000 or more cubic yards per week if required.

We should, of course, be prepared to give any reasonable security for the due fulfilment of any contract that may be entered into. It is impossible in this to specify all conditions, and the whole offer is subject to a proper legal agreement being entered into, which we are prepared to do at any time. The controlling body would, of course, have to assist in every way possible, by acquiring rights over any land necessary for mooring or giving access to dredge, &c.

Yours, &c.,

P. N. Kingswell, Managing Director.

The Chairman, Ohinemuri River-silting Commission, Auckland.

EXHIBIT 77.

TONNAGES CRUSHED BY VARIOUS MINING COMPANIES IN OHINEMURI.

Summary of Total Tonnages crushed.

	Short Tons.
Waihi Gold-mining Company (Limited), 1896–1909	3,135,720
Waihi Grand Junction Company, 1906–9	155,985
Talisman Gold-mining Company, 1896–1909	407,361
New Zealand Crown Mines Company, 1891–1909	333,746
Komata Reefs Company, 1897–1908	156,335
Woodstock Gold-mining Company, 1896–99	27,583
Waitekauri Gold-mining Company, 1896–1904	148,895
Waihi-Silverton Gold-mining Company, 1897	7,707
Union-Waihi Gold-mining Company, 1901	19,418
Total	4,392,750

Statement showing Tonnages (Short Tons) crushed by various Companies.

Year.	Waihi Company.	Talisman Company.	Grand Junction Company.	Crown Company.	Komata Company.	Wood-stock Company.	Union-Waihi Company.	Waihi-Silverton Company.	Waite-kauri Comp'y.
1896 ..	38,539	313	..		..	1,352			2,606
1897 ..	45,658	3,765	..		3,285	4,480			15,165
1898 ..	87,280	8,528	..		2,390	8,812			23,346
1899 ..	114,667	10,824	..		4,170	12,939			23,518
1900 ..	125,453	11,014	..		..	..			26,198
1901 ..	178,444	13,762	..		8,660	..			25,606
1902 ..	201,023	19,474	..	1891 to 1909,	12,190	..	Nov., 1900, to	July, 1896, to	25,820
1903 ..	259,082	48,935	..	333,746	14,780	..	Sept., 1901,	June, 1897,	4,984
1904 ..	291,176	49,376	..		15,800	..	19,418	7,707	1,652
1905 ..	298,531	49,197	..		16,820	..			..
1906 ..	328,866	51,230	8,141		21,640	..			..
1907 ..	356,974	50,627	40,220		28,430	..			..
1908 ..	393,214	48,858	48,477		28,170	..			..
1909 ..	416,813	51,101	59,147		..	..			..

E. and O.E.

June 6, 1910.

Charles Rhodes.

EXHIBIT 78.

STATEMENT OF CAPITAL FOUND, DIVIDENDS PAID, AND EXPENDITURE BY MINING COMPANIES IN OHINEMURI COUNTY.

WAIHI GOLD-MINING COMPANY (LIMITED).

	£	£
Capital	495,907	
Premia on shares	84,582	
	580,489	
Bullion to December, 1908	7,220,624	
,, for 1909	960,000	
,, for five months, 1910	343,535	
		9,104,648
Less Dividends paid to 1st June, 1910	3,863,141	
Cash assets on hand,—		
December, 1908 £430,000		
Add for 1909 100,000		
	530,000	
		4,393,141
Estimated total expenditure by company on wages and machinery, &c.		£4,711,507

Amount expended on wages during last five years,—	
1905	210,789
1906	204,168
1907	213,806
1908	232,458
1909	222,191
	£1,093,412

Expended on revenue and capital for five years,—	Revenue. £	Capital. £
1905	282,963	65,565
1906	308,354	66,465
1907	304,539	85,323
1908	326,233	65,190
1909	337,175	74,273
	£1,559,264	356,816

1909 tonnage, 416,813, £960,000.
Men employed, say, 1,500, at Waihi.

CHAS. RHODES,
Local Director.

FIGURES OF COMPANIES OTHER THAN WAIHI AND TALISMAN GOLD-MINING COMPANIES.

	Expenditure. £	Dividends. £	Money found by Shareholders. £
Waitekauri to May, 1903	468,077	83,400	274,000
Woodstock, June, 1899	104,556	...	149,385
,, 1903	54,446	...	...
New Zealand Crown Mines, August, 1909	671,574	70,000	204,000
Ohinemuri, September, 1901	28,580	...	28,580
Union-Waihi, September, 1901	121,302	..	106,000
Komata Reefs, December, 1908	250,746	33,333	81,690
Grand Junction, December, 1908	394,108	...	...
,, 1909, and 1910 to 16th April	143,416	...	250,000
Waitekauri Union, July, 1897	3,764	...	3,764
Waitekauri Cross, December, 1897	6,259	...	6,259
Waihi-Silverton, June, 1899	35,000*	...	...
	31,666	...	63,000
New Zealand Jubilee, December, 1907	18,290	...	18,290
	£2,296,784	£186,733	£1,184,868
	35,000*		

6th June, 1910.

CHAS. RHODES.

* For property.

EXHIBIT 79.

PROPOSAL BY MR. W. G. MOUAT TO CLEAR THE RIVERS BY DREDGING, AND TO MAKE CUT AT PERENIKI'S BEND.

DEAR SIR,—

Karangahake, 4th June, 1910.

As an experienced dredgemaster and engineer, I beg to offer a few suggestions in connection with the silting of the Ohinemuri and Waihou Rivers which may be of some value to you. No better settling-ground could be found for silt than these two rivers, with their numerous sharp bends and their willow-bound banks. No one who has studied the willow and its effect on sand can doubt for a moment that they have priority in the holding of the accumulating deposits, as they send out numerous roots, higher and higher as the material accumulates around the trunk. Dredging is certainly the only method for removing this material, and a dredge could be procured at a very much less cost than many of your witnesses have estimated.

If the whole of the willows were removed, a cut dredged up the river, say, 120 ft. wide, and 6 ft. of the present accumulated silt removed, cutting the worst of the protruding banks, at the same time keeping as straight a course as possible, this would leave fewer facilities for the travelling silt to settle, and I am sure would be effective.

With reference to the proposed cut at Pereniki's Bend, I certainly think that this would be beneficial. A suitable dredge to carry out this work to advantage, and at a minimum cost, could be built at from £12,000 to £13,000, similar in design to the larger type of the gold-dredges now working, and fitted with elevators of such a design as to deliver the material dredged on to the banks of the river half a chain or more back, or in hoppers, if necessary, and capable of removing 160 cubic yards per hour.

After the dredge was supplied, the cost of dredging and delivering the material on to the banks would be about 6d. per cubic yard, including wear-and-tear, or £3,500 per mile of river, which would take about twelve weeks to get over.

The cut at Pereniki's Bend could be put through at about 5d. per cubic yard, or £100 per chain, assuming the width of the cut to be 111 ft., by 18 ft. deep.

If the material was simply dredged and delivered into punts, no elevators would be required, and the cost of a dredge would be very much less. The expense of dredging would also be less, and the material would probably be delivered into the punts at 4d. per cubic yard.

I do not think the extraction-works would in any way be a drawback; if anything they would assist the clearing of the river, as the tailings treated are practically of the coarser class.

The dredgings stacked by elevator along the river-banks would, in my opinion, form very effective stop-banks. These, if a mixture of clay, soil, and sand, would set firmly, as the material would be delivered from the elevators practically dry.

The planting of the much-abused willows at a distance beyond the stop-bank, as closely together as possible, would assist in the binding of the stop-bank, and at the same time prevent the sand from blowing all over the country.

If no further tailings were deposited in the river the trouble would be much the same as at present for many years to come, as so much has been already deposited that the rivers are much too shallow to carry the flood-waters without overflowing, and the overflow would carry the loose sand already lying along the banks over the adjoining country.

I have had a long experience in dredging and hydraulic engineering, and feel sure that if a course was dredged, as above suggested, which would clear the river-bed of willow-roots and other obstructions, further deposits would be reduced to a minimum.

Having to send the tailings to Waihi Beach by rail or otherwise would entail enormous expense, which would, no doubt, materially affect the mining industry in the locality.

I have, &c.,

Mr. W. Ferguson, Chairman, Royal Commission, Auckland. W. G. MOUAT.

EXHIBIT 80.

STATEMENT BY UNDER-SECRETARY FOR MINES OF GOLD DUTY AND GOLDFIELDS REVENUE, &c., PAID TO LOCAL BODIES.

RETURN OF GOLD DUTY AND GOLDFIELDS REVENUE PAID TO CERTAIN LOCAL BODIES FOR SEVERAL YEARS, ENDING 31ST MARCH, 1909.

Year.	Counties.						Boroughs.			
	Ohinemuri.		Piako.		Thames.		Thames.		Waihi.	
	Gold Duty.	Goldfields Revenue.	Gold Duty.	Goldfields Revenue.	Gold Duty.	Goldfields Revenue.	Gold Duty.	Goldfields Revenue.	Gold Duty.	Goldfields Revenue.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
1888	228 6 4	500 8 0	192 18 7	295 17 3	878 3 2	33 8 6	646 12 3	16 2 0	..	..
1889	241 8 7	331 18 0	92 14 5	454 12 6	1,072 14 8	104 10 0	1,158 8 9	20 18 0	..	..
1890	15 18 2	64 7 5	51 4 11	195 0 0	856 12 0	42 13 0	1,179 2 4	25 4 0	..	..
1891	998 8 2	217 16 7	88 19 1	203 4 0	1,134 19 0	30 5 0	1,028 17 1	20 18 0	..	..
1892	738 0 2	172 7 1	82 16 0	99 15 0	1,302 17 7	56 4 0	1,078 16 2	17 17 0	..	..
1893	1,448 9 2	52 2 3	63 11 5	45 4 6	1,138 9 1	15 0 0	557 10 7	1 19 0	..	..
1894	2,567 0 3	94 8 0	47 18 0	69 5 0	1,181 19 2	14 17 0	662 11 5	5 14 0	..	..
1895	3,206 12 7	61 5 0	39 13 2	11 10 0	926 12 7	11 17 6	674 2 11	1 0 0	..	..
1896	5,998 3 1	156 17 0	14 9 1	20 18 0	928 8 10	57 9 0	801 2 0	14 12 0	..	..
1897	5,610 17 5	13,627 10 7	5 9 11	562 7 9	427 19 5	195 3 6	570 15 7	1 10 0	..	..
1898	8,018 6 9	1,722 11 4	16 0 0	9 17 6	394 0 6	96 6 0	373 9 5	5 1 0	..	..
1899	12,637 1 1	319 12 0	8 18 7	..	608 11 9	63 6 0	462 5 6	2 13 0	..	..
1900	13,804 4 8	339 3 0	24 5 11	0 5 0	977 19 3	102 3 0	594 13 5	3 7 0	..	..
1901	12,755 0 7	4,413 0 3	102 17 0	33 4 2	102 17 0	1,135 16 9	749 2 5	85 19 8	..	..
1902	16,201 1 6	3,611 0 10	56 14 7	80 6 11	832 7 6	707 2 5	548 3 4	55 8 1	804 6 0	..
1903	4,345 12 9	2,858 13 8	23 9 4	18 13 10	1,308 2 8	1,254 16 7	511 4 8	88 9 8	952 8 10	1,179 14 5
1904	5,579 7 1	2,048 12 10	112 19 1	21 17 7	977 15 7	1,189 10 1	357 11 2	140 8 6	21,038 2 4	1,498 19 11
1905	4,133 14 7	2,498 18 2	23 9 0	49 2 8	371 4 9	893 15 4	190 0 3	54 14 7	16,423 14 1	771 1 6
1906	5,689 6 3	2,222 5 6	58 4 3	98 18 10	614 13 8	1,141 16 10	1,369 2 2	77 5 7	15,794 14 3	1,641 2 7
1907	5,736 10 7	2,252 14 8	26 17 0	91 3 5	760 10 6	1,145 19 6	6,113 14 9	105 10 6	16,757 2 0	1,695 12 8
1908	7,447 12 11	2,871 0 9	1 16 0	165 12 5	685 7 9	907 15 2	3,911 12 7	89 6 10	19,674 12 1	1,591 11 10
1909	6,497 0 8	2,498 6 9	..	248 14 6	463 5 6	972 5 4	697 19 11	85 5 0	20,775 17 2	1,553 14 9
Totals	123,898 3 4	42,934 19 8	1,135 5 4	2,775 10 10	17,945 11 11	10,172 0 0	24,236 18 8	919 3 5	112,220 16 9	9,931 17 8

Statement of Amounts paid out of Mines Department Vote.

Year.	Counties.											
	Thames.			Ohinemuri.			Piako.					
	Subsidies.	Grants.	Prospecting.	Subsidies.	Grants.	Prospecting.	Subsidies.	Grants.	Prospecting.			
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.			
1895	47 7 6	1,658 13 10	51 12 6	549 19 10	734 5 6	25 0 0	..	..	..			
1896	50 0 0	1,278 4 8	98 2 8	22 5 0	972 8 0	..	..	2,084 17 3	..			
1897	524 4 9	1,044 13 3	..	1,106 5 1	891 13 4	..	..	924 5 10	..			
1898	104 4 6	3,503 14 2	..	516 7 2	1,621 11 11	..	145 0 0	1,764 16 10	5 12 6			
1899	39 2 0	3,410 12 9	..	894 2 7	3,374 18 2	..	175 0 0	..	..			
1900	..	2,209 9 4	..	58 6 3	2,174 1 6	..	237 0 0	425 0 0	..			
1901	100 18 6	4,098 18 2	..	51 15 0	1,637 14 11	1 4 0	290 0 0	275 0 0	..			
1902	147 9 0	2,197 16 5	74 0 10	391 7 6	4,679 4 3	..	210 0 0	58 0 0	..			
1903	..	4,047 19 6	39 9 10	283 10 0	3,190 4 5	16 0 0	..	105 0 0	..			
1904	100 0 0	2,572 5 6	304 0 0	..	2,889 12 7	23 0 0	75 0 0	..	..			
1905	..	1,759 1 0	967 11 1	..	1,152 19 8	..	100 0 0	..	..			
1906	..	2,940 17 2	..	15 5 6	1,654 10 6	411 13 6	..	..	..			
1907	25 0 0	1,450 2 2	26 8 0	..	1,628 11 6	51 0 3	..	..	..			
1908	465 5 6	2,710 6 2	..	..	1,599 11 0	87 5 4	..	..	..			
1909	..	3,838 5 0	..	..	5,230 7 1	196 17 0	..	..	..			
1910	..	5,645 7 10	..	..	5,081 14 5	432 4 8	..	116 7 6	..			
Totals..	1,603 11 9	44,366 6 11	1,561 4 11	3,889 3 11	38,513 8 9	1,244 4 9	1,232 0 0	5,753 7 5	5 12 6			

EXHIBIT 81.

REVENUE OF WAIHI BOROUGH FOR YEARS 1903–9.

STATEMENT PUT IN BY MR. COTTER, COUNSEL FOR THE OHINEMURI COUNTY COUNCIL.

Year.	Gold Duty.	Goldfields Revenue.	Rates.	Total Revenue.	Mayor's Salary.
	£	£	£	£	£
1903	8,304	1,165	200	10,044	350
1904	20,173	1,483	380	22,843	200
1905	16,769	727	479	18,613	150
1906	15,509	1,591	634	18,358	200
1907	15,819	1,658	812	19,834	150
1908	19,026	1,564	839	20,088	150
1909	23,147	1,518	829	26,226	150
	118,747	9,706	4,173	136,006	..

EXHIBIT 82.

ANALYSES OF DETRITUS FROM WAIHOU RIVER, AND DEDUCTIONS FROM SAME, BY W. H. BAKER, B.Sc.

Thames School of Mines, Thames, 7th June, 1910.

SIR,—

In accordance with your wish, I am forwarding the results of assays and grading tests made by me of the portion of the Ohinemuri and Waihou Rivers near their junction. I have also taken the liberty of adding my deductions on the samples.

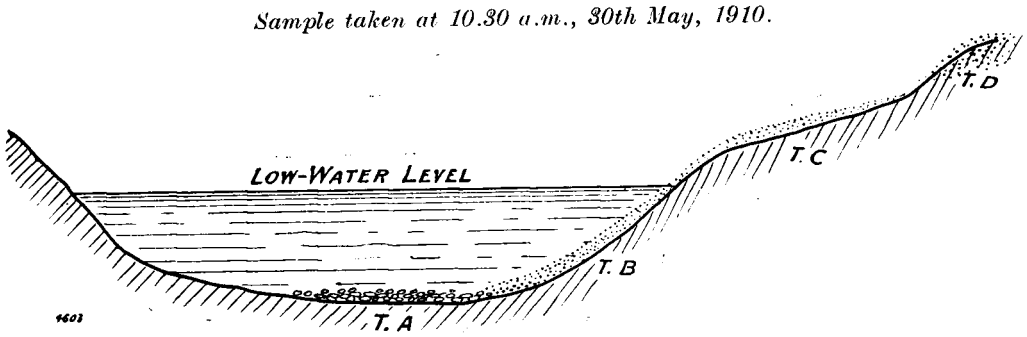
I am, &c.,

W. H. BAKER.

The Chairman, River-silting Commission, Auckland.

CROSS-SECTION OF WAIHOU RIVER AT THORP'S, NEAR PUKE

Sample taken at 10.30 a.m., 30th May, 1910.



DIAGRAMMATIC CROSS-SECTION OF WAIHOU RIVER AT THORP'S, NEAR PUKE, LOOKING DOWN-STREAM.

T.A. Midstream. River-gravels, chiefly pumice, with coarse sands derived from rhyolitic rock. Very little battery sand.

T.B. Under water 6 ft. from water's edge and at depth of 5 ft. In appearance essentially battery sand. Contained small amount of slime.

T.C. Between low- and high-water marks, about 18 in. above low-water level, and for distance of 30 yards. Obviously battery sands and slimes. Contained much slime.

T.D. Above high-water mark. Evidently flood-deposit. Semi-plastic mass of sand and slimes.

Grading and Assay Tests.

Sample T.A.

Mesh per Inch (Linear).	Per Cent.	Assay Value per Ton. Gold. Gr.	Silver. Dwt.
+ 30 ..	90·8 ..	Trace ..	Trace.
— 30 + 60 ..	7·8 ..	Trace ..	1
— 60 + 90 ..	0·6 ..	18 ..	20
— 90 ..	0·8		

Sample T.B.

+ 30 ..	0·4 ..	.. ..	..
— 30 + 60 ..	11·6 ..	4 ..	2½
— 60 + 90 ..	74·4 ..	27 ..	20
— 90 + 150 ..	10·2 ..	29 ..	21
— 150 ..	3·4 ..	.. ..	..

Grading and Assay Tests.—continued.

Sample T.C.

Mesh per Inch (Linear).	Per Cent.	Assay Value per Ton. Gold. Gr.	Silver. Dwt.
+ 30	0·01	..	..
— 30 + 60	2·4	..	..
— 60 + 90	36·5	30	20
— 90 + 150	18·9	30	20
— 150	42·2	29	24

Sample T.D.

+ 30	0·0	..	..
— 30 + 60	0·5	..	..
— 60 + 90	9·4	..	..
— 90 + 150	8·7	18	38
— 150	81·4	36	40

Conclusions obtained from this Cross-section.

Where the river has its greatest velocity it is impossible for the battery slimes to co-exist to any appreciable extent with the coarser detritus. Where the velocity is decreased either by widening of the bed, by formation of backwater, by meeting deflecting points, or by the natural tendency of decreased velocity near its banks, a deposit of sands and slimes will take place in accordance with the principle of "equal falling particles." There will therefore be a natural grading of the river detritus from the coarse in the midstream to the finest on the banks.

SAMPLE No. 3 (PERENIKI'S BEND, RIGHT BANK).

Sample taken at 8.30 a.m., 30th May, 1910.

Sample obtained by tailings-sampler for a depth of 18 in., along a line extending 2 chains, at a height of 6 ft. above low-water level.

Mesh per Inch (Linear).	Per Cent.	Assay Value per Ton. Gold. Gr.	Silver. Dwt.
+ 30	0·04	..	..
— 30 + 60	6·63	48	25
— 60 + 90	38·73	33	17½
— 90 + 150	15·80	31	18½
— 150	38·80	27	19½

The sample consisted of angular particles of sand with very little clayey material; obviously battery-product.

This sample shows that, although one-third is practically—that is, from a battery-man's point of view—in the form of slime, yet this slime will deposit in a backwater, and, by filling the interstices between the larger angular fragments, tend to prevent scour of the resulting mixture.

SAMPLE No. 19.

Sample taken at 11.30 a.m., 30th May, 1910.

Taken from river-bank two miles below Puke, for a depth of 5 in. along a line extending 2 chains.

Semi-plastic material.

Practically all, with the exception of a little vegetable matter and 0·5 per cent. of + 60 sand, passed through the 150-mesh.

Assay value, 21 gr. gold, 26 dwt. silver.

Conclusions derived from Samples Nos. 3 and 19.

In time of flood coarse and fine sands are transported together; but the water, being overloaded with suspended matter, has not time to sort the material into grades, so that when velocity is reduced a mixture of the grades is deposited as a bank or bar. Some of the material is, however, sorted, and the finer material only is carried down-stream.

From these two tests, taken in conjunction with tests made at Wharepoa, Turua, and mouth of Thames River for the Thames County Council and Harbour Board, there is no doubt that there is a grading in longitudinal section similar to that shown in the accompanying cross-section. On account, however, of bends and varying velocities of the river, it is not possible to obtain an ideal longitudinal section.

SAMPLE No. 22.

Sample taken at Midday, 30th May, 1910.

Swept from bed of Ohinemuri River, 1½ chains above the junction of the two rivers.

Mesh per Inch (Linear).	Per Cent.	Assay Value per Ton. Gold. Gr.	Silver. Dwt.
+ 30	0·1	..	..
— 30 + 60	3·2	10	7
— 60 + 90	86·3	34	23
— 90 + 150	6·0	38	28
— 150	4·4	42	37

This sample consists essentially of battery sands, probably derived from the erosion of the huge deposit at Pereniki's Bend.

The velocity of the current is not great enough to sweep the − 60 + 90 particles into the main river, but appears sufficiently strong to give them a rolling motion along the bottom, whereby they ultimately join the main stream. When the Waihou water joins the Ohinemuri the velocity increases sufficiently to carry these particles in suspension in the midstream, and then deposits them in places of decreased velocity at the sides.

Samples taken of river-gravels in the bed of the Waihou, one mile above the Junction; in the bed of the Waihou at Thorp's, near Puke; at a point two miles below Puke; and samples graded from material in river-bed at Turua and mouth of Thames River, prove that the coarse natural detrital matter carries practically no bullion. This material is obviously derived from the country rock in the watershed; but, as the finest material taken from the river-banks invariably shows bullion in appreciable quantities, it is evident that the source of some of the fine material is not the same as that of the coarse. In my opinion, the only possible source of the bullion is the residue from the treatment plants of the Ohinemuri Goldfield.

With regard to the Waihi Mine, the ore consists chiefly of quartz, and after crushing even to a 200-mesh the quartz will retain its crystalline character, and deposit in favourable localities. All crystalline particles, or any particles not in a colloidal state, will tend to sink in still water at a rate depending directly on their mass and inversely on their surface. But, as the mass is a function of the cube, and the surface is a function of the square of the linear dimension, the rate of sinking will directly depend on the size of the particle, assuming, of course, the same composition.

The smaller particles therefore take longer to sink, and accordingly are acted on for a longer time by the current, and are thus transported further than the larger. Their ultimate arrest will depend on meeting still water for a period which will be short in shallow and longer in deep water.

With regard to colloids present, a certain amount of quartz in all reefs is of the amorphous variety, and in mining operations a certain amount of country rock containing kaolin is necessarily crushed with the quartz. This material may be mechanically entangled with a certain amount of quartz, and this gives rise to the erroneous idea that because a certain amount remains in suspension the whole of the − 200 material is doing so or will do so. It is evident that the greater part of this material will deposit near the banks of the river, and part will be distributed over the estuary at the mouth of the Thames. If a system of dredging and easing of banks is resorted to, it would improve the navigation of the river and decrease the liability to flooding, but would also lead to the formation of shoals and bars near the mouth of the river, and to further shoaling at the Thames Wharf. If, however, the dredging operations were intended for the length of the river and included the Thames Wharf, the silt-deposit would cause little damage.

W. H. Baker, B.Sc., Director.

EXHIBIT 83.

STATEMENT BY MR. E. F. ADAMS AS TO LIFE-HISTORY OF PARTICLES IN MIDSTREAM.

Travel of Float on Waihou River, Midstream Current, from Ohinemuri Junction to Firth of Thames.

		Total Miles.
1st hour's travel,	¾ mile on ebb	¾
2nd „	1¼ miles „	2
3rd „	1½ „ „	3½
4th „	1½ „ „	5
5th „	1¾ „ „	6¾
6th „	2 „ „	8¾
7th „	2 „ „ (Hikutaia)	10¾
7½ „	¾ mile „ (meeting flood)	11½
8th „	Nil; on flood	11½
9th „	½ mile on flood	11
10th „	1½ miles „	9½
11th „	1¾ „ „	7¾
12th „	¼ mile (meeting ebb)	7½
13th „	½ „ on ebb	8
14th „	1¾ miles „	9¾
15th „	2¼ „ „ (passing Hikutaia)	12
16th „	2¼ „ „	14¼
17th „	2½ „ „	16½
18th „	2¼ „ „	18¾
19th „	1½ „ „ (within 2¼ miles of Kopu)	20¼
20th „	Nil; on ebb and flood	20¼
21st „	1 mile on flood	19¼
22nd „	1½ miles „	17¾
23rd „	2¼ „ „	15½
24th „	Nil; flood meeting ebb	15½

STATEMENT BY MR. E. F. ADAMS AS TO LIFE-HISTORY OF PARTICLES IN MIDSTREAM—*continued*.

TRAVEL OF FLOAT ON WAIHOU RIVER, MIDSTREAM CURRENT, FROM OHINEMURI JUNCTION TO FIRTH OF THAMES—*continued*.

		Total Miles.
25th hour's travel,	1 mile on ebb	
26th ,,	2¼ miles ,,	16½
27th ,,	2¾ ,, ,,	18¾
28th ,,	2½ ,, ,, (passing Kopu)	21½
29th ,,	2 ,, ,, ,, (three-quarters of a mile outside fairway buoy)	24
30th ,,	2 miles out, 1 mile in (meets rising tide)	26
31st ,,	1¼ miles on flood	27
32nd ,,	1½ ,, ,,	25¾
33rd ,,	2¼ ,, ,, (passing Kopu)	24¼
34th ,,	1½ ,, ,,	22
35th ,,	Meets ebb	20½
36th ,,	½ mile on ebb	20½
37th ,,	2¼ miles ,, (passing Kopu)	21
38th ,,	2¼ ,, ,, (one-quarter of a mile beyond fairway buoy)	23¼
		25½

E. F. ADAMS,
Surveyor and Mining Engineer, Thames.

EXHIBIT 84.

LETTER FROM MR. E. G. B. MOSS RELATIVE TO ALLOCATION OF GOLD DUTY, AND COMMENTS BY "OHINEMURI GAZETTE" AS TO UPKEEP OF MAIN ROAD.

CLEARING THE RIVER.—THE GOLD DUTIES ACT.

SIR,— [To the Editor of the *Ohinemuri Gazette*.]

On all sides in Auckland one can hear expressions of sympathy for Paeroa in its misfortune, and I need not say after the many happy years I spent in Paeroa how deeply I regret the discomfort and misfortune that Wednesday's flood has brought you. I trust, however, that the Commission which is to be appointed will be of some benefit.

The work of clearing the Ohinemuri River of tailings has a very strong claim on the Gold Duties Act, passed originally in 1903. The original Bill introduced by the Hon. James McGowan provided for the Government having power by Order in Council to divide the gold duty. This arbitrary power was strongly opposed when the Bill was in Committee, as giving the Government too great opportunities for bribing or penalizing any one portion of the electorate. Subsequently the Bill was amended in the House, and passed so that the division be on the recommendation of the Warden after the various local bodies had had an opportunity of stating their case before him. I tried on several occasions to get the Government to authorize the Warden to hold an inquiry and divide the gold duty, but failed. Mr. McGowan, the then Minister of Mines, would not consent unless the farmers first rated themselves. When the Bill was in Committee, and also when the Bill was passing through the House, I emphasized the fairness of using the gold duty, in part at all events, in mitigating the damage caused to the farming community in the winning of that duty. This argument appealed to a number of country members representing farming electorates in various parts of New Zealand, and materially helped in getting the Bill passed.

I pointed out then, and still wish to urge you to bring before the Commission, the importance of making an overflow channel from the Railway Wharf to the Junction. Even as far back as ten years ago the big bend in the river between the Railway Wharf and the Junction was rapidly being filled up by the silt, and the willows were still more rapidly blocking the channel and retarding the flow of the water. I need not detail the many efforts made by me to endeavour to persuade the Government to obtain other reports than Mr. Perham's and to authorize the Warden to hold an inquiry to allocate the gold duty, as these facts are well known to the many Paeroa residents who spent time and money without stint in assisting me in my endeavours to show the authorities the necessity and fairness of doing both these things.

Mr. McGowan's repeated refusal to authorize the Warden to hold an inquiry unless the farmers were prepared to rate themselves was a distinct admission that the farmers had some claim on the gold duty.

I am, &c.,
Auckland, 2nd April, 1910. E. G. B. MOSS.

THE MAIN ROAD.

The damage caused to the main Paeroa–Waihi Road by the recent flood must necessarily bring into prominence the question as to the payment of the cost of repairing and maintaining this road. It will be remembered that for some time the Waihi Borough had to pay to the Ohinemuri County two-thirds of the cost of maintaining the road, up to a certain amount per annum. This arrangement continued for some years, until the Waihi Borough Council—doubtless wanting all its enormous gold revenue for luxuries in the Township of Waihi—made application for amendment of the award under which Waihi contributed towards the maintenance of the Paeroa–Waihi Road. The question was reopened, with the result that the Commissioner appointed to go into the matter decided that it was not equitable that Waihi should pay anything towards the cost of this road. In our own opinion this decision was entirely wrong, but as apparently there was no appeal from the decision

of the Commissioner the matter was allowed to drop. But now an entirely fresh set of circumstances has arisen. The road has been washed away, and the cost of repairing it is going to run into thousands of pounds. The chief users of this road are the carters to Waihi, and during the time the railway service was suspended owing to the flood Waihi people who wanted goods from the outside world had to have them carted over this road or go without. Moreover, Waikino, although an important part of the county, produces but little county revenue, although the Waihi Gold-mining Company's big reduction-works are situated in the Waikino Township. There is, of course, no reason why the Waikino residents should not be just as free from rates as those who live in Waihi, seeing that both are to a very great extent dependent on and working for the Waihi Gold-mining Company, from which company comes most of the gold revenue that provides the lucky Waihi people with all sorts of luxuries at no cost to themselves. But the point is this: the whole of the traffic from Karangahake to Waihi, and a great part of the traffic from Paeroa to Karangahake, is in connection (directly or indirectly) with the mining operations at Waihi, and it is only right that portion of the gold revenue resulting from those mining operations should be spent in maintaining the main Paeroa–Waihi Road. Municipal gasworks, municipal bowling-greens, subsidies to municipal bands, fine footpaths, and so on are very desirable no doubt, but when it comes to a question of deciding between these and similar luxuries and the question of paying for necessities such as a main road to the outside world, the people of Waihi should see that they ought, morally at least, to contribute towards the maintenance of that road. If Waihi people will not be reasonable, the County Council will have to take such steps as will bring it home to them that the county has not the money nor the inclination to spend the greater part of its revenue in maintaining a road that is for the benefit of an industry from which nearly all the revenue is spent elsewhere. Doubtless this matter will be discussed at the meeting of the Ohinemuri County Council to-morrow, and the decision of that body will be awaited with interest.

EXHIBIT 85.

REVENUE OF OHINEMURI COUNTY FOR YEARS 1906–10.

—	31st March, 1906.	31st March, 1907.	31st March, 1908.	31st March, 1909.	31st March, 1910.
Goldfields Revenue and Gold Duty received by the Ohinemuri County Council.					
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Goldfields revenue ..	2,044 5 10	2,737 12 7	2,751 18 9	2,449 12 9	2,449 0 10
Gold duty	5,254 0 3	5,466 9 7	7,197 14 7	6,996 15 9	5,953 9 0
Government Grants received by the Ohinemuri County Council.					
..	1,563 11 11	1,785 14 3	1,634 14 0	7,278 1 10	8,124 7 3
General Rates received by the Ohinemuri County Council.					
..	499 1 0	801 5 1	795 11 5	556 13 3	1,599 2 11
Aid to Prospecting.—Amount paid out of County Fund during the Years ending as above.					
..	344 15 0	61 0 9	52 19 0	269 0 6	389 9 4

EXHIBIT 86.

LANDS HELD BY EUROPEANS, NATIVES, AND THE CROWN IN OHINEMURI COUNTY.

PARTICULARS OF NATIVE AND CROWN LANDS IN THE COUNTY OF OHINEMURI (NOT INCLUDING CROWN LANDS WITHIN THE GOLDFIELDS AREA).

Rateable Lands.—Native lands occupied by Europeans, 6,266 acres 2 roods 33 perches; occupied Crown lands, 14,738 acres and 23 perches.

Land held and occupied by Natives, upon which rates can only be enforced with consent of Native Minister, 22,042 acres and 14 perches.

Non-rateable Lands.—Unoccupied Crown lands, 95,093 acres and 12 perches.

Native Lands.

On East Side of Waihou.—Held and occupied by Natives, 2,285 acres 2 roods 6 perches; owned by Natives and occupied by Europeans, 1,564 acres 3 roods 15 perches.

On West Side of Waihou.—Held and occupied by Natives, 19,756 acres 2 roods 8 perches; owned by Natives and occupied by Europeans, 4,701 acres 3 roods 18 perches.

Occupied Crown Lands.

On western side of Waihou River, 401 acres 3 roods 9 perches; on western side of Piako River (near the foothills), 14,336 acres 1 rood 14 perches.

The greater portion of the land on the western side of the Piako River is rateable this year for the first time, being held under leases which exempt from rating for a fixed number of years.

EXHIBIT 88.

MUNICIPAL ACCOUNTS OF THE WAIHI BOROUGH FOR FINANCIAL YEARS 1903–9.

WAIHI BOROUGH COUNCIL.—BALANCE-SHEET OF THE DISTRICT FUND ACCOUNT FOR THE YEAR ENDING THE 31ST MARCH, 1903.

I. GENERAL ACCOUNT.

Receipts.			£ s. d.
Rates, general			200 17 7
License fees,—			
Publicans	£165 0 0		
Auctioneers	10 0 0		
Vehicles	21 16 0		
Drivers	2 5 0		
Kerosene	4 0 0		
Billiard-saloon	1 0 0		
Slaughterhouse	1 0 0		
Building permit	0 5 0		
			205 6 0
Gold duty on account			8,304 6 0
Goldfields revenue			1,165 3 11
Fees and fines, per Court			22 19 6
Dog-registration			115 7 6
Forfeited deposit, Mayoral election			10 0 0
Sale of electoral rolls			4 14 0
Sale of by-laws			0 13 0
Private crossings			6 14 9
Water-supply service			3 13 6
Driving-fees from pound			1 14 0
Donation for library			1 0 0
Miscellaneous receipts			1 16 1
Balance, 31st March, 1903			4,424 8 10
			£14,468 14 8

Expenditure.			£ s. d.
Administration,—			
Salaries	£628 5 1		
Mayor's honorarium	350 0 0		
Legal expenses	218 5 6		
Printing and advertising	206 3 5		
Travelling-expenses	258 13 6		
			1,661 7 6
Miscellaneous,—			
Rent	£28 11 6		
Petty cash	55 0 0		
Government valuation roll	40 0 0		
Accident insurance	42 10 0		
Stationery	37 14 11		
Election expenses	161 8 0		
Interest on overdraft and bank charges	47 4 0		
Expenses *re* financial adjustment with county	18 7 0		
			430 15 5
Public works,—			
Roads and footpaths—			
Day-labour			5,197 10 8
Breaking metal			1,013 9 8
Carting			1,775 3 2
Timber and material			1,612 19 6
Metal			982 10 8
Permanent levels			135 0 0
Bridges			31 2 6
Report on waterworks			25 0 0
Report on drainage			15 0 0
Report on gasworks			10 10 0
Report on electric light			10 10 0
Plans and surveys			55 2 6
Plans of abattoir			14 14 7
Water-supply service			43 5 5
Watering streets			7 2 4
Prevention of fire,—			
Subsidy to brigade	£50 0 0		
Material and appliances	88 12 6		
Turn-outs to fires	3 18 6		
Rent of station-site	1 10 0		
Watchman	9 11 0		
Premium design for station	5 5 0		
			158 17 0
Hospital and charitable aid,—			
Thames Hospital	£72 7 6		
Thames Charitable Aid Board	86 0 6		
			158 8 0
Waihi School of Mines			100 0 0
Waihi Public Library			79 12 0
Waihi rifle range			5 0 0
Section 159, Municipal Corporations Act, 1900,—			
Peace celebrations	£13 18 8		
Waikino Public Library	10 0 0		
			23 18 8
Local Authorities Indemnity Act, 1902,—			
Coronation celebrations—			
Children's treat	£50 0 0		
Recreation-ground	13 10 6		
Expenses laying Hospital foundation-stone	36 13 3		
Waihi Hospital	63 6 9		
			163 10 6
Dog-registration			26 6 9
Donation received and paid to library			1 0 0
Driving-fees to Cattle Ranger			1 14 0
Horse-feed			5 18 9
Plant and appliances,—			
Water-cart	£20 15 0		
Fire-bell	47 6 7		
Lamp-posts	84 14 6		
Footpath-roller	17 2 6		
			169 18 7
Office furniture and fittings			18 16 5
Landed property,—			
Hazard Street	£148 0 0		
Moresby Avenue	130 0 0		
			278 0 0
Expenditure on Paeroa–Waihi Main Road, section 218, Municipal Corporations Act, 1900	£98 18 11		
On behalf of Ohinemuri County Council (to be refunded)	139 17 4		
			238 16 3
Miscellaneous expenditure			17 13 10
			£14,468 14 8

II. Separate Accounts.

Contractors' Deposits Accounts.

	£ s. d.		£ s. d.
Deposits received	19 0 0	Deposits refunded	9 0 0
		Balance, 31st March, 1903	10 0 0
	£19 0 0		£19 0 0

Statement of Balances, 31st March, 1903.

	£ s. d.		£ s. d.
General Account, Dr.	4,424 8 10	National Bank of New Zealand,—	
Contractors' deposits accounts, Cr. ..	10 0 0	No. 2 Account, Dr.	4,747 0 2
		No. 1 Account, Cr.	470 0 3
			4,276 19 11
		Unpresented cheques	137 8 11
Dr.	£4,414 8 10		£4,414 8 10

Statement of Assets and Liabilities at 31st March, 1903.

Assets.	£ s. d.	*Liabilities.*	£ s. d.
General rate outstanding	211 6 7	Balance, No. 2 Bank Account	4,747 0 2
Government subsidy on rate	50 4 4	Unpresented cheques	137 8 11
Balance at credit, No. 1 Bank Account ..	470 0 3	Accounts and wages	176 11 4
Gold duty	5,769 10 10	Contractors' deposits	10 0 0
Goldfields revenue	129 6 2	Liability to Ohinemuri County Council under award, as per *Gazette* No. 20, 19th March, 1903,—	
Coronation subsidy	81 15 3	Borough's share of excess of county's liabilities over assets, 31st March, 1902 £1,594 19 1	
Expenditure on Paeroa–Waihi Main Road to be refunded by Ohinemuri County Council	139 17 4	Six-per-cent. interest to date 95 14 0	
Rates collected by Ohinemuri County Council under award	94 14 8	Interest paid by county 23 3 10	
		Proportion of maintenance, Paeroa–Waihi Main Road 4,455 12 8	
			6,169 9 7
		Cost of award	44 9 8
	£6,946 15 5		£11,284 19 8

Real Property.	£ s. d.	*Estimated Assets.*	£ s. d.
Fire-brigade Station	320 0 0	Borough Office	100 0 0
Section 6, Moresby Avenue	130 0 0	Part Section 31, Haszard Street ..	200 0 0
Section Part 20, Haszard Street	148 0 0	Office furniture	20 0 0
Reserve, Toomey Street	60 0 0	Fire-brigade appliances	200 0 0
Waihi Water-supply Reserve	110 0 0	Water-supply works	300 0 0
Abattoir Reserve	150 0 0	Pound	50 0 0
Silverton Quarry Reserve	..	Stable and tool-shed	50 0 0
Tauranga Road Quarry Reserve	..	Plant and appliances	170 0 0
Pound Quarry Reserve	..	Metal on hand	150 0 0
Waitete Quarry Reserve	..		
Reserve, Mitchell Street	..		
	£918 0 0		£1,240 0 0

Statement of the Public Debt of the Borough of Waihi on the 31st March, 1903.

Portion of Inscribed Loan of £1,348 9*s.* 10*d. to Ohinemuri County Council under the Government Loans to Local Bodies Act*, 1886.

	£ s. d.
Amount allocated to Waihi Borough Council in financial adjustment (*New Zealand Gazette* No. 20, 19th March, 1903); at 4½ per cent. per annum, £23 3s. 10d. for interest and sinking fund	515 7 4

Statement of Reserves and other Real Estate under Regulation 26.

Part Section 20, Haszard Street, 37 ft. by 66 ft., Fire-brigade Station site.
Part Section 6, Moresby Avenue, 50 ft. by 66 ft.
Part Section 31, Haszard Street, Borough Office site.
Abattoir and Pound Reserve, 50 acres, Waitete Creek.
Water-supply Reserve, 215 acres, Mangatoitoi Creek.
Mitchell Street Reserve.
Toomey Street Reserve.
Quarry Reserve, Waitete Creek, 5a. 2r. 23p.
Pound Quarry Reserve, 3a. 3r. 29p.
Silverton Quarry Reserve, 5a. 3r. 30p.
Tauranga Road Quarry Reserve, 3a. 3r.

H. D. Morpeth,
Town Clerk and Treasurer.

Examined and found correct.—J. K. Warburton, Controller and Auditor-General.

Waihi Borough Council.—Balance-sheet of the District Fund Account for the Year ending the 31st March, 1904.

I. General Account.

Receipts.	£ s. d.	£ s. d.
General rate, 1902–3	111 2 9	
,, 1903–4	259 2 9	
Additional 10 per cent. on overdue rates	10 9 3	
Government subsidy on general rates	103 12 10	
License fees,—		
Publicans £164 10 0		
Auctioneers 20 0 0		
Vehicles 14 10 0		
Drivers 1 2 6		
Kerosene 13 0 0		
Billiard-saloons 3 0 0		
Public buildings 12 10 0		
Slaughterhouses 1 10 0		
Building-permits 0 15 0		
	230 17 6	
Gold duty	20,173 10 4	
Goldfields revenue	1,483 12 1	
Fees and fines, per Courts	49 18 0	
Subsidy on expenditure *re* coronation	81 15 3	
Poundage fees	9 16 0	
Dog-registration	34 2 6	
Sale of by-laws	0 11 0	
Sale of electoral rolls	3 16 0	
Private crossings	25 4 0	
Refund from Ohinemuri County under Dr. Giles's award	265 12 3	
Balance, 31st March, 1904	5,717 2 4	
	£28,560 4 10	

Expenditure.	£ s. d.	£ s. d.
Balance, 1st April, 1903		4,424 8 10
Administration,—		
Salaries £944 11 8		
Mayor's honorarium 200 0 0		
Legal expenses 125 15 5		
Travelling-expenses 252 16 6		
	1,523 3 7	
Miscellaneous,—		
Stationery £24 13 1		
Printing and advertising 103 5 9		
Petty cash 32 15 10		
Interest on overdraft and bank charges 297 18 6		
Government valuations 7 19 0		
Election expenses 80 8 3		
Rent 22 18 6		
Horse-feed 29 6 2		
Plans and surveys 5 6 0		
Accident insurance 96 1 4		
Special report on electric light 38 14 8		
Audit fee 13 13 4		
Licensing expenses—		
Tauranga County 22 10 6		
Ohinemuri County 5 6 1		
	780 17 0	
Sanitation	54 17 4	
Public works—Roads and footpaths,—		
Day-labour £3,619 19 4		
Metal 1,182 1 3		
Breaking metal 1,181 15 5		
Timber 835 2 10		
Carting 2,151 17 4		
Material and tools 190 16 10		
Co-operative labour 242 14 3		
Tar 55 12 5		
Permanent levels 96 1 6		
	9,556 1 2	
Public reserves	40 0 11	
Music Hall	45 17 6	
Water-service	76 11 3	
Lighting streets	223 14 6	
Prevention of fire,—		
Subsidy to brigade £75 0 0		
Turn-outs to fires 9 19 6		
Brigade appliances 12 4 11		
Fire-brigade Station 377 15 2		
	474 19 7	
Dog-registration	15 6 9	
Subsidies,—		
Waihi School of Mines	100 0 0	
Public Library	100 0 0	
District Hospital, Waihi	750 0 0	
Bowentown landing-shed, Katikati Road Board (section 45, Municipal Corporations Act, 1900)	15 0 0	
Section 159, Municipal Corporations Act, 1900: Grant to Waihi Cemetery Trustees	25 0 0	
Charitable aid	6 15 11	
Water-conservation reserve	65 8 8	
Payment under award (*Gazette* No. 20, 19th March, 1903), Ohinemuri County Council,—		
Maintenance Paeroa–Waihi Main Road £8,119 15 11		
Share of overdraft, &c. 1,711 7 4		
Half-share cost Dr. Giles's arbitration 15 3 1		
Interest on Government loan 46 7 8		
	9,892 14 0	
Treasury, half cost of award	44 14 10	
Maintenance Paeroa – Waihi Main Road (section 218 of Municipal Corporations Act, 1900)	180 15 7	
Office furniture	133 4 0	
Miscellaneous	30 13 5	
	£28,560 4 10	

II. Separate Accounts.

1. *Deposit Accounts.*

	£ s. d.		£ s. d.
Balance, 1st April, 1903	10 0 0	Deposits refunded	26 0 0
Deposits on contracts	195 0 0	Balance, 31st March, 1904	179 0 0
	£205 0 0		£205 0 0

2. *Loan of £15,000 over the whole District, under the Local Bodies' Loans Act, 1900, and Local Bodies' (Goldfields) Public Works and Loans Act, 1901, for Construction of Waterworks. £10,000 raised.*

	£ s. d.		£ s. d.
Advance from Treasury on account of loan	10,000 0 0	Pipes and material	342 19 11
		Labour	430 7 1
		Quarrying and breaking metal	140 1 11
		Engineer's salary	166 13 4
		Sundries	10 16 4
		Balance, 31st March, 1904	8,909 1 5
	£10,000 0 0		£10,000 0 0

Statement of Balances.

Accounts.	£ s. d.	*Bank.*	£ s. d.
Cr. Deposit Account	179 0 0	Cr. Waterworks Loan Account £9,144 13 10	
Cr. Waterworks Loan Account	8,909 1 5	Less unpresented cheques 235 12 5	8,909 1 5
	9,088 1 5	Cr. District Fund Account £576 3 0	
Dr. General Account	5,717 2 4	Less unpresented cheques 149 6 6	426 16 6
			9,335 17 11
		Dr. District Fund Account No. 2 ..	5,964 18 10
	£3,370 19 1		£3,370 19 1

Statement of Assets and Liabilities at 31st March, 1904.

Assets.	£ s. d.	*Liabilities.*	£ s. d.
Gold duty due but not paid	1,684 11 9	Dr. balance, No. 2 Bank Account ..	5,964 18 10
General rate, 1903, outstanding	100 3 10	Unpresented cheques, No. 1 Account ..	149 6 6
,, 1904, outstanding	168 19 10	Unpresented cheques, Waterworks Loan Account	235 12 5
Balance at Cr., No. 1 Bank Account ..	576 3 0	Accounts current and wages due £598 10 10	
,, Waterworks Loan Account	9,144 13 10	Accounts current, Waterworks Account 333 12 3	932 3 1
		Contractors' deposit on hand	179 0 0
		Liability to county under award No. 20, 19th March, 1903 £603 14 6	
		Proportion county loan 515 7 4	1,119 1 10
	£11,674 12 3		£8,580 2 8

Real Property.	£ s. d.	*Estimated Assets.*	£ s. d.
Fire-brigade Station and tower	590 0 0	Borough Office	100 0 0
Section 6, Moresby Avenue	280 0 0	Office furniture	150 0 0
Waitete Reserve	150 0 0	Fire-brigade appliances	250 0 0
Waihi Water-supply Reserve	110 0 0	Water-supply works	300 0 0
Abattoir Reserve	150 0 0	Pound and cottage	100 0 0
Part Section 31, Haszard Street ..	200 0 0	Stable and tool-shed	50 0 0
Silverton Quarry Reserve	300 0 0	Lamps, posts, &c.	200 0 0
Tauranga Road Quarry Reserve ..	200 0 0	Plant and appliances	230 0 0
Pound Quarry Reserve	3,000 0 0	Water-conservation area	65 0 0
Waitete Quarry Reserve	300 0 0	Metal and material on hand	500 0 0
Toomey Street Reserve	100 0 0		
Recreation Reserve	600 0 0		
	£5,980 0 0		£1,945 0 0

Statement of Public Debt.

Waterworks Loan of £15,000 under the Local Bodies' (Goldfields) Public Works and Loans Act, 1901, and its Amendment, and Local Bodies' Loans Act, 1901, borrowed for Twenty-six Years, at 4½ per Cent. Interest and Sinking Fund.

	£ s. d.
Loan inscribed	5,058 12 7
Advance not inscribed	5,000 0 0
	£10,058 12 7

Statement of Reserves and Real Estate under Regulation 26.

Part Section 20, Haszard Street, 37 ft. by 66 ft., Fire-brigade Station site.
Part Section 6, Moresby Avenue, 50 ft. by 66 ft.
Part Section 31, Haszard Street, 66 ft. by 99 ft., office-site.
Abattoir and Pound Reserve, 50 acres, Waitete Creek.
Water-supply Reserve, 215 acres, Mangatoitoi Creek.
Mitchell Street Reserve, 2a. and 22p.
Toomey Street Reserve, 2r. 34p.
Quarry Reserve, Waitete, 5a. 2r. 23p.
Pound Quarry Reserve, 3a. 3r. 29p.
Silverton Quarry Reserve, 5a. 3r. 30p.
Tauranga Road Quarry Reserve, 3a. 3r.
Recreation Reserve, 12 acres.

A STATEMENT FOR THE YEAR ENDING 31ST MARCH, 1904, showing the Amount of Rates of each Nature struck or recurring for that Year; the Amount outstanding at the Beginning of that Year of the Rates of each Nature struck or recurring for Previous Years; the Amount collected; the Amount written off during the Year; and the Amount outstanding at the Year, and the Amount outstanding at the end of the Year.

Rates levied.		Amount of Rates levied.			
For Year ending 31st March,	Nature of.	Outstanding at Beginning of Year.	Struck or Recurrent during the Year.	Collected during the Year.	Outstanding at End of the Year.
		£ s. d.	£ s. d.	£ s. d.	£ s. d.
1904 ..	General	..	427 9 9	258 9 11 0 12 10*	168 19 10
1903 ..	..	211 6 7	..	111 2 9	100 3 10
	Total	211 6 7	427 9 9	0 12 10 369 12 8	269 3 8

* Twice paid.

H. D. MORPETH,
Borough Treasurer.

Examined and found correct.—J. K. WARBURTON, Controller and Auditor-General.

Settled and adopted at a special meeting held on the 24th November, 1904.—THOMAS GILMOUR, Mayor.

WAIHI BOROUGH COUNCIL.—BALANCE-SHEET OF THE DISTRICT FUND ACCOUNT FOR THE YEAR ENDING THE 31ST MARCH, 1905.

I. GENERAL ACCOUNT.

Receipts.	£ s. d.	*Expenditure.*	£ s. d.
General rate, 1902–3	43 2 10	Balance, 1st April, 1904	5,717 2 4
„ 1903–4	95 6 9	Administration,—	
„ 1904–5	325 3 6	Salaries £749 9 8	
Additional 10 per cent. on overdue rates ..	14 13 3	Mayor's honorarium 150 0 0	
Government subsidy on general rates ..	22 16 9	Legal expenses .. 51 11 6	
License fees,—		Travelling-expenses .. 27 7 6	
Publicans £161 0 0		Collection of rates .. 41 11 3	
Wholesale liquor .. 16 9 8			1,019 19 11
Auctioneers .. 40 0 0		Miscellaneous,—	
Vehicles 34 5 0		Stationery £54 10 4	
Drivers 1 10 0		Printing and advertising 162 14 3	
Kerosene 10 0 0		Petty cash 35 0 0	
Billiard-saloon .. 2 0 0		Interest on overdraft and bank charges .. 367 16 0	
Public buildings .. 10 10 0		Election expenses .. 39 9 0	
Slaughterhouses .. 1 0 0		Rent 37 11 11	
Plumbers 6 0 0		Plans and surveys .. 7 0 4	
	282 14 8	Fire insurance .. 17 12 9	
Gold duty	16,769 8 1	Accident insurance .. 102 0 6	
Goldfields revenue	727 11 0	Dog-registration .. 19 9 7	
Fees and fines, per Courts	50 6 6	Sanitary services .. 73 14 8	
Subsidy on expenditure *re* coronation ..	118 4 9		916 19 4
Poundage fees	33 9 6	Public works—Roads and footpaths,—	
Dog-registration	105 5 0	Day-labour .. £3,654 5 8	
Building-permits	2 5 0	Co-operative work .. 2,372 8 7	
Kerosene-store rent	3 9 0	Metal 242 10 1	
Private crossings	19 4 0	Breaking 653 9 8	
Sale of electoral rolls	1 14 0	Timber 1,059 15 9	
Miscellaneous	2 3 6	Carting 1,633 4 9	
Katikati Road Board refund	15 0 0	Material 541 3 2	
Balance, 31st March, 1905	10,401 11 0		10,156 17 8
		Tar	120 18 11
		Water-supply service	100 13 3
		Lighting service	124 7 6
		Waihi Hospital Board .. £772 10 0	
		Music Hall 166 7 0	
		Ngatokoi Domain Board 137 0 0	
		Waihi Domain Board .. 100 0 0	
		Waihi School of Mines 100 0 0	
		Waihi Public Library subsidy 126 3 4	
		Katikati Domain Board (section 355, Municipal Corporations Act, 1900) 20 0 0	
			1,422 0 4
		Council Chambers .. £1,228 6 5	
		Stone-breaker 604 1 0	
		Land bought, Waihi South 126 10 0	
		Road-roller 100 9 3	
		Fire-brigade Station .. 11 16 6	
		Furniture and fittings .. 189 5 5	
			2,260 8 7
Carried forward	£29,033 9 1	Carried forward	£21,839 7 10

Receipts.	£ s. d.
Brought forward	£29,033 9 1
	£29,033 9 1

Expenditure.		£ s. d.
Brought forward		£21,839 7 10
Recreation-ground		694 0 4
Kerosene-store		9 0 0
Prevention of fire,—		
Plant and uniforms ..	£125 19 3	
Turn-outs to fires ..	12 14 6	
Subsidy to brigade ..	75 0 0	
		213 13 9
Compensation for cutting down road	£50 0 0	
Compensation for accidents to workmen	17 4 9	
		67 4 9
Improvement of Broadway and planting streets		442 11 4
Waitete Reserve		4 10 0
Tauranga County Council, Bowentown Landing (section 45, Municipal Corporations Act, 1900)		15 0 0
Horse-feed		34 3 1
Bay of Plenty licensing election, Tauranga County ..	£17 13 7	
Audit fee	14 0 0	
Clerical assistance ..	27 18 6	
Municipal Association ..	3 3 0	
Fee, Gas Report ..	5 5 0	
Commission	3 12 0	
Miscellaneous ..	12 5 6	
		83 17 7
Payment to Ohinemuri County Council under *Gazette* No. 20, 19th March, 1903,—		
Maintenance, Paeroa–Waihi Main Road ..	£4,472 18 5	
Interest—proportion, county loan	23 3 10	
		4,496 2 3
Tauranga–Waihi–Bowentown Road inquiry costs		49 1 9
Under section 159, Municipal Corporations Act,—		
Charitable aid ..	£12 0 0	
Presentation medal, Hon. the Premier	6 13 0	
		18 13 0
Transfer to Waterworks Construction Loan Account		838 10 9
Transfer to Interest Account		227 12 8
		£29,033 9 1

II. Separate Accounts.

1. *Deposit Accounts.*

	£ s. d.
Balance, 1st April, 1904	179 0 0
Deposits received	572 0 0
	£751 0 0

	£ s. d.
Deposits refunded	593 0 0
Balance, 31st March, 1905	158 0 0
	£751 0 0

2. *Loan of £15,000 over the whole District, under the Local Bodies' Loans Act, 1901, and Local Bodies' (Goldfields) Public Works and Loans Act, 1901, for Construction of Waterworks.*

	£ s. d.
Balance, 1st April, 1904	8,909 1 5
Third instalment received from Treasury ..	5,000 0 0
Refund from Ferguson	8 3 11
Transfer from General Account	838 10 9
	£14,755 16 1

	£ s. d.
Pipes and material	11,617 19 0
Labour	2,738 17 0
Engineer's salary	366 13 4
Miscellaneous	32 6 9
	£14,755 16 1

3. *Water-supply Revenue Account.*

	£ s. d.
Water rates and charges, three months to 31st March, 1905	86 17 0
	£86 17 0

	£ s. d.
Wages and salary	76 15 0
Balance, 31st March, 1905	10 2 0
	£86 17 0

4. *Interest on Inscribed Loan of £5,058 12s. 7d. for Construction of Waterworks, at 4½ per Cent., for Twenty-six Years, over whole District.*

	£ s. d.
Transfer from General Account ..	227 12 8

	£ s. d.
Interest to 1st Eebruary, 1905	227 12 8

Statement of Balances.

Accounts.	£	s.	d.
Dr. General Account	10,401	11	0
Cr. Deposit Account £158 0 0			
Cr. Water-supply Revenue Account 10 2 0	168	2	0
	£10,233	9	0

Bank.	£	s.	d.
Dr. District Fund Account £9,857 2 9			
Add unpresented cheques 376 6 3	10,233	9	0
Cr. Waterworks Loan Account £223 0 7			
Less unpresented cheques 223 0 7			
	£10,233	9	0

Statement of Cash Assets and Liabilities at 31st March, 1905.

Assets.	£	s.	d.
Waterworks Loan Account	223	0	7
General rate, 1902–3, outstanding	57	0	1
„ 1903–4, „	74	11	6
„ 1904–5, „	110	7	8
Water charges, &c.	12	18	4
Gold duty due but not paid	1,098	0	0
Goldfields revenue, estimated	500	0	0
	£2,085	18	4

Liabilities.	£	s.	d.
Dr. Balance District Fund Account £9,857 2 9			
Outstanding cheques 376 6 3	10,233	9	0
Waterworks Loan Account,—			
Outstanding cheques	223	0	7
Contractors' deposits on hand	158	0	0
Liability to Ohinemuri County Council under award (*Gazette* No. 20, 19th March, 1903),—			
Maintenance Main Road	848	2	4
Proportion of county loan of £515 7s. 4d. (paid £69 11s. 6d.)	445	15	10
Wages and Account Current,—			
General Account £757 3 7			
Waterworks Account 279 10 11	1,036	14	6
	£12,945	2	3

Real Property.	£	s.	d.
Fire-brigade Station	600	0	0
Section 6, Moresby Avenue	300	0	0
Council Chambers and site	2,000	0	0
Sections 269–73, Waihi South	100	0	0
Section Part 226A, Walker Street	30	0	0
Waitete Reserve	155	0	0
Waihi Water-supply Reserve	110	0	0
Abattoir Reserve	150	0	0
Silverton Quarry Reserve	300	0	0
Tauranga Road Quarry Reserve	200	0	0
Pound Quarry Reserve	3,000	0	0
Waitete Quarry Reserve	300	0	0
Toomey Street Reserve	100	0	0
Recreation Reserve	1,500	0	0
	£8,845	0	0

Estimated Assets.	£	s.	d.
Waterworks	16,000	0	0
Stone-breaker	600	0	0
Road-roller	100	0	0
Kerosene-store	50	0	0
Lamp-posts, lamps, &c.	200	0	0
Fire-brigade appliances	300	0	0
Plant and material	300	0	0
Metal on hand	200	0	0
	£17,750	0	0

Statement of Public Debt.

Waterworks Loan of £15,000, under the Local Bodies' (Goldfields) Public Works and Loans Act, 1901, and its Amendments, and the Local Bodies' Loans Act, 1901, borrowed for Twenty-six Years, at 4½ per Cent. Interest and Sinking Fund.

	£	s.	d.
Loan inscribed	5,058	12	7
„	10,308	9	9
	£15,367	2	4

Statement of Reserves and Real Estate under Regulation 26.

Part section, Haszard Street, 37 ft. by 66 ft., Fire-brigade Station.
Part section, Moresby Avenue, 50 ft. by 66 ft., workshop and yard.
Section 31A, Haszard Street, 66 ft. by 99 ft., site Council Chambers.
Abattoir and Pound Reserve, 50 acres, Waitete Creek.
Water-supply Reserve, 215 acres, Mangatoitoi Creek.
Waitete Reserve, 2a. and 22p.
Toomey Street Reserve, 2r. 34p.
Quarry Reserve, Waitete, 5a. 2r. 23p.
Pound Quarry Reserve, 3a. 3r. 29p.
Silverton Quarry Reserve, 5a. 3r. 30p.
Tauranga Road Quarry Reserve, 3a. 3r.
Recreation Reserve, 12 acres.
Sections 269–73, Waihi South.

A STATEMENT FOR THE YEAR ENDING 31ST MARCH, 1905, showing the Amount of the Rates of each Nature struck or recurring for that Year; the Amount outstanding at the Beginning of that Year of the Rates of each Nature struck or recurring for Previous Years; the Amount collected; the Amount written off during the Year; and the Amount outstanding at the End of the Year.

Rates levied.		Amount of Rates levied.			
For Year ending 31st March,	Nature of.	Outstanding at Beginning of Year.	Struck or recurrent during Year.	Collected during Year.	Outstanding at End of Year.
		£ s. d.	£ s. d.	£ s. d.	£ s. d.
1905 ..	General	..	435 11 2	325 3 6	110 7 8
1904 ..	„	168 19 10 (add 0 18 7)	..	95 6 9	74 11 8
1903 ..	„	100 3 10	..	43 2 10	57 1 0
	Total	270 2 3	435 11 2	463 13 1	242 0 4

H. D. MORPETH,
Borough Treasurer.

Examined and found correct, except that the Waterworks Loan Separate Account is unlawfully charged with more than the amount of the moneys provided for it.—J. K. WARBURTON, Controller and Auditor-General.

Adopted 21st December, 1905.—THOMAS GILMOUR, Mayor.

WAIHI BOROUGH COUNCIL.—BALANCE-SHEET OF THE WAIHI DISTRICT FUND ACCOUNT FOR THE YEAR ENDING THE 31ST MARCH, 1906.

I. GENERAL ACCOUNT.

Receipts.		£ s. d.
General rate, 1902–3		7 0 4
„ 1903–4		19 2 10
„ 1904–5		51 8 8
„ 1905–6		539 6 6
Additional 10 per cent. on overdue rates		17 11 6
Government subsidy on general rates		80 10 11
License fees,—		
Publicans	£161 0 0	
Wholesale liquor	20 0 0	
Auctioneers	50 0 0	
Vehicles	24 5 0	
Drivers	1 15 0	
Kerosene	6 0 0	
Billiards	2 0 0	
Public buildings	13 10 0	
Plumbers	7 0 0	
Slaughterhouse	1 0 0	
		286 10 0
Gold duty		15,509 13 3
Goldfields revenue		1,591 16 7
Fees and fines, per Courts		77 5 6
Dog-registration		96 12 6
Poundage		0 16 6
Private crossings		15 1 0
Permits		5 15 0
Kerosene-store rent		6 12 0
Recreation-ground		37 0 0
Advance for water-connection		12 0 0
Miscellaneous		4 14 0
Balance, 31st March, 1906		20,383 5 1
Carried forward		£38,742 2 2

Expenditure.		£ s. d.
Balance, 1st April, 1905		10,401 11 0
Salaries		1,146 13 4
Mayor's honorarium		200 0 0
Legal expenses		116 14 2
Travelling-expenses		96 10 10
Stationery		83 13 3
Printing and advertising		144 19 3
Petty cash		65 0 0
Interest on overdraft and bank charges		562 17 0
Election expenses		85 15 4
Rent		7 2 6
Surveys and plans		37 14 6
Fire insurance		13 5 2
Accident insurance		142 7 0
Dog-registration		17 11 6
Sanitation		26 7 0
Forage		29 4 7
Roads and footpaths,—		
Day-labour	£3,052 19 0	
Co-operative work	1,205 13 1	
Contracts	326 18 11	
Metal	543 8 8	
Quarrying and breaking	757 15 9	
Carting	1,599 5 2	
Timber	427 15 0	
Material	726 12 6	
		8,640 8 1
Payment to Ohinemuri County Council under award (*Gazette* No. 20, 19th March, 1903),—		
Maintenance Paeroa–Waihi Main Road	£3,765 8 8	
Interest on proportion of county loan	23 3 10	
		3,788 12 6
Abattoir, construction of		1,004 17 2
Gasworks,—		
Gas plant	£1,785 7 6	
Mains	2,581 7 6	
Material	1,273 0 0	
Wages	1,571 7 3	
Interest	172 12 11	
Sundries	11 0 0	
		7,394 15 2
Waterworks extension, material and wages		866 2 10
Recreation-ground		274 19 10
Stone-crusher		87 15 0
Council Chambers		30 17 6
Lighting-service		156 14 7
Tauranga County Council, paid under award (*Gazette* No. , 1905)		200 0 0
Waihi Hospital and Charitable Aid Board		940 0 0
Music Hall		127 10 0
Carried forward		£36,689 19 1

GENERAL ACCOUNT—*continued.*

Receipts.	£ s. d.	*Expenditure.*	£ s. d.
Brought forward ..	.. £38,742 2 2	Brought forward ..	.. £36,689 19 1
		Public Library	150 0 0
		Katikati Domain Board, under section 355 of Municipal Corporations Act, 1900 ..	20 0 0
		Prevention of fire,—	
		Subsidy to brigade .. £100 0 0	
		Turn-outs 27 13 6	
		Plant 21 16 10	
			149 10 4
		Pound	23 0 0
		Unauthorized expenditure under section 159, Municipal Corporations Act, 1900,—	
		Cemetery Trustees .. £10 0 0	
		Medical attendance *re* accident 6 5 9	
		Municipal Association 3 3 0	
		Fencing Worth's paddock 5 0 0	
			24 8 9
		Expenditure under Public Health Act, 1900, section 28	5 15 6
		Bay of Plenty licensing election ..	15 3 1
		Audit fee	17 0 0
		Caretaker	37 10 0
		Miscellaneous	43 12 3
		Transfer to Interest Account	691 10 4
		Transfer to Sanitary Account	874 12 10
	£38,742 2 2		£38,742 2 2

II. SEPARATE ACCOUNTS.

1. *Deposit Account.*

	£ s. d.		£ s. d.
Balance, 1st April, 1905	158 0 0	Deposits returned	666 17 6
Deposits received	586 17 6	Balance, 31st March, 1906	78 0 0
	£744 17 6		£744 17 6

2. *Water-supply Account.*

	£ s. d.		£ s. d.
Balance, 1st April, 1905	10 2 0	Wages and salary	186 0 0
Water rates	649 6 2	Printing and advertising	15 15 0
Water charges	103 1 6	Balance, 31st March, 1906	560 14 8
	£762 9 8		£762 9 8

3. *Sanitary Service Account.*

	£ s. d.		£ s. d.
Sanitary fees	385 17 8	Plant and depot	879 4 8
Transfer from General Account ..	874 12 10	Wages	215 2 11
		Forage	74 14 4
		Material	50 3 0
		Maintenance	22 6 3
		Sundry charges	18 19 4
	£1,260 10 6		£1,260 10 6

4. *Interest Account.—Interest on Inscribed Loan of £15,367 2s. 4d. for Construction of Waterworks, at 4½ per Cent., for Twenty-six Years, over the whole District.*

	£ s. d.		£ s. d.
Transfer from General Account ..	691 10 4	Interest to February, 1906	691 10 4

STATEMENT OF BALANCES.

Accounts.		£ s. d.	*Bank.*	£ s. d.
General Account, Dr.		20,383 5 1	District Fund Account..	19,689 1 3
Deposit Account, Cr. ..	£78 0 0		Add unpresented cheques	55 9 2
Water-supply Account, Cr.	560 14 8			
		638 14 8		
		£19,744 10 5		£19,744 10 5

STATEMENT OF CASH ASSETS AND LIABILITIES AT 31ST MARCH, 1906.

Assets.	£ s. d.	*Liabilities.*	£ s. d.	£ s. d.
General rates outstanding, 1902–3 ..	50 0 8	Dr. Balance District Fund Account	£19,689 1 3	
,, 1903–4 ..	56 7 5	Outstanding cheques ..	55 9 2	
,, 1904–5 ..	58 19 0			19,744 10 5
,, 1905–6 ..	128 19 6	Contractor's deposits on hand		78 0 0
Water rates outstanding, 1905-6 ..	155 2 9	Liability to Ohinemuri County Council under award (*Gazette* No. 20, 19th March, 1903),—		
Water charges outstanding	0 13 9	February	£309 16 1	
Sanitary fees outstanding	24 12 6	March	289 12 6	
Gold duty paid but not remitted by Treasury	1,841 18 0			599 8 7
Goldfields revenue	491 1 8	Proportion of loan to Ohinemuri County	£515 7 4	
		Less paid	92 15 4	
				422 12 0
		Wages and accounts current		511 0 1
	£2,807 15 3			£21,355 11 1

Real Property.	£ s. d.	*Estimated Assets.*	£ s. d.
Fire-brigade Station	600 0 0	Waterworks	17,000 0 0
Section 6, Moresby Avenue	300 0 0	Gasworks	7,500 0 0
Council Chambers	2,000 0 0	Abattoirs	1,000 0 0
Abattoirs	1,000 0 0	Sanitary service outfit	850 0 0
Waitete Reserve	155 0 0	Stone-breaker	700 0 0
Waihi Water-supply Reserve	110 0 0	Road-roller	100 0 0
Silverton Quarry Reserve	300 0 0	Kerosene-store	50 0 0
Pound Quarry Reserve	3,000 0 0	Street-lamps	200 0 0
Waitete Quarry Reserve	300 0 0	Fire-brigade appliances	300 0 0
Toomey Street Reserve	100 0 0	Fire-bells	70 0 0
Recreation Reserve	1,775 0 0	Bowling-green requisites	65 0 0
River-bank Reserve	100 0 0	Plant and material	500 0 0
Sanitary Reserve	300 0 0	Metal on hand	300 0 0
Tauranga Road Quarry Reserve ..	200 0 0		
Sections 269–73	400 0 0		
Spring Reserve, Moresby Avenue ..	100 0 0		
	£10,740 0 0		£28,635 0 0

STATEMENT OF PUBLIC DEBT.

Waterworks Loan of £15,000 *under the Local Bodies' (Goldfields) Public Works Act,* 1901, *and its Amendments, and the Local Bodies' Loans Act,* 1901, *borrowed for Twenty-six Years, at* 4½ *per Cent. Interest and Sinking Fund.*

	£ s. d.
Loan inscribed	15,367 2 4

STATEMENT OF RESERVES AND REAL ESTATE UNDER REGULATION 26.

Part Section 20, Haszard Street, 37 ft. by 66 ft., Fire-brigade S ation.
Part Section 6A, Moresby Avenue, 50 ft. by 66 ft., workshop and yard.
Section 31A, Haszard Street, 66 ft. by 99 ft., Council Chambers.
Sections 269–73, Quarry Road, gasworks, 3a. 3r. 2p.
Abattoirs Reserve, 33 acres, Seddon Avenue.
Waitete Reserve, 2a. and 22p.
Toomey Street Reserve, 2r. 34p.
Waitete Quarry Reserve, 5a. 2r. 23p.
Pound Quarry Reserve, 3a. 3r. 29p.
Silverton Quarry Reserve, 5a. 3r. 30p.
Tauranga Road Reserve, 3a. 3r.
Waterfall Reserve, 3 acres.
Recreation Reserve, 12 acres.
,, 5 acres, East End.
,, 47 acres, Riverbank.
Spring Reserve, 3r. 15p., Moresby Avenue.

A STATEMENT FOR THE YEAR ENDING 31ST MARCH, 1906, showing the Amount of Rates of each Nature struck or recurring for that Year; the Amount outstanding at the Beginning of that Year of the Rates of each Nature struck or recurring for Previous Years; the Amount collected; the Amount written off during the Year; and the Amount outstanding at the End of the Year.

Rates levied.		Amount of Rates levied.			
For Year ending 31st March,	Nature of.	Outstanding at Beginning of Year.	Struck or recurrent during Year.	Collected during the Year.	Outstanding at End of the Year.
		£ s. d.	£ s. d.	£ s. d.	£ s. d.
1906 ..	General rate	..	668 6 0	539 6 6	128 19 6
1905 ..	,, ...	110 7 8	..	51 8 8	58 19 0
1904 ..	,, ...	74 11 8	..	..	..
..	Add new valuation	0 18 7	..	19 2 10.	56 7 5
1903 ..	General rate	57 1 0	..	7 0 4	50 0 8
1906 ..	Water rate	..	804 8 11	649 6 2	155 2 9

Examined and found correct, except that separate account numbered 3 is unlawfully charged with more than the moneys provided.—J. K. WARBURTON, Controller and Auditor-General.

H. D. MORPETH,
Borough Treasurer.

Settled and adopted at a special meeting held on the 20th February, 1907.

THOMAS GILMOUR,
Mayor.

Waihi Borough Council.—Balance-sheet of the Waihi District Fund Account for the Year ending the 31st March, 1907.

I. General Account.

Receipts.	£	s.	d.
General rate, 1902–3	8	8	8
„ 1903–4	19	6	2
„ 1904–5	20	13	0
„ 1905–6	110	1	0
„ 1906–7	636	15	6
Additional 10 per cent. on overdue rates	17	13	11
Government subsidy on general rates	142	12	3
License fees,—			
Publicans £164 0 0			
Wholesale liquor 20 0 0			
Vehicles 24 12 6			
Drivers 2 5 0			
Kerosene 5 0 0			
Billiards 2 0 0			
Public buildings 12 0 0			
Plumbers 7 0 0			
Butchers 4 0 0			
	240	17	6
Gold duty	15,819	7	10
Goldfields revenue	1,658	4	2
Fees and fines, per Courts	66	15	6
Dog-registration	62	11	6
Private crossings	16	2	0
Building-permits	5	15	0
Kerosene-store rent	3	19	0
Miscellaneous	5	11	6
Refund from Waterworks Loan Account	926	0	0
Balance, 31st March, 1907	17,490	7	5
	£37,251	1	11

Expenditure.	£	s.	d.
Balance, 1st April, 1906	20,383	5	1
Salaries	1,039	16	8
Mayor's honorarium	150	0	0
Legal expenses	106	9	1
Travelling-expenses	107	10	0
Stationery	63	14	11
Printing and advertising	143	2	1
Petty cash	75	0	0
Interest on overdraft and bank charges	1,022	6	4
Election expenses	90	1	4
Rent	31	0	0
Plans and surveys	11	9	6
Fire insurance	13	2	10
Accident insurance	81	1	0
Forage	26	14	10
Roads and footpaths,—			
Day-labour £3,093 11 8			
Co-operative and contracts 1,393 9 9			
Metal and breaking 1,183 17 7			
Timber 429 7 8			
Carting 1,940 19 5			
Material 636 4 6			
	8,677	10	7
Payment to Ohinemuri County Council under award (*Gazette* No. 20, 19th March, 1903),—			
Maintenance, Paeroa–Waihi Main Road	1,636	7	9
Interest and sinking fund on proportion of County Government Loan	23	3	10
Street-lighting	660	19	9
Prevention of fire	229	9	8
Pound	32	18	0
Waterworks material and wages	322	4	4
Waihi Hospital	1,250	0	0
Waihi School of Mines	150	0	0
Waihi Public Library	125	0	0
Music Hall	145	9	2
Katikati Domain, under section 355, Municipal Corporations Act	20	0	0
Recreation-ground	287	6	3
Waihi Domain	27	0	7
Government Audit fee	20	6	8
Bay of Plenty licensing election	33	3	9
Unauthorized Expenditure under section 159, Municipal Corporations Act, 1900,—			
Waihi Public Cemetery £14 10 0			
Waikino Public Library 10 10 0			
Municipal Association 3 19 0			
Medical attendance 1 2 9			
	30	1	9
Expenditure under Public Health Act	20	2	6
New Zealand Exhibition, under New Zealand Exhibition Empowering Act, 1905	10	0	0
Collection of rates	53	19	0
Miscellaneous	46	9	11
Council Chambers	48	4	9
Horse bought	16	0	0
Caretaker, Council Chambers	40	10	0
	£37,251	1	11

II. Separate Accounts.

1. *Deposit Account.*

	£	s.	d.
Balance, 1st April, 1906	78	0	0
Deposits received	110	1	0
	£188	1	0

	£	s.	d.
Deposits returned	127	5	0
Balance, 31st March, 1907	60	16	0
	£188	1	0

2. *Water-supply Account.*

	£	s.	d.
Balance, 1st April, 1906	560	14	8
Water rates £664 9 2			
Water charges 240 2 0			
Water services laid 9 17 1			
	914	8	3
	£1,475	2	11

	£	s.	d.
Wages and salary	186	0	0
Printing, advertising, and charges	12	4	0
Transfer to Interest Account	691	10	4
Balance, 31st March, 1907	585	8	7
	£1,475	2	11

3. *Sanitary Service Account.*

	£ s. d.		£ s. d.
Sanitary fees	1,006 17 7	Wages	650 15 11
Balance, 31st March, 1907	497 18 5	Horse-feed	148 15 1
		Maintenance	25 14 11
		Material	23 1 0
		Printing and advertising	14 6 6
		Charges	22 14 5
		Plant	125 3 2
		Depot	250 0 0
		Cottage at depot	189 6 0
		Improvement Account	54 19 0
	£1,504 16 0		£1,504 16 0

4.—*Abattoir Account.*

	£ s. d.		£ s. d.
Slaughtering fees	454 8 9	Inspection	63 0 0
Cash for offal	5 0 0	Wages	240 13 0
Balance, 31st March, 1907	621 9 6	Salary	43 6 8
		Printing and stationery	21 10 1
		Insurance	13 5 0
		Fuel	13 2 6
		Telephone	10 10 1
		Sundry charges	9 6 0
		Building, plant, and appliances	666 4 11
	£1,080 18 3		£1,080 18 3

5. *Gasworks Account.*

	£ s. d.		£ s. d.
Sale of gas, products, and fittings ..	2,243 0 11	Plant	1,917 19 7
Balance, 31st March, 1907	2,819 10 11	Gas-fittings	1,368 3 9
		Manager's house	383 8 11
		Working-expenses	421 13 6
		Coal	523 17 9
		Street-lighting	132 0 0
		Printing, advertising, and stationery ..	48 19 11
		Salary	191 15 0
		Charges	59 10 11
		Petty cash	15 2 6
	£5,062 11 10		£5,062 11 10

6. *Loan of £6,000 over the whole District, under the Local Bodies' Loans Act, 1901, and the Local Bodies' (Goldfields) Public Works and Loans Act, 1901, for Extension of Waterworks: Refund to District Fund, £1,389 7s. 4d.; Waterworks, £4,610 12s. 8d.*

	£ s. d.		£ s. d.
Cash from Treasury	4,000 0 0	Material	1,911 4 9
		Labour	743 10 5
		Refund to District Fund Account ..	926 0 0
		Balance, 31st March, 1907	419 4 10
	£4,000 0 0		£4,000 0 0

7. *Interest Account.—Interest on Inscribed Loan of £15,367 2s. 4d. for Construction of Waterworks, at 4½ per Cent., for Twenty-six Years, over the whole District.*

	£ s. d.		£ s. d.
Transferred from Water-supply Account ..	691 10 4	Interest to 1st February, 1907	691 10 4

Statement of Balances.

Accounts.	£ s. d.		*Bank.*	£ s. d.
General Account, Dr. ..	£17,490 7 5			
Sanitary Account, Dr. ..	497 18 5			
Abattoir Account, Dr. ..	621 9 6			
Gasworks Account, Dr. ..	2,819 10 11			
	21,429 6 3		District Fund Account, Dr.	£20,491 2 0
			Add unpresented cheques	291 19 8
				20,783 1 8
Water-supply Account, Cr.	£585 8 7			
Deposit Account, Cr. ..	60 16 0			
Waterworks Extension Account, Cr.	419 4 10		Waterworks Extension Loan Account, Cr. ..	£424 4 4
	1,065 9 5		Less unpresented cheques	4 19 6
				419 4 10
	£20,363 16 10			£20,363 16 10

Examined and found correct, except the following:—

1. The amount paid under the New Zealand International Exhibition Empowering Act, 1905, is not the authorized cost authorized by the Act of collecting and preparing such exhibits.

2. The charges to separate accounts numbered 3, 4, and 5 exceed the provision made to meet them.

3. An amount of £44 2s. 6d., being part of the loan of £6,000, has been used for extension of waterworks, although in the proposals submitted to the ratepayers it was stated to be the intention of the Council to repay it to the District Fund.

J. K. Warburton,
Controller and Auditor-General.

STATEMENT OF CASH ASSETS AND LIABILITIES, 31ST MARCH, 1907.

Assets.	£	s.	d.
Bank balance, Waterworks Loan Extension Account	424	4	4
General rates outstanding, 1902–3	41	12	0
" 1903–4	37	1	3
" 1904–5	38	6	0
" 1905–6	18	18	6
" 1906–7	90	7	6
Water rates	158	1	1
Water charges	71	16	2
Sanitary fees	15	17	6
Abattoir fees	57	2	6
Gold duty paid, but not remitted by Treasury	2,991	2	7
Goldfields revenue	601	15	8
Fees and fines	8	1	6
	£4,554	6	7

Liabilities.		£	s.	d.
Dr. Balance District Fund Account	£20,491 2 0			
Unpresented cheques	291 19 8			
		20,783	1	8
Unpresented cheques, Waterworks Extension Loan Account		4	19	6
Contractors' deposits		60	16	0
Liability to Ohinemuri County Council under award (*Gazette* No. 20, 19th March, 1903),—				
January	£198 16 11			
February	54 13 4			
March	66 0 8			
	399 8 2			
Proportion of loan to Ohinemuri County £515 7 4				
Less paid 115 19 2				
		718	19	1
Wages and accounts current		1,082	16	3
		£22,650	12	6

Examined and found correct.—J. K. WARBURTON, Controller and Auditor-General.

Real Property.	£	s.	d.
Fire-brigade Station	150	0	0
Section 6	300	0	0
Council Chambers	500	0	0
Abattoir Reserve	300	0	0
Waitete Reserve	155	0	0
Waihi Water-supply Reserve	110	0	0
Silverton Quarry Reserve	300	0	0
Pound Quarry Reserve	3,000	0	0
Waitete Quarry Reserve	300	0	0
Toomey Street Reserve	100	0	0
Recreation Reserve	2,000	0	0
Riverbank Reserve	100	0	0
Sanitary Reserve	300	0	0
Tauranga Road Quarry Reserve	200	0	0
Sections 269–73	400	0	0
Spring Reserve, Moresby Avenue	100	0	0
Walmsley's Creek Reserve	1,400	0	0
	£9,715	0	0

Estimated Assets.	£	s.	d.
Waterworks	20,000	0	0
Gasworks	10,800	0	0
Abattoirs	1,600	0	0
Sanitary service	1,200	0	0
Stone-breaker	700	0	0
Road-roller	100	0	0
Council Chambers	2,000	0	0
Kerosene-store	50	0	0
Street lamps	300	0	0
Fire-brigade plant, fire-bell, and station	800	0	0
Bowling requisites	65	0	0
Sundry plant	500	0	0
Metal on hand	500	0	0
	£38,615	0	0

STATEMENT OF PUBLIC DEBT.

Waterworks Loan of £15,000 *under the Local Bodies' (Goldfields) Public Works Act,* 1901, *and its Amendments, and the Local Bodies' Loans Act,* 1901, *borrowed for Twenty-six Years, at* 4½ *per Cent. Interest and Sinking Fund.*

	£	s.	d.
Loan inscribed	15,367	2	4

Waterworks Extension Loan of £6,000 *under the above-named Acts, for Twenty-six Years, at* 5 *per Cent.*

	£	s.	d.
Amount received on account	4,000	0	0
Inscribed as	£4,047	2	6

Examined and found correct.—J. K. WARBURTON, Controller and Auditor-General.

STATEMENT OF RESERVES AND REAL ESTATE UNDER REGULATION 26.

Part Section 20, Haszard Street, 37 ft. by 66 ft., Fire-brigade Station.
Part Section 6A, Moresby Avenue, 50 ft. by 66 ft., workshop and yard.
Section 31A, Haszard Street, 66 ft. by 99 ft., Council Chambers.
Sections 269–73, Quarry Road, gasworks, 3a. 3r. 2p.
Abattoir Reserve, Seddon Avenue, 33 acres.
Waitete Reserve, 2a. and 22p.
Toomey Street Reserve, 1a. 2r. 34p.
Pound Quarry Reserve, 3a. 3r. 29p.
Silverton Quarry Reserve, 5a. 3r. 30p.
Tauranga Road Reserve, 3a. 3r.
Waitete Quarry Reserve, 5a. 2r. 23p.
Waterfall Reserve, 3 acres.
Recreation Reserve, 12 acres.
" (East End), 5 acres.
" (Riverbank), 47 acres.
Spring Reserve (Moresby Avenue), 3r. 15p.

Examined and found correct.—J. K. WARBURTON, Controller and Auditor-General.

ACCOUNTS OF THE WAIHI BOROUGH FOR THE YEAR ENDING THE 31ST MARCH, 1907.

A Statement for the Year for which the Accounts are rendered, showing the Amount of the Rates of each Nature struck or recurring for that Year; the Amount outstanding at the Beginning of that Year of the Rates of each Nature struck or recurring for Previous Years; the Amount collected; the Amount written off during the Year; and the Amount outstanding at the End of the Year.

Rates levied.		Amount of Rates levied.			
For Year ending 31st March,	Nature of.	Outstanding at Beginning of Year.	Struck or recurrent during Year.	Collected during the Year.	Outstanding at End of the Year.
		£ s. d.	£ s. d.	£ s. d.	£ s. d.
1907 ..	General rate	..	727 3 0	636 15 6	90 7 6
1906 ..	"	128 19 6	..	110 1 0	18 18 6
1905 ..	"	58 19 0	..	20 13 0	38 6 0
1904 ..	"	56 7 5	..	19 6 2	37 1 3
1903 ..	"	50 0 8	..	8 8 8	41 12 0
1907 ..	Water rate	..	739 3 8	581 2 7	158 1 1
1906 ..	"	155 2 9	..	83 6 7	71 16 2

Examined and found correct.—J. K. WARBURTON, Controller and Auditor-General.

H. D. MORPETH,
Borough Treasurer.

Settled and adopted at a special meeting on 19th December, 1907.

THOMAS GILMOUR,
Mayor.

WAIHI BOROUGH COUNCIL.—BALANCE-SHEET OF THE WAIHI DISTRICT FUND ACCOUNT FOR THE YEAR ENDING THE 31ST MARCH, 1908.

I. GENERAL ACCOUNT.

Receipts.		£ s. d.
General rates, 1902–3		0 2 1
" 1903–4		0 6 3
" 1904–5		0 11 5
" 1905–6		3 11 6
" 1906–7		70 13 6
" 1907–8		749 15 6
Additional 10 per cent. on overdue rates ..		14 3 8
Government subsidy on general rates ..		157 8 1
License fees,—		
Publicans	£162 0 0	
Auctioneers ..	70 0 0	
Wholesale liquor ..	20 0 0	
Vehicles	19 5 0	
Drivers	3 15 0	
Kerosene	10 0 0	
Billiards	2 0 0	
Butchers	4 0 0	
Public buildings ..	8 0 0	
Plumbers	3 0 0	
		302 0 0
Gold duty		19,026 16 11
Goldfields revenue		1,564 2 10
Fees and fines, per Courts		45 1 6
Dog-registration		105 10 1
Private crossings		26 19 0
Miscellaneous		21 11 3
Refund from Waterworks Loan Account ..		463 7 4
Balance at 31st March, 1908 ..		16,845 15 3
		£39,397 16 2

Expenditure.		£ s. d.
Balance, 1st April, 1907		17,490 7 5
Salaries		1,050 6 8
Mayor's honorarium		150 0 0
Legal expenses		104 5 5
Travelling-expenses		106 0 10
Stationery		78 12 1
Printing and advertising		81 15 0
Petty cash		75 0 0
Interest on overdraft and bank charges ..		938 17 2
Election expenses		135 12 6
Rent		6 10 6
Maps and plans		45 14 6
Insurance (accident, fire, and fidelity) ..		147 5 2
Forage		40 0 8
Valuation and rates		46 10 3
Roads and footpaths,—		
Day-labour ..	£5,044 1 3	
Co-operative labour ..	1,469 0 11	
Metal and breaking ..	1,194 5 5	
Carting	2,572 8 6	
Material	2,232 16 6	
		12,512 12 7
Payment to Ohinemuri County Council, award (*Gazette* No. 20, 19th March, 1903),—		
Maintenance, Paeroa–Waihi Main Road		1,833 2 7
Interest and sinking fund, proportion of county Government loan		23 3 10
Payment to Tauranga County Council under award (*Gazette*, 23rd March, 1905) ..		26 6 0
Street-lighting		625 2 6
Prevention of fire		183 19 4
Pound		159 4 0
Water-conservation Reserve		100 0 0
Waihi Hospital and Charitable Aid Board ..		1,600 0 0
Waihi School of Mines		300 0 0
Waihi Public Library		150 0 0
Music Hall		137 0 0
Recreation-ground		367 7 3
Katikati Domain		20 2 0
Ngatikoi Domain		65 12 4
Rifle range		25 0 0
Bay of Plenty licensing election		22 5 4
Audit fee		24 0 0
Expenditure under Public Health Act, 1900		59 12 4
Compensation paid Waihi Printing Company		527 10 0
Caretaker, Council Chambers, lighting, &c.		57 10 10
Collection of rates		35 16 3
Miscellaneous		32 7 10
Unauthorized expenditure under section 156, Municipal Corporations Act, 1900,—		
Salvation Army band		10 0 0
Municipal Association		3 3 0
		£39,397 16 2

II. Separate Accounts.

1. *Deposit Account.*

	£ s. d.		£ s. d.
Balance, 1st April, 1907	60 16 0	Deposits returned	83 16 0
Deposits received	41 0 0	Balance, 31st March, 1908	18 0 0
	£101 16 0		£101 16 0

2. *Water-supply Account.*

	£ s. d.		£ s. d.
Balance, 1st April, 1907	585 8 7	Wages and salary	191 15 0
Water rates, 1906	11 12 1	Printing and advertising	13 16 0
,, 1907	129 0 5	Transfer to Interest Account	883 15 2
,, 1908	916 4 7	Balance, 31st March, 1908	958 13 6
Water services	164 7 9		
Water charges	241 6 3		
	£2,047 19 8		£2,047 19 8

3. *Sanitary Service Account.*

	£ s. d.		£ s. d.
Sanitary fees	1,030 7 3	Balance, 1st April, 1907	497 18 5
Rent	15 5 0	Wages	721 18 10
Balance, 31st March, 1908	1,153 18 4	Horse-feed	208 0 1
		Maintenance	42 11 8
		Material	43 19 1
		Printing, advertising, and charges ..	28 15 8
		Plant	147 17 8
		Buildings	448 7 10
		Improvement Account	60 1 4
	£2,199 10 7		£2,199 10 7

4. *Abattoir Account.*

	£ s. d.		£ s. d.
Fees received	745 12 6	Balance, 1st April, 1907	621 9 6
Balance, 31st March, 1908	818 0 1	Inspection	84 0 0
		Wages	388 11 6
		Salary	52 0 0
		Material	27 11 4
		Forage	45 6 5
		Fuel	17 14 6
		Insurance	17 14 10
		Printing, advertising, and charges ..	19 10 9
		Horse-hire	8 5 0
		Horse bought	40 0 0
		Buildings and plant	241 8 9
	£1,563 12 7		£1,563 12 7

5. *Gasworks Account.*

	£ s. d.		£ s. d.
Gas and fittings sold	3,405 15 8	Balance, 1st April, 1907	2,819 10 11
Balance, 31st March, 1908	3,089 9 4	Plant	1,261 10 9
		Gas-fittings	598 19 10
		Working-expenses	544 14 4
		Coal	785 14 3
		Street-lighting	167 18 7
		Salary	217 3 4
		Charges	55 12 5
		Petty cash	15 0 0
		Printing, advertising, and stationery ..	21 12 5
		Manager's house	7 8 2
	£6,495 5 0		£6,495 5 0

6. *Loan of* £6,000 *over the whole District, under the Local Bodies' Loans Act*, 1901, *and the Local Bodies' (Goldfields) Public Works and Loans Act*, 1901, *for Extension of Waterworks: Refund to District Fund*, £1,389 7*s.* 4*d.*; *Waterworks*, £4,610 12*s.* 8*d.*—£6,000.

	£ s. d.		£ s. d.
Balance, 1st April, 1907	419 4 10	Material	1,460 4 0
Cash from Treasury	2,000 0 0	Labour	407 3 6
		Refund to District Fund Account ..	463 7 4
		Balance, 31st March, 1908	88 10 0
	£2,419 4 10		£2,419 4 10

7. *Interest Account.—Interest on Inscribed Loans of £15,367 2s. 4d. and £4,047 2s. 6d. for Construction of Waterworks, at 4½ per Cent., for Twenty-six Years, over the whole District.*

	£ s. d.		£ s. d.
Transferred from Water-supply Account ..	691 10 4	Interest to 1st February, 1908, on £15,367 2s. 4d.	691 10 4
" " ..	192 4 10	Interest to 1st February, 1908, on £4,047 2s. 6d.	194 4 10
	£883 15 2		£883 15 2

STATEMENT OF BALANCES.

Accounts.	£ s. d.		*Bank.*	£ s. d.
General Account, Dr. .. £16,845 15 3			District Fund Account	20,837 4 11
Sanitary Account .. 1,153 18 4			Unpresented cheques	93 4 7
Abattoir 818 0 1				20,930 9 6
Gasworks 3,089 9 4	21,907 3 0		Waterworks Extension Loan Account ..	88 10 0
Water-supply Account, Cr. £958 13 6				
Deposit Account .. 18 0 0				
Waterworks extension .. 88 10 0	1,065 3 6			
	£20,841 19 6			£20,841 19 6

Examined and found correct except as follows :—

1. The charge to separate accounts numbered 3, 4, and 5 exceeds the provisions made to meet them.

2. The amount of expenditure under section 159 exceeds the limit imposed by the section.

Examined and found correct.

J. K. WARBURTON,
Controller and Auditor-General.

STATEMENT OF CASH ASSETS AND LIABILITIES, 31ST MARCH, 1908.

Assets.	£ s. d.	*Liabilities.*	£ s. d.
Bank balance, Waterworks Extension Loan Account	88 10 0	District Fund Account	20,837 4 11
General rates outstanding, 1902–3 ..	41 9 11	Unpresented cheques	93 4 7
" 1903–4 ..	36 15 0	Contractors' deposits	18 0 0
" 1904–5 ..	37 14 7	Liability to Ohinemuri County Council under award gazetted 19th March, 1903,—	
" 1905–6 ..	15 7 0	January £179 16 10	
" 1906–7 ..	19 14 0	February 66 13 6	
" 1907–8 ..	90 14 0	March 36 16 5	
Water rates, 1908	66 8 3		283 6 9
" 1907	29 0 8		
" 1906	60 4 1	Proportion of loan payable	376 4 4
Sanitary fees	51 0 0	Wages and accounts current	1,166 6 5
Abattoir fees	81 13 0		
Gold duty	3,349 16 2		
Goldfields revenue	641 14 8		
Fees and fines	7 4 6		
	£4,617 5 10		£22,774 7 0

Examined and found correct.—J. K. WARBURTON, Controller and Auditor-General.

Real Property.	£ s. d.	*Estimated Assets.*	£ s. d.
Fire-brigade Station	650 0 0	Waterworks	22,000 0 0
Section 6, Moresby Avenue	360 0 0	Gasworks	12,000 0 0
Council Chambers	2,000 0 0	Abattoir	1,850 0 0
Abattoir Reserve	300 0 0	Sanitary service	2,000 0 0
Waitete Reserve	155 0 0	Stone-breaker	700 0 0
Waihi Water-supply Reserve	110 0 0	Road-roller	100 0 0
Silverton Quarry Reserve	300 0 0	Fire-brigade plant and appliances ..	500 0 0
Pound Quarry Reserve	3,000 0 0	Kerosene-store	50 0 0
Waitete Quarry Reserve	300 0 0	Street lamps	350 0 0
Tauranga Road Quarry Reserve ..	200 0 0	Bowling appliances	60 0 0
Toomey Street Reserve	100 0 0	Sundry plant	500 0 0
Recreation Reserve	2,400 0 0	Metal on hand	500 0 0
Riverbank Reserve	100 0 0		
Sanitary Reserve	300 0 0		
Sections 269–73, Waihi South	400 0 0		
Springs Reserve, Moresby Avenue ..	100 0 0		
Walmsley's Creek Reserve	1,500 0 0		
	£12,275 0 0		£40,910 0 0

STATEMENT OF PUBLIC DEBT.

Waterworks Loan of £15,000 under the Local Bodies' (Goldfields) Public Works Act, 1901, and its Amendments, and the Local Bodies' Loans Act, 1901, borrowed for Twenty-six Years, at 4½ per Cent. Interest and Sinking Fund.

	£ s. d.
Loan inscribed as	15,367 2 4

Waterworks Extension Loan of £6,000 under the above-named Acts, for Twenty-six Years, at 4½ per Cent.

	£ s. d.
£4,000 received, inscribed as	4,047 2 6
£2,000 " "	2,067 14 3
	£6,114 16 9

Examined and found correct.—J. K. WARBURTON, Controller and Auditor-General.

STATEMENT OF RESERVES AND REAL ESTATE UNDER REGULATION 26.

Part Section 20, Haszard Street, 37 ft. by 66 ft., Fire-brigade Station.
Part Section 6, Moresby Avenue, 50 ft. by 66 ft., workshop and yard.
Section 31, Haszard Street, 66 ft. by 99 ft., Council Chambers.
Sections 269–73, Quarry Road, gasworks, 3a. 3r. 2p.
Abattoir Reserve, Seddon Avenue, 28 acres.
Waitete Reserve, 2a. and 22p.
Toomey Street Reserve, 1a. 2r. 34p.
Pound Quarry Reserve, 3a. 3r. 29p.
Silverton Quarry Reserve, 5a. 3r. 30p.
Tauranga Road Reserve, 3a. 3r.
Waitete Quarry Reserve, 5a. 2r. 23p.
Waterfall Reserve, 3 acres.
Recreation Reserve, 12 acres.
" (East End), 5 acres.
" (Riverbank), 47 acres.
Springs Reserve, 3r. 15p.

Examined and found correct.—J. K. WARBURTON, Controller and Auditor-General.

ACCOUNTS OF THE WAIHI BOROUGH FOR THE YEAR ENDING THE 31ST MARCH, 1908.

A Statement for the Year for which the Accounts are rendered, showing the Amount of Rates of each Nature struck or recurring for that Year; the Amount outstanding at the Beginning of that Year of the Rates of each Nature struck or recurring for Previous Years; the Amount collected; the Amount written off during the Year; and the Amount outstanding at the End of the Year.

Rates levied.		Amount of Rates levied.			
For Year ending 31st March,	Nature of.	Outstanding at Beginning of Year.	Struck or recurrent during Year.	Collected during the Year.	Outstanding at End of Year.
		£ s. d.	£ s. d.	£ s. d.	£ s. d.
1908	General rate	..	840 9 6	749 15 6	90 14 0
1907	"	90 7 6	..	70 13 6	19 14 0
1906	"	18 18 6	..	3 11 6	15 7 0
1905	"	38 6 0	..	0 11 5	37 14 7
1904	"	37 1 3	..	0 6 3	36 15 0
1903	"	41 12 0	..	0 2 1	41 9 11
1908	Water rate	..	982 12 10	916 4 7	66 8 3
1907	"	158 1 1	..	129 0 5	29 0 8
1906	"	71 16 2	..	11 12 1	60 4 1

Examined and found correct.—J. K. WARBURTON, Controller and Auditor-General.

H. D. MORPETH,
Borough Treasurer.

Adopted at a special meeting on the 14th January, 1909.

JOHN NEWTH,
Mayor.

WAIHI BOROUGH COUNCIL.—BALANCE-SHEET OF THE WAIHI DISTRICT FUND ACCOUNT FOR THE YEAR ENDING THE 31ST MARCH, 1909.

I. GENERAL ACCOUNT.

Receipts.	£ s. d.	*Expenditure.*	£ s. d.
General rates, 1902–3	0 1 0	Balance, 1st April, 1908	16,845 15 3
" 1903–4	0 1 0	Salaries	995 8 4
" 1904–5	0 2 0	Mayor's honorarium	150 0 0
" 1905–6	0 2 0	Legal expenses	93 1 9
" 1906–7	0 19 0	Travelling-expenses (staff, £4 17s. 6d.; Councillors, £125 11s.)	130 8 6
" 1907–8	36 11 0	Stationery	67 13 3
" 1908–9	792 0 9	Printing and advertising	53 9 1
Additional 10 per cent. on overdue rates	8 15 9	Petty cash	55 0 0
Government subsidy on rates	176 0 3	Interest on overdraft and bank charges	1,119 18 7
License fees,—		Election expenses	176 18 6
Auctioneers	40 10 0	Maps and plans	8 8 0
Publicans	162 0 0	Insurance,—	
Wholesale liquor	20 0 0	Accident	191 7 9
Vehicles	14 0 0	Fire and fidelity	15 3 11
Drivers	3 12 6	Horse-feed	34 6 6
Public buildings	17 0 0	Valuation and rates	44 11 6
Plumbers	3 0 0	Telephone	12 13 3
Butchers	4 0 0	Roads and footpaths,—	
Billiards	4 0 0	Day-labour £4,621 1 0	
Kerosene	12 0 0	Co-operative work 1,820 1 7	
Gold duty	23,147 18 10	Metal and breaking 982 9 3	
Goldfields revenue	1,518 4 9	Carting 2,429 5 10	
Fees and fines, per Courts	42 3 0	Timber 712 7 1	
Dog-registration	119 7 6	Material 1,658 18 2	
Motor-registration	2 0 0		12,224 2 11
Private crossings	27 3 0	Abattoir Road	50 0 0
Deposit on section sold	10 0 0	Payment to Ohinemuri County Council (award gazetted, 19th March, 1903),—	
Miscellaneous	5 11 0	Maintenance, Paeroa–Waihi Main Road	1,560 15 0
Bath	18 16 4	Proportion of interest on county loan	11 11 11
Recreation-ground	40 8 3	Payment to Tauranga County Council under award gazetted 23rd March, 1905	58 0 0
Balance, 31st March, 1909	15,446 2 7	Waihi Hospital and Charitable Aid Board	1,675 0 0
Carried forward	£41,672 10 6	Carried forward	£35,573 14 0

I. General Account—*continued.*

Receipts.	£ s. d.	*Expenditure.*	£ s. d.
Brought forward	£41,672 10 6	Brought forward	35,573 14 0
		Waihi Public Library	150 0 0
		Waihi Music Hall	154 10 3
		Waikino Domain	25 0 0
		Waikino Library	10 0 0
		Parihuia Reserve	74 3 8
		Tree-planting	209 6 5
		Katikati Domain	37 1 11
		Waihi Beach Roa	260 16 1
		Street-lighting	501 11 9
		Prevention of fire	216 4 11
		Construction of swimming-bath	620 15 8
		Pound	45 5 3
		Cottage at pound	60 18 0
		Purchase of borough yard	200 0 0
		Purchase, Section 274, Waihi South ..	37 0 0
		Library-site	3 0 0
		Water-cart	102 6 9
		Walmsley's quarry	225 11 2
		Walmsley's tramway	550 12 2
		Street-sweeper	20 0 0
		Stone-crusher	838 6 4
		Metal-hopper	39 5 6
		Waterworks	1,039 18 2
		Bay of Plenty licensing election	14 13 7
		Dog-registration	30 14 9
		Audit fee	25 0 0
		Street-name plates	31 15 0
		Ashford litter	24 0 5
		Office furniture and fittings	56 8 10
		Expenditure on public health	12 15 8
		Lighting chambers	9 12 9
		Caretaker	39 0 0
		Nightwatchman	6 5 0
		Council Chambers	23 0 0
		Drinking-fountain	20 3 0
		Hospital Trustees	26 0 2
		Miscellaneous	21 9 0
		Under section 101, Municipal Corporations Act, 1908: Salvation Army, £10; Cemetery Trustees, £10; social, £17 17s. 6d.; Municipal Association, £3 3s.	41 0 6
		Swimming-baths	30 13 1
		Recreation-ground	264 10 9
	£41,672 10 6		£41,672 10 6

II. Separate Accounts.

1. *Deposit Account.*

	£ s. d.		£ s. d.
Balance, 1st April, 1908	18 0 0	Deposits returned	11 0 0
Deposits received	1 0 0	Balance, 31st March, 1909	8 0 0
	£19 0 0		£19 0 0

2. *Water-supply Account.*

	£ s. d.		£ s. d.
To Balance, 1st April, 1908	958 13 6	Wages and salaries	185 15 0
Water rates, 1907	3 16 0	Printing and advertising	9 6 6
,, 1908	46 11 5	Analysis	3 3 0
,, 1909	1,083 11 4	Freight	1 0 0
Water charge, 1907	0 17 6	Transfer to Interest Account	966 7 6
,, 1908	121 10 9	Balance, 31st March, 1909	1,273 19 8
,, 1909	115 11 9		
Water services	108 19 5		
	£2,439 11 8		£2,439 11 8

3. *Sanitary Service Account.*

	£ s. d.		£ s. d.
To sanitary fees	1,063 19 10	Balance, 1st April, 1908	1,153 18 4
Rent	25 5 0	Wages	781 7 2
Balance, 31st March, 1909	1,660 18 8	Horse-feed	162 10 9
		Maintenance	66 16 11
		Material	58 4 1
		Printing, advertising, and charges ..	18 6 0
		Plant	240 13 0
		Buildings	167 3 0
		Improvement Account	91 13 3
		Depot	9 11 0
	£2,750 3 6		£2,750 3 6

4. *Abattoir Account.*

	£ s. d.		£ s. d.
Fees received	783 1 0	Balance, 1st April, 1908	818 0 1
Balance, 31st March, 1909	808 12 5	Wages	407 16 10
		Horse-feed	11 16 6
		Maintenance and material	37 17 10
		Fuel	22 10 6
		Insurance	19 2 3
		Printing, advertising, and charges ..	24 9 11
		Salary	52 0 0
		Inspection	84 0 0
		Buildings and plant	113 19 6
	£1,591 13 5		£1,591 13 5

5. *Gasworks Account.*

	£ s. d.		£ s. d.
Gas and fittings sold	3,542 8 3	Balance, 1st April, 1908	3,089 9 4
Balance, 31st March, 1909	5,845 9 8	Plant	3,649 16 11
		Fittings	627 9 1
		Working-expenses	760 2 1
		Coal	938 9 8
		Salary	232 0 0
		Charges	56 8 11
		Petty cash	10 0 0
		Printing, advertising, and stationery ..	7 1 11
		Manager's house	17 0 0
	£9,387 17 11		£9,387 17 11

6. *Loan of £6,000 over the whole District under the Local Bodies' Loans Act, 1901, and the Local Bodies' (Goldfields) Public Works and Loans Act, 1901, for Extension of Waterworks: Refund to District Fund, £1,389 7s. 4d.; Extension of Waterworks, £4,610 12s. 8d.—£6,000.*

	£ s. d.		£ s. d.
Balance, 1st April, 1908	88 10 0	Material	80 3 5
		Printing	0 15 0
		Labour	7 11 7
	£88 10 0		£88 10 0

7. *Interest Account.—Interest on Inscribed Loan of £21,474 19s. 1d. for Construction of Waterworks, at 4½ per Cent., for Twenty-six Years, over the whole District.*

	£ s. d.		£ s. d.
Transferred from Water-supply Account ..	966 7 6	Interest paid	966 7 6

STATEMENT OF BALANCES.

Accounts.	£ s. d.		*Bank.*	£ s. d.
General, Dr.	£15,446 2 7		District Fund Account	22,359 5 0
Sanitary, Dr.	1,660 18 0		Unpresented cheques	119 18 8
Abattoir, Dr.	808 12 5			
Gas	5,845 10 4			
		23,761 3 4		
Deposit Account, Cr. ..	£8 0 0			
Water-supply, Cr. ..	1,273 19 8	1,281 19 8		
		£22,479 3 8		£22,479 3 8

The Audit Office having examined the balance-sheet and accompanying accounts, prepared as in accordance with the provisions of the Municipal Corporations Act, 1908, hereby certifies to the correctness thereof, subject to the following exceptions :—

1. The expenditure under section 101 exceeds by £116 11s. 6d. the amount authorized by the section. The charges to the separate accounts numbered 3, 4, and 5 exceed the provision made to meet them.

JAMES B. HEYWOOD,
Assistant Controller and Auditor.

STATEMENT OF CASH ASSETS AND LIABILITIES, 31ST MARCH, 1909.

Assets.	£ s. d.		*Liabilities.*	£ s. d.
General rates outstanding, 1902–3 ..	41 8 11		District Fund Account	22,359 5 0
,, 1903–4 ..	36 14 0		Unpresented cheques	119 18 8
,, 1904–5 ..	37 12 7		Liability to Ohinemuri County Council under award, 19th March, 1903 ..	352 14 3
,, 1905–6 ..	15 5 0		Wages and accounts current	1,500 0 0
,, 1906–7 ..	18 15 0		Contractors' deposits	8 0 0
,, 1907–8 ..	54 3 0		Proportion of loan	353 0 6
,, 1908–9 ..	88 3 9			
Sanitary fees	61 0 0			
Abattoir fees	70 5 0			
Gold duty	164 0 0			
Goldfields revenue	569 10 3			
Fees and fines	22 7 8			
Outstanding account, gasworks	592 1 0			
Water rates, 1906 .. £60 4 1				
,, 1907 .. 25 4 8				
,, 1908 .. 19 16 10				
,, 1909 .. 76 19 7				
	182 5 2			
	£1,953 11 4			£24,692 18 5

Statement of Cash Assets and Liabilities, 31st March, 1909.

Real Property.	£	s.	d.
Fire-brigade Station	650	0	0
Council Chambers	2,000	0	0
Abattoir Reserve	300	0	0
Waitete Reserve	155	0	0
Waterworks Supply Reserve	110	0	0
Silverton Quarry Reserve	300	0	0
Pound Quarry Reserve	3,000	0	0
Tauranga Road Quarry Reserve	200	0	0
Toomey Street Quarry Reserve	100	0	0
Recreation Reserve	2,400	0	0
Parihuia Reserve	200	0	0
Sanitary Reserve	400	0	0
Sections, Waihi South	450	0	0
Spring Reserve, Moresby Avenue	100	0	0
Walmsley's Creek Reserve	1,500	0	0
Borough Yard, Union Street	400	0	0
	£12,265	0	0

Estimated Assets.	£	s.	d.
Waterworks	23,000	0	0
Gasworks	13,000	0	0
Abattoir	1,900	0	0
Sanitary service	2,000	0	0
Stone-breaker	700	0	0
Stone-breaker, tram, and hopper, Walmsley's Tram	1,350	0	0
Road-roller	100	0	0
Fire-brigade plant	500	0	0
Street lamps	350	0	0
Bowling appliances	60	0	0
Water-cart	100	0	0
Sundry plant	500	0	0
Metal on hand	500	0	0
	£44,060	0	0

Statement of Public Debt.

Waterworks Loan of £15,000 *under the Local Bodies' (Goldfields) Public Works Act, 1901, and its Amendments, and the Local Bodies' Loans Act, 1901, borrowed for Twenty-six Years, at 4½ per Cent. Interest and Sinking Fund.—Waterworks Extension of* £6,000, *borrowed under the above-named Acts, for Twenty-six Years, at 4½ per Cent.*

	£	s.	d.
Inscribed 1st February, 1908	21,474	19	1

Statement of Reserves and Real Estate under Regulation 26.

Part Section 20, Haszard Street, 37 ft. by 36 ft., Fire-brigade Station.
Section 31, Haszard Street, 66 ft. by 99 ft., Council Chambers.
Borough Yard, Union Street, Sections 414, 414A, 414B, 414C, 415A, 415B.
Gasworks-site, Sections 269, 269A, 270, 270A, 271, 271A, 272, 272A, 273, 274.
Waitete Reserve, 2a. and 22p.
Toomey Street Reserve, 1a. 2r. 34p.
Abattoir Reserve, 28 acres.
Pound Quarry Reserve, 3a. 3r. 29p.
Silverton Quarry Reserve, 5a. 3r. 30p.
Tauranga Road Reserve, 3a. 3r.
Waitete Quarry Reserve, 5a. 2r. 23p.
Waterfall Reserve, 3 acres.
Recreation Reserve, 12 acres.
" (East End), 5 acres.
Parihuia Reserve, 45a. 1r.
Springs Reserve, 3r. 15p.

Accounts of the Waihi Borough for the Year ending the 31st March, 1909.

A Statement for the Year for which the Accounts are rendered, showing the Amount of the Rates of each Nature struck or recurring for that Year; the Amount outstanding at the Beginning of that Year of the Rates of each Nature struck or recurring for Previous Years; the Amount collected; the Amount written off during the Year; and the Amount outstanding at the End of the Year.

Rates levied. For Year ending 31st March,	Nature of.	Amount of Rates levied. Outstanding at beginning of Year.	Struck or recurrent during Year.	Collected during the Year.	Remitted and written off.	Outstanding at End of Year.
		£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
1909	General rate	..	880 4 6	792 0 9	..	88 3 9
1908	"	90 14 0	..	36 11 0	..	54 3 0
1907	"	19 14 0	..	0 19 0	..	18 15 0
1906	"	15 7 0	..	0 2 0	..	15 5 0
1905	"	37 14 7	..	0 2 0	..	37 12 7
1904	"	36 15 0	..	0 1 0	..	36 14 0
1903	"	41 9 11	..	0 1 0	..	41 8 11
1909	Water rate	..	1,161 0 11	1,083 11 4	0 10 0	76 19 7
1908	"	66 8 3	..	46 11 5	..	19 16 10
1907	"	29 0 8	..	3 16 0	..	25 4 8
1906	"	60 4 1	..	..	..	60 4 1

Adopted at a special meeting of the Waihi Borough Council on the 16th February, 1910.

JOHN NEWTH, Mayor.
ALFRED JACKSON, Councillor.
H. D. MORPETH, Town Clerk and Treasurer.

EXHIBIT 92.

STATISTICAL TABLE FROM BLUE-BOOK SHOWING POPULATION, REVENUE, ETC., OF TWENTY BOROUGHS IN DOMINION.

Name of Borough.	Population.	Number of Ratepayers.	Revenue received from Rates, including Special Rate.	Total Revenue.	Average Amount of Rates per Head of Population.
			£	£	£ s. d.
Waihi	5,850	1,410	829	33,122	0 2 1
Whangarei	3,000	500	2,857	3,742	0 19 0
Devonport	6,300	1,103	8,564	9,282	1 7 2
Mount Eden	8,700	2,409	5,854	7,217	0 13 4
Grey Lynn	7,000	1,356	5,995	7,828	0 17 1
Parnell	5,600	674	6,974	7,573	1 4 10
Thames	3,750	920	2,919	6,380	0 15 6
Hamilton	2,600	550	2,749	5,499	1 1 1
Gisborne	7,000	1,200	13,560	20,254	1 18 8
New Plymouth	5,200	800	9,491	18,675	1 16 10
Palmerston North	11,650	1,420	16,536	25,323	1 8 4
Napier	10,459	1,306	17,591	24,793	1 13 7
Petone	7,200	1,026	8,902	19,415	1 4 8
Blenheim	3,351	751	3,235	10,313	0 19 6
Nelson	8,455	..	20,128	27,522	2 7 7
Westport	4,000	1,200	4,943	18,996	1 4 8
Hokitika	2,100	625	1,562	3,870	0 10 1
Lyttelton	4,150	635	2,194	14,064	0 10 6
Timaru	7,600	1,450	15,789	20,815	2 1 6
Oamaru	6,000	1,250	7,476	20,263	1 4 11

EXHIBIT 93.

OUTLINE OF SCHEME BY CAPTAIN BAYLDON FOR DEALING WITH DEPOSITS OF SLIMES IN RIVERS.

SIR,— Harbourmaster's Office, Thames, 8th June, 1910.

I send you a lithographed chart of the Thames River lower reaches—that is, below Hikutaia. As I think that the run of the stream from Paeroa rarely gets below Hukatia, on account of the flood tide meeting it there or thereabouts, I think the various recommendations as to snagging the river, forming stop-banks, and in other ways confining the channel within reasonably steep banks is worthy of due consideration. It appears to me to be a question of getting rid of the slimes as easily as possible without injuring any one, or as little as possible; and I think that scouring the channel out, outside Opani Point, and so lowering the fall, is as easy and feasible a method as could be adopted. I have shown in red lines on chart two courses. The eastern one, or Thames side, would need some amount of dredging to cut through the hard sand and shells as shown inside the lines. The lines more to the westward, W. by N. ¾ N., would, in my opinion, only require raking or vigorously agitating on the ebb tide to scour away almost any silt that comes down with ordinary freshes. If these channels, or either of them, were scoured out, say, 8 ft. deeper than the water shown on the plan, I opine it would be sufficient to scour away any slimes brought down. It might require to be done or raked over again as time went on, but experience has taught most of us that, once dredging or scouring has been started, it has to be continued at intervals. If the N.W. by W. line were taken, it would be necessary to form half-tide training-walls, and pump the sand and *débris* over on to the Thames side, with a suction dredge for preference; but if the more westerly line were adopted, it, I think, could be done with a raking or scarifying method, working only on the ebb tide.

Years ago, in Cornwall, where silt from the tin-mines was blocking up a channel, it was found necessary to adopt a method of raking, so as to make use of the ebb to carry away the silt, and Mr. Charles Manuel has described roughly to me the way in which it was done—viz., by having a rotary barrel with pointed arms set into the barrel, and by a method of lowering this down and keeping it revolving the sand and silt were well loosened up, and the scour took it away. Such a revolving-barrel could be fitted to almost any dredge-ladder, and gear would be necessary in the shape of an endless chain, with a gipsy (sea term) on both barrels, and deck winch, and some method of supporting the ladder at a required depth.

I have not had time to think out the mechanical details of such a raking-machine, but the method appears to me very feasible. Doubtless it might be found that some assistance in the shape of dredging would be wanted to assist the raker; but what I contend is, that by deepening the channels where they spread out on mud-flats, for want of confining and scouring, a great part of the present difficulty could be overcome.

As to where the cost of such work shall be obtained, those who have had the benefit of the river for use as a sludge-channel, and the powers who granted them the right, should find the means. It

looks to me from the agitation at present going on for bridges across the river that in a short time the upper reaches in the river will be a negligible quantity, and that navigation will have to cease, and the traffic be carried on from some convenient site either inside or outside the river and by rail. As long as the channel is kept deep enough everything can be washed to sea. It may, like other places known, shoal again outside, and consequently need following and raking further out; but it would be more gradual as time went on, having a much greater extent of ground to spread over and deeper water to sink in.

There may not be much in the idea here propounded, but I am assured by Mr. Manuel that in his part of Cornwall, where he learned his mining, it acted well and effectively.

I have, &c.,

T. C. Bayldon, Harbourmaster.

W. Ferguson, Esq., C.E., Chairman, Ohinemuri Silting Commission.

Note.—The Piako River mouth, if deepened three or four feet where now dry at low water, would, I think, assist in scouring.—T. C. B.

EXHIBIT 94.

STANDARD LABORATORY SCREENS FOR TAILINGS AND SLIMES.

Table showing Institution of Mining and Metallurgy Standard Laboratory Screens.

Mesh, or Apertures per Linear Inch.	Diameter of Wire.		Aperture.		Screening-area.
	In.	Mm.	In.	Mm.	Per Cent.
20	0·0250	0·635	0·0250	0·635	25·00
30	0·0167	0·424	0·0166	0·421	24·80
40	0·0125	0·317	0·0125	0·317	25·00
60	0·0083	0·211	0·0083	0·211	24·80
80	0·0063	0·160	0·0062	0·157	24·60
100	0·0050	0·127	0·0050	0·127	25·00
120	0·0041	0·104	0·0042	0·107	25·40
140	..	..	..	..	..
150	0·0033	0·084	0·0033	0·084	24·50
200	0·0025	0·063	0·0025	0·063	25·00

Diameter of Apertures of Screens actually used at Waihi and Junction Mills.

200-mesh,—
Waihi Gold-mining Company .. .. 0·085 mm., 0·095 mm.
Waihi Grand Junction .. .. .. 0·082 mm., 0·075 mm., 0·085 mm.

150-mesh,—
Waihi Gold-mining Company .. .. 0·115 mm.
Waihi Grand Junction .. .. .. 0·11 mm.

100-mesh,—
Waihi Grand Junction .. .. .. 0·16 mm., 0·15 mm., 0·16 mm., 0·165 mm.

9th June, 1910.

Wm. Frank Grace.

The Waihi Grand Junction Gold Company (Limited),
Waihi, Auckland, N.Z., 13th June, 1910.

Dear Sir,—

As requested by you, I communicated with the various mines in this district to obtain, if possible, samples of the various screens as used in the respective laboratories for making their sizing-tests, and herewith append a list of the results of examinations, and also small samples of the screens tested, and a small piece of a standard 80-mesh screen.

I am also enclosing two letters from Messrs. Greening and Sons, of Warrington, England, in which you will see they state they only make up to 120-mesh. I have, however, so far only been able to obtain from them the 100-mesh, and as this is so much finer than the commercial 100, I have had to defer the introduction of the standard screens until such time as I could obtain a complete set up to, say, 200-mesh, and also until I have completed various comparative tests on the efficiency of various changes I have made in our mill. You will note that standard 80-mesh is very nearly what our 100-mesh screen runs.

As you might like to peruse the Institute of Mining and Metallurgy Standardization Table, I have enclosed it, but would like you to return me the same.

I regret that Mr. Daw did not send me any samples, and I enclose you his reply to my letter.

Trusting this will give you all the information you require,

Yours, &c.,

Wm. Frank Grace.

The Chairman, the Royal Commission of Silting of Ohinemuri and Waihou Rivers, Wellington.

MICROMETRIC MEASUREMENTS OF APERTURES OF SCREENS IN USE AT THE MILLS AT WAIHI AND KARANGAHAKE.

No. of Sample.	Used as	Mill.	Average Diameter of Aperture.	Maximum Diameter.
			Mm.	Mm.
No. 1	60-mesh	Waihi Mill	0·240	0·26
,, 2	,,	Waikino Mill	0·244	0·27
,, 7	,,	Junction Mill	0·235	0·24
,, 3	80-mesh	Waihi Mill	0·197	0·20
,, 4	,,	Waikino Mill	0·185	0·19
,, 5	100-mesh	Waihi Mill	0·170	0·18
,, 6	,,	Waikino Mill	0·165	0·17
,, 8	,,	Junction Mill	0·160	0·17
,, 9	30-mesh	Talisman Mill	0·500	0·52
No. 10	80-mesh	Standard I.M.M.	0·160	..

Waihi, 15th June, 1910. WM. FRANK GRACE.

From N. GREENING AND SONS (Limited), Warrington, England.

DEAR SIRS,—

We are much obliged for your esteemed favour of the 2nd instant. In reply, we have pleasure to enclose you a list of the I.M.M. standard laboratory screens; also our quotation for same. We have all numbers from 5 to 120 ready, which we can supply in 8 in. squares, or made up into sieves. We are not yet ready with the 150 and 200 meshes. As soon as we are we will advise you.

We shall be glad to know what we may have the pleasure of doing for you.

Awaiting your further favours.

We are, &c.,

For N. GREENING AND SONS (LIMITED):
LIN. GREENING.

The Waihi Grand Junction Gold Company (Limited), 18 Finsbury Circus, London, E.C.

Quotation from N. GREENING AND SONS (LIMITED), Warrington.

DEAR SIRS,— 3rd November, 1909.

In reply to your esteemed inquiry of the 2nd instant, we have much pleasure in quoting you as under, and trust we may be favoured with your valued orders, which shall have our most careful attention.

Place of delivery—Warrington.
Time of delivery—
Terms of payment—Net cash, 10th of month following d/y.
Open for acceptance—
Packing, if any, at cost-price extra.

All orders are taken subject to strikes, fire, and other causes of delay beyond our control.

I.M.M. Standard Laboratory Screens.

In 8 in. Squares, without Frames.

No. 5, 8, 10, 12, 16, and 20 mesh steel	At	5/4 per 8 in. square.
No. 30 and 40 mesh brass	,,	5/4 ,,
No. 50, 60, 70, 80, and 90 mesh brass	,,	6/8 ,,
No. 100, 120, 150, and 200 mesh brass	,,	8/0 ,,
If with brass frames, 8 in. diameter	,,	13/6 each extra.
If with japanned tinned steel frames, 8 in. diameter	,,	4/0 ,,
Brass lids	,,	3/8 ,,
Brass bottoms	,,	3/8 ,,
Japanned steel lids (tinned)	,,	2/0 ,,
Japanned steel bottoms	,,	2/0 ,,

Yours, &c.,
For N. GREENING AND SONS (LIMITED):
LIN. GREENING
(Sole Proprietors of the Brand, "Agate Steel").

Messrs. The Waihi Grand Junction Gold Company (Limited), 18 Finsbury Circus, London, E.C.

THE INSTITUTION OF MINING AND METALLURGY.—STANDARDIZATION.—MESH OF WIRE CLOTH.

The following table of "I.M.M. Standard Laboratory Screens" is intended for use in making grading-tests, and for the correlation of screens used in commercial or other work.

When screens other than the I.M.M. standards are employed, the diameters of apertures should be given in any published results, so that comparisons may be made.

When screens are described simply by the number of meshes per linear inch, it will be understood that the I.M.M. standard is referred to.

The number of sizes standardized has been reduced to a minimum, as it is desirable to abandon excessive refinements in grading-tests. It is believed that the I.M.M. standards will meet all necessary requirements of the laboratory.

In reporting grading-tests, it is desirable to state whether wet or dry screening has been employed.

I.M.M. Standard Laboratory Screens.

Mesh, or Apertures per Linear Inch.	Diameter of Wire.		Aperture.		Screening-area.
	In.	Mm.	In.	Mm.	Per Cent.
5	0·1000	2·540	0·1000	2·540	25·00
8	0·0630	1·600	0·0620	1·574	24·60
10	0·0500	1·270	0·0500	1·270	25·00
12	0·0417	1·059	0·0416	1·056	24·92
16	0·0313	0·795	0·0312	0·792	24·92
20	0·0250	0·635	0·0250	0·635	25·00
30	0·0167	0·424	0·0166	0·421	24·80
40	0·0125	0·317	0·0125	0·317	25·00
50	0·0100	0·254	0·0100	0·254	25·00
60	0·0083	0·211	0·0083	0·211	24·80
70	0·0071	0·180	0·0071	0·180	24·70
80	0·0063	0·160	0·0062	0·157	24·60
90	0·0055	0·139	0·0055	0·139	24·50
100	0·0050	0·127	0·0050	0·127	25·00
120	0·0041	0·104	0·0042	0·107	25·40
150	0·0033	0·084	0·0033	0·084	24·50
200	0·0025	0·063	0·0025	0·063	25·00

NOTE.—Whilst *absolute* accuracy to the fourth place of decimals of an inch is impracticable in the manufacture of wire cloth, a sufficiently close approximation to the above standards is attainable.

The adoption of a screening-area of 25 per cent., necessitating equality of size of wire and aperture, secures perfect interlocking, and consequent permanence of aperture.

Some of the finer-mesh screens can only be woven in what is known as "twilled."

By order of the Council.

Salisbury House, London, E.C., 4th November, 1907. C. MCDERMID, Secretary.

The Waihi Grand Junction Gold Company (Limited),
Waihi, Auckland, N.Z., 23rd June, 1910.

DEAR SIR,—

I received yesterday the screens as used by the Waihi-Paeroa Gold-extraction Company, and herewith append the micrometric measurements of the apertures. I regret I cannot send pieces of the screens, but the only ones sent me are mounted, and cannot therefore be cut without spoiling them.

Screen 100-mesh: Average diam., 0·155 mm.; maximum diam., 0·16 mm.
" 150- " : " 0·085 mm.; " 0·09 mm.
" 200- " : " 0·075 mm.; " 0·08 mm.

The 150 and 200 mesh were "twilled."

I am, &c.,
WM. FRANK GRACE.

William Ferguson, Esq., M.A., Chairman, The Royal Commission on Silting of Ohinemuri River.

EXHIBIT 95.

WAIHI-PAEROA GOLD-EXTRACTION COMPANY'S APPLICATION FOR NINE RIVER CLAIMS.

WARDEN'S WRITTEN JUDGMENT AND NOTES OF EVIDENCE.

JUDGMENT.

THE Waihi-Paeroa Gold-extraction Company are the applicants for nine river claims, embracing that portion of the Ohinemuri River lying between a point near Mackaytown and a point about half a mile above the junction of the Waihou and Ohinemuri Rivers. These claims are to be taken up for the purpose of collecting and treating the auriferous tailings lying in the bed of the river, with the object of extracting the remaining gold therefrom. The tailings mentioned have been discharged from the quartz-crushing mills at Waihi, Waikino, and Karangahake for a number of years past, and have been brought to the place at which they are now lying by the action of the Ohinemuri River.

The applications were objected to by the Thames Harbour Board, the Thames Borough Council, and the Thames County Council; also by Arthur Charles Hubbard on behalf of certain residents of Paeroa, by the Netherton Branch of the New Zealand Farmers' Union, by Samuel Charles Laughlin, William Moore, and the Thames Valley Co-operative Dairy Company. The objectors oppose the granting of the applications on the grounds, generally, that the operations of the claim-owners will injuriously affect private property, the navigation of the river, the Thames Harbour, and the fishing industry at the Thames. During the hearing of the applications it appears, however, that if the licenses are made subject to a condition that the grantees are not to return the tailings to the river after they have dealt with them, the objection to the granting of the licenses will not be maintained. This condition, it is argued, the Warden can impose under subsection (*i*) of section 170 of the Mining Act, 1908. In addition to those mentioned above, objections were lodged by William Marsh, Tuuti Ti Putu, Asher Cassrels, Rihitoto Mataia, Frederick Cock, and Susannah Jamieson, on the ground that the claims applied for, or some of them, encroach on their private lands. All these, however, are withdrawn, with the exception of those of William Marsh, who objects to the applications for claims Nos. 8 and 9.

The matter of the company's applications seems to have aroused much interest in the district, particularly among residents holding properties on or near the Ohinemuri and Thames Rivers. It appears from the evidence taken at the hearing in Court that these people are convinced that by reason of the discharge of tailings into the river they are made to suffer great loss and injury to their lands and to the pastures and crops, and are injuriously affected in their use of the Thames River because, they assert, its navigation is being destroyed, and they believe that the intended operations of the applicant company will add to the evils complained of. The matter is one of great importance, therefore, not only to the applicant company, who contemplate spending a large amount of capital in the erection of their plant and in the prosecution of their work, but also to a considerable section of the public, who are apprehensive of injury to their property by the company's intended operations.

A large amount of evidence was placed before me. Much of that given by the objectors was not pertinent to the applications under consideration, but was directed to show generally the injury already done and now being done by the use of the rivers mentioned as sludge-channels. The matter was ably argued on both sides, and after giving the question careful consideration I have come to the conclusion that, in view of the Governor's Proclamation and the provisions of the Mining Act, it is not competent for me as Warden, if I grant the applications, to prohibit the licensees from using the Ohinemuri River as a sludge-channel. This river, with the Thames River, with their tributaries (except Tarariki and Komata Creeks), were by Proclamation of the Governor in Council of the 25th March, 1895, declared and proclaimed, as from the 10th July, 1895, to be watercourses into which tailings, mining *débris*, and waste water of every kind used in, upon, or discharged from any claim or licensed holding adjacent to such watercourse should be suffered to flow or be discharged. This Proclamation was made under the provisions of the Mining Act, 1891, but is still kept in force by the operation of section 6 of the Mining Act, 1908. Subsection (*a*) of section 135 of the Mining Act, 1908, gives to holders of claims situated in the watercourse the right to discharge their tailings and other *débris* into the watercourse. The claims before the Court are taken up for the express purpose of working the bed of the river, and it does not appear to me that, because the licensees will, in the process of treating the material, have to lift it out of the river-bed, their right to the use of the river as a sludge-channel is thereby in any way affected, or that a condition that this material is not again to be returned to the bed of the river can be imposed without infringing their statutory rights. If it were possible to deal with the tailings without removing them from the river, it is clear that it would be impracticable to place a restriction upon the use of the sludge-channel, unless, of course, the Warden refused to grant a license at all.

There is no gainsaying the fact that the use of the river as a sludge-channel has in many instances operated injuriously to holders of property along the river-bank, and that in portions of the river the water has shoaled to the extent of preventing its navigation, at any rate for the time being. But if, moved by a desire to end or amend this condition of things, I begin by refusing these applications, or by imposing conditions prohibiting the use of the proclaimed sludge-channel, I must be consistent, and refuse all future applications for claims on or near the Ohinemuri River; or, if I grant them, restrain the owners from using the river as a watercourse into which they may discharge their tailings and *débris*. By doing this I should be virtually closing the sludge-channel except to the claims now using it. I should, in fact, be nullifying the Governor's Proclamation. This I have not the right or power to do. Now, in respect of claims on the banks

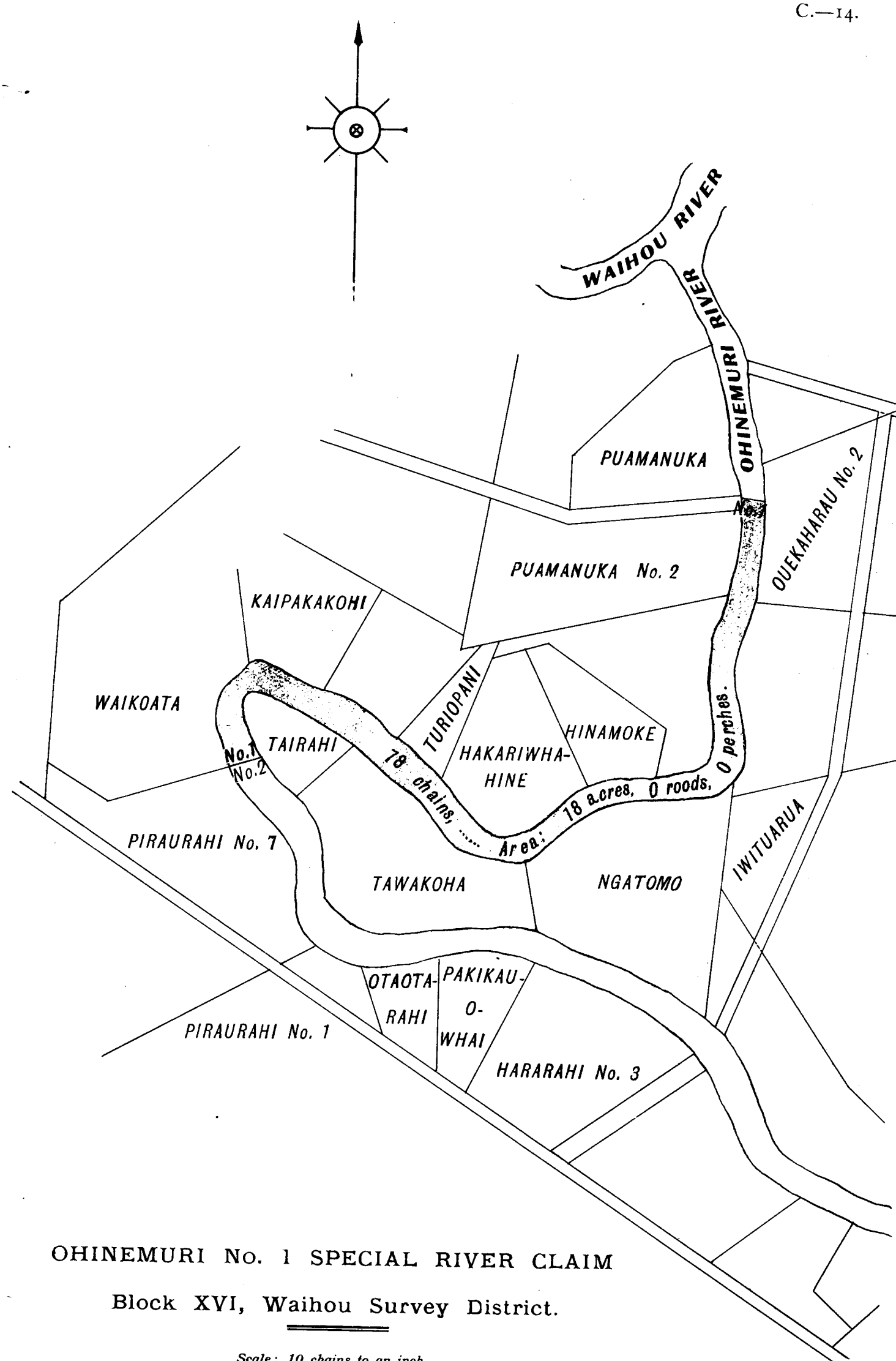
of or near to the Ohinemuri River the working of which would necessarily add to the tailings and *débris* already in the river, I could not refuse to grant licenses nor prohibit the use of the river as a sludge-channel. I can have still less jurisdiction for so acting with regard to the claims now applied for, the operations on which will not add anything to the quantity of tailings already in the river. But it is urged that if I cannot take away the right of the grantees to put their tailings back into the river when once their applications are granted, I can, in exercise of the powers given to the Warden under subsection (*m*) of section 165 of the Mining Act, 1908, refuse the applications altogether on the ground that it is against the public interest that they should be granted: *In re* Patterson, xvi N.Z. L.R., 295 cited. If I hold the granting of these claims to be against public interest, I can only do so because the company intend to use the Ohinemuri River as a sludge-channel—a thing which under the Governor's Proclamation and the Mining Act they are distinctly entitled to do as owners of claims in the watercourse. That is to say, I am to refuse this company's licenses for their claims because they intend to do what they have a positive right to do. If the objectors' contention is sound, then it would be applicable to all claims hereafter applied for, the tailings from which would find their way into the Ohinemuri River; and to give effect to it would be virtually to stop any increase to the number of mining claims as at present existing. What the objectors are apparently aiming at is to procure the disuse of the Ohinemuri River as a sludge-channel. But this sludge-channel exists by virtue of the Governor's Proclamation giving to all miners with claims adjacent to it the right to use it for the disposal of their tailings, &c., and that fact cannot be overlooked by me, nor can I overlook the fact that the Mining Act in force at the time afforded opportunity to all persons then affected by the Proclamation to claim and obtain compensation for any actual or prospective damage.

The conclusion at which I have arrived is that I cannot refuse the applications on the grounds put forward by the objectors, nor can I impose a condition forbidding the return of the tailings to the river. Whatever may be the effect on my mind of the evidence with regard to the injury done to the settlers near the river, it will not give me the right to interfere in such a way as to render nugatory the Governor's Proclamation and deprive mine-owners of the rights conferred by it. The applications therefore will, upon the surrender of the existing titles, be granted, with the exception of those for claims Nos. 8 and 9, to which Mr. Marsh has objected. These are adjourned, and will be dealt with at a future date.

I am of opinion that the Warden, though not empowered to interdict the use of the sludge-channel, could, if he deemed it in the public interest to do so, impose reasonable conditions stipulating the place of discharge of the material back into the river, and this I have been asked by certain of the objectors to do in the event of my deciding to grant the applications without a condition forbidding the use of the Ohinemuri River for the return of the tailings. The question is whether the circumstances of the case demand that such should be done.

It appears from the evidence that during recent years a bank—by some witnesses called an "island"—has formed at the junction of the Waihou and Ohinemuri Rivers. It is alleged by several of the witnesses called for the objectors that this island has been formed by tailings brought down by the Ohinemuri. It appears, however, to have been caused originally by some obstruction carried there by the river on which fragments of willow have caught and grown, and around which tailings and river-drift have accumulated. It is alleged by several witnesses, particularly those resident at Netherton, that this island, by interfering with the current of the Waihou River, causes it to flow back over the low lands above the Junction, whence it finds its way to Netherton, flooding the land, and causing great injury and loss to the settlers by the damage done to the grass and growing crops. It is urged that if the applicant company is permitted to return the tailings to the river at the point indicated as the site of the reduction plant (about three-quarters of a mile above the Junction in the Ohinemuri River) the obstruction at the Junction previously referred to will be much increased, and the damage from floods greatly aggravated. No doubt, if the tailings were to be returned to the river in the condition in which they are removed, it would result in a decided accretion to the island and seriously impede the flow of the Waihou River. The evidence shows, however, that the material lifted out of the river will be subjected to a process of such exceedingly fine grinding that the resulting tailings, or, as they are called, slimes, will be carried away by the action of the river before they have time to permanently settle in the river or be deposited on the banks. The objectors and their witnesses contend that even the finest-ground tailings are deposited in the river or on the river-banks, and during times of high flood spread upon the land. The evidence is abundant that the coarser tailings are to be found in large quantities in the river, particularly above the Junction; but the evidence as to the accumulation of the fine tailings—the slimes—is by no means so positive. In fact, numbers of witnesses were challenged to say if anywhere they had seen a deposit of 2 in. of slimes, and were unable to do so.

Having come to the conclusion that I cannot prevent the use of the river as a sludge-channel by the applicant company, it is unnecessary for me to weigh the evidence generally as to the present or future damage to the lands of the settlers, or to the navigation of the river and harbour, or as to the injury done, or likely to be done, to the fishing industry by the discharge of tailings into the river; for these considerations cannot, for reasons I have given, influence my judgment with respect to the present applications. I am concerned now to know whether, by collecting tailings from eight or nine miles of the river at a point within less than a mile of the obstacle in the river at the Junction, and by liberating them into the river daily from that point in large quantities (500 tons a day), the company will be increasing the injury and damage already caused by the presence of the tailings in the river; and, if so, whether this could be in a measure avoided by compelling the company to deposit the tailings below the Junction. The evidence on behalf of the applicant company, given by men of long experience in the crushing and the treatment of ores and in dealing with the tailings and slimes—the pulverized ore from which the bullion has been extracted—goes to show that the slimes escaping into the river at the proposed site will not sink through the water and form a bank in the river, but will be swept by the current past the obstruc-



OHINEMURI No. 1 SPECIAL RIVER CLAIM

Block XVI, Waihou Survey District.

Scale: 10 chains to an inch.

605.8"10.100C

tion in the channel, and will be carried much further down the river than if they had remained in their coarser form, and will in all probability in time reach the sea. The evidence is that experience has shown that these slimes, from their excessive fineness and lightness, will not settle permanently: although during slack water at the turn of the tide a small proportion of them may sink to the bottom and be left by the falling river, they will be lifted again on the inflowing river at flood tide, and when it flows down once more will be deposited again further down the river, but never resting in one place long enough to form a deposit of more than an inch or two. This appears to me, therefore, to be an answer to the contention of the objectors that these tailings will add to the existing obstruction at the Junction, and increase the liability to flooding of the Netherton district. The condition of the river will not be rendered any worse than it is, and there is a probability that it will be improved. I do not think, therefore, I should impose any restriction as to where the tailings shall be returned to the river. There is also this further consideration: that it has been shown in evidence that these slimes will not flow along a comparatively flat surface, and a channel through which they could run would have to be erected at a considerable angle, and large quantities of water would have to be pumped from the river to cause them to flow. In view of the evidence as to the action of the slimes in the river, it would be unreasonable to compel the company to incur such a large expense for the purpose of carrying their slimes to the Junction, when the water of the river will do it equally as well.

I do not make any condition, therefore, as to the point from which the tailings will be returned to the river, but, as the claims are bounded all along their course by private lands, I impose a condition that for the protection of these lands no operations shall be carried on in the bed of the river on any of the claims within 2 ft. of the bank on each side.

Vol. x, folio 100.—No. of license: 7289.—Form 29 (Reg. 33).

Under the Mining Act, 1908.

LICENSE FOR A CLAIM OTHER THAN AN ORDINARY CLAIM.

PURSUANT to the Mining Act, 1908, I, the undersigned, Frederick James Burgess, Esquire, a Warden of the Hauraki Mining District, do hereby grant to the Waihi-Paeroa Gold-extraction Company, of Auckland, this license for Ohinemuri No. 1 Special River Claim, in respect of the land described in the First Schedule hereto.

This license is granted for a term of forty-two years, commencing on the date hereof, subject to the payment of the rent as specified in the Second Schedule hereto, and also to the terms, conditions, reservations, and provisions set out in the aforesaid Act and the regulations thereunder, and to such additional terms, conditions, reservations, and provisions as are specified in the Third Schedule hereto.

In witness whereof I have hereunto subscribed my name, and affixed the seal of the Warden's Court at Paeroa, this eighteenth day of March, 1910.

F. J. BURGESS, Warden.

First Schedule.

All that area of land in the Hauraki Mining District, containing by admeasurement 18 acres, more or less, situate at Paeroa, being portion of Block XVI of the Waihou Survey District; as the same is more particularly shown on the plan drawn hereon, coloured blue.

Second Schedule.

1. A rental in respect of each acre, or portion thereof, at the rate of 2s. 6d. a year for the period elapsing between the date hereof and the last day of June ensuing after the expiration of one year from the date hereof, 5s. for the next succeeding year, and 7s. 6d. for each subsequent year during the term of the license; the amount of the rental being for the first year £2 5s., for the next succeeding year £4 10s., and for each subsequent year £6 15s.

2. All payments in respect of the aforesaid rent have been duly made up to the last day of June next following the date of this license, and the subsequent payments are to be made by half-yearly instalments in advance, the first half-yearly instalment being due and payable in advance on the last day of June aforesaid.

Third Schedule.

1. The right of the public to use the river for ordinary purposes and for public traffic is reserved.

2. That the owner hereof will *bona fide* and continuously work the claim by carrying on mining operations for gold thereon with reasonable diligence and skill, and will commence such operations within twenty-one days from the date of this license.

3. That the licensees, their successors or assigns, will not carry on mining operations in that part of the bed of the river on any of the claims within 2 ft. of the bank on each side.

4. That this license is issued subject to the provisions of the River Boards Act, 1908.

F. J. BURGESS, Warden.

WARDEN'S NOTES OF THE EVIDENCE.

James Henry Adams, sworn: Employed by my brother, Mr. E. F. Adams, surveyor, Thames. I was instructed to peg out these claims. I marked out nine claims; commenced at No. 4; put in regulation-sized pegs; marked out as required by the Act. The claims from No. 4 downwards were pegged from a boat: we pegged first one side of the river, and then the other. No. 4 claim pegs marked with E/4 and No. 3 claim with E/3, and each claim I marked with E over the number of the claim up to No. 9: cut lockspits at each peg. Pegs were put in at commencement and termination of claim. I also put in pegs at every bend of the river with lockspits. Every claim had terminal pegs, as well as at the bends of the river. Pegs were put in close to the edge of the river: put in at half-flood marks, or perhaps below that. I had tracings of the claims when I marked them out. I marked out the claims in strict accordance with the plans. I posted a notice on each claim. I conformed to all regulations as far as possible in marking out these claims. In claim 7 I put a peg as close to the river as I could, so as not to include any of the occupier's land if possible. Claim No. 8: I do not remember any of Mr. Marsh's land being included. I put peg close to the river; may have been a foot or two away. In claim No. 7, terminal peg is where bank is sloping; I put peg about half-way up the bank. Claim No. 5, highest peg is pretty close to the water; on the bend of the river above put peg close to the bank: the terminal peg is close to an old willow. Peg was nailed to this willow in No. 6 claim. Know Mr. Nicholls's land; think peg put fairly high up on the bank, where the silt-mark meets the grass in the paddock.

By Mr. Clendon: Claims commence half a mile above the Mackaytown boardinghouse, and finish at the Junction, extending over eight miles: claims are all adjoining. I should say that the claims are coterminous with the existing claims. Pegs are within 10 ft. or 15 ft. of the original pegs. I used compass bearings to find the positions. So far as I am aware, I am within 10 ft. or 15 ft. of the original pegs. Cannot say how many channels at Marsh's. I was present and saw every peg put in; marked on both sides of the river. I did not put in any peg 3 chains from the river. Cannot say if river-bed is in same position as when these claims were surveyed some years ago.

By Mr. Miller: Pegs are practically in position of old pegs. Original pegs are all covered with silt. Could have put new pegs directly over the top of the old pegs. I put the pegs in such positions that they would not be washed away, and could be maintained, and as near as possible to the position of old pegs. Pegs put over the old pegs would be liable to be carried away by floods. I did not find the old position: did not find any of the old original pegs. Pegs could have been put in the original spot, but they would have been difficult to maintain.

Re-examined: I had assistants with me when I put in the pegs: had William McMahon with me. At terminal peg of claim No. 8, I put in new peg within 10 ft. or 15 ft. of the position of the old pegs. I took compass bearings for the terminal pegs; ground included in pegs I put in is the same as shown on the plans in Court. I have no recollection of going back 3 chains from the river and putting in a peg. Never went back a chain. Put them on the bank of the river where people could see them.

(Miner's right produced, 70849, dated 12th May, 1909; also newspaper containing copy of advertisement of applications.)

William McMahon, sworn, saith: Assisted Mr. Adams to peg out these river claims. I have no recollection of putting in any peg 3 chains from the river-bank. We put pegs as close as we could get to the river-bank. If there was a willow-tree close at hand we fastened the peg to the willow-tree. I do not think we went more than 8 ft. or 10 ft. from the river-bank at the most. Mr. Adams took the bearings of each claim. Each claim was pegged at the terminal, and on each side of the river.

Examined by Mr. Clendon: I do not know a great deal about the Mining Act. Put in pegs and lockspits: lockspits mostly 4 ft.: depth about a foot: about a foot wide. Did not measure them all, but I should say they were about a foot. Did not know anything about existing claims. We kept away from the water's edge, as we thought the pegs might be washed away.

Prima Facie *Case for Applicants*.

It is agreed, That evidence given by George Warne at Thames be admitted as evidence in this case also: that the evidence of William Baker, W. J. McCormick, and W. H. Lucas, if given, would corroborate the evidence of Mr. Warne.

That evidence of Albert Bruce, William Henry Baker, Thomas Cook Bayldon, and William Reddish be admitted as evidence in this case.

That Charles Taylor, Henry Kerby, and Frank Robinson would, if called, corroborate the evidence of William Reddish as to the effect of the tailings in the Thames River upon the fishing industry of the Thames.

It is also admitted that Mr. R. N. Buttle would give evidence that a bank has been formed in front of his place on the Thames River opposite Kopu. It is also admitted that Mr. Kerby's evidence would be that he is trading up and down the river with steam-launch for some years: that the river is getting shallower; and that, owing to the shoaling of the river, he cannot navigate the river as he could do in previous years: and that he corroborates the evidence of William Reddish as to the fishing industry.

(All objections of owners of private lands *re* encroachment are withdrawn, except with respect to Mr. Marsh. Question of costs to be reserved till conclusion of the case.)

For the Objectors.

Arthur Charles Hubbard, sworn, saith: Objector on behalf of Thames Valley Co-operative Dairy Company, and on behalf of Paeroa residents. I was appointed by a meeting of Paeroa residents on the 6th January to object on their behalf. I represent the dairy company. I am chairman of directors of that company, and authorized to object on their behalf. I am acquainted with what has been going on with regard to discharge of tailings in Ohinemuri and Thames Rivers. I have made calculations from the published returns of the mining companies, and find considerably over a thousand tons a day are treated at the different batteries. Majority of this is sluiced into the river. A great quantity of this stuff lodges in the river. I mean, it never gets out to sea—remains in river and on the banks. It is a solid, and sooner or later it must settle. Round about Paeroa, river is affected by the tide. I know Mr. Marsh's property, and I understand they commence there. I cannot speak with certainty, but I have seen the tide running up under the bridge. The tide affects the water beyond the bridge. We have on our farm (brother's and mine) a considerable extent of low-lying land which we have tile-drained. These tile drains lead out into open drains. This drain opens into the sludge-channel. This sludge-channel is the Komata Creek, and it empties into the river. Though this creek has been used as a sludge-channel for several years, it has not materially affected the working of the tile drains. At the commencement of this winter I had the open drain cleaned out; before the contractor had finished his work a fresh took place. This fresh lodged a considerable quantity of silt in drain, and I had to pay the contractor extra to remove the tailings. Shortly after he completed this job another fresh came along, and lodged another deposit of tailings in the drain, and again I had to let a contract to clean it out. A third fresh came shortly after this and lodged a fresh deposit, and it is there still. Tile drains cannot work while outlet is choked up. I have been in the district rather over seventeen years. Shortly after I came up here I had occasion to go out to Mr. Marsh's, and crossed the river. At that time the banks of the river ran right down to the water's edge, and Marsh's cows fed on them. I have been out at different times, and I have noticed gradual silting process going on, until now there is an area of ground, estimated by Mr. Marsh at 20 acres, covered with silt. Marsh lives six or seven miles away from me. I have heard of general damages, but I have never been to see them. I have nothing to say about shoaling the river. I know locality where claims are. River is very tortuous there. When January floods occurred two years ago, one settler had for his cheque for one month £150 (Fisher Bros.). This flood stood for some days on his place at Netherton, and when it subsided the grass was killed. He had to turn his stock out; sent them away to graze.

(Adjourned to 7.15 p.m. Resumed.)

Fisher's cheque for the month of February was £1 9s. 8d. He could not continue milking, for he had to replough and resow his farm. Great many farmers affected same way. For the December month of 1906 the total payments to settlers for creamery was about £1,296, and the payments for February following was £500-odd (December, £1,275 10s. 10d.; and February, £574 3s. 2d.). This is the Netherton creamery only. Always is falling-off after December. The payments next December, £881 19s. 8d., and payments for February, £632 11s. 2d., showing much less falling-off than for previous year. Large deposits of tailings can be seen by any one going along the river. Majority of our supply comes from the river-flats. In conjunction with residents we have taken steps. Have sent deputation to Wellington. Several Ministers have been here. Have taken them up and down the river, and have had witnesses before them. They made us promises. We had a deputation at Wellington within the last two months. Silting Association have letter saying Government will set up a Royal Commission to inquire into silting. During flood in January, 1907, had a paddock cut and standing in stooks. Flood came over the paddock, and great portion of these oats were under water. Damage done by water was intensified by the silt lodging in the sheaves. The Komata Creek is our boundary, and there is deposit of silt all along our boundary. Before the trouble with silt our grass grew to the water's edge. In some places silt is 12 ft. up the bank. In natural state creek formed natural boundary. Now all holes are filled up, and we have had to fence our land. I took a glass to-day at 12 o'clock and filled it with water; at 2 o'clock there was indication of settling of deposit in the water.

Cross-examined: I have tried to be fair in giving my testimony in this case. I have been here seventeen years. Our lands have during that time been liable to be flooded. There were heavy floods over this district at the time I mention about Fisher's paddock. I knew at that time that all the Waikato was as well under flood. It is the general term to call the *débris* "tailings"—ground ore from the mines. I know Roach's property. I do not know his drain. I have heard it contended that this drain had helped to put *débris* into the river. Never considered it necessary to investigate this. My experience of Komata is that natural silt brought down the river did not settle. It went into the Waihou River. It was continually on the move. I know a proportion of the Waihi tailings is slimed. I have been informed that 60 per cent. is slimed. I have only seen slimes in liquid state: no opportunity of seeing slimes in dry state. I never examined the river close enough to see if slimes would be deposited to a depth of 3 in. Cannot say how many persons were present: I think about fifteen. Believe there are fifteen hundred people in Paeroa. Due notice was given of the meeting. Those principally concerned were at the meeting—viz., Mr. A. J. Thorp (a member of River-silting Association), also Mr. John Thorp, Mr. Moore, Mr. F. Cock, Mr. Brunskill, Mr. S. Hunt (not a member of association), Mr. Whitten (not a member), Mr. Edwards (not a member), Mr. Laughlin, Mr. Nicholls (member and secretary of association), Mr. Buchanan (chairman), Mr. Martin (not a member at that time). I cannot remember any more. I consider we do represent the inhabitants of Paeroa. Great many people gave us financial support, though they did not attend the meeting. I remember when this river was declared a sludge-channel. I did not take much interest in public matters at that time. My

father at that time took an interest in public matters. There are willows in Komata Creek. I consider the deposit of tailings is responsible for the growth of the willows. I do not consider the growth of the willows is mostly responsible for the condition of the river. I believe the willows are partly responsible for the state of the river. The presence of the willows tends to retard the scouring of the river. I hold 665 acres of land. I should say about 5 acres of that show signs of tailings upon them. These are on a shelving bank of the creek, and on a low flat of 2 acres in extent. Greatest depth 6 ft. There is a depth of 6 ft. over probably half an acre. I do not know where the water came from over Mr. Fisher's. I will not swear it came from the Ohinemuri River at all. I will not contradict the statement that it came from the Waihou above the Junction. I am not aware of drains leading into Netherton from other districts. There is a drain by the creamery. It starts in Netherton, and leads into the river. Netherton fairly large district. This drain is bringing water from higher land on to low land at Netherton. Great proportion of Netherton land is clay land. Been subject to water lying on it. Drains put in to get water into the river. The bank of the river is higher than Netherton land.

Re-examined: Cannot say with certainty if any tailings coming down the Waihou: do not know of any. Meeting was called for the purpose of considering if we should object to the application. I do not think more than two days' notice was given. Meeting was held, I think, on the 6th January. Notice given by advertisement day before. We had a meeting previous to consider previous objection. We had two public meetings to consider question. At first meeting I should think there were fully twice as many people present. I personally canvassed Paeroa, and two other gentlemen canvassed Netherton.

Frederick Cock, sworn, saith: Settler residing at Paeroa. First came to district in 1874. Got the property where I now reside on the Ohinemuri River. I have resided there ever since. My place is situated two miles above Paeroa. When I went there, about 8 ft. of water in the river at my place. The tide would make a difference of sometimes 4 ft., sometimes more. Material for my house brought up in a cutter drawing 7 ft. of water. About 7 in. of water at my place. Tide makes a difference of 1 ft. or 2 ft. You can ride a horse across at high water. Good few willows along bank at my place. Waihi dumpings has caused shoaling of the river. My land goes right down to the water of the river. I claim to the middle of the river. In previous years I could use the land to the water's edge; plenty of cocksfoot on it. In those years I was able to use every part of my land. Cannot do so now. About 16 acres of pasture has been destroyed, and I have had to move my fences several times. In some places there are deposits of 25 ft. of tailings on my land. The configuration of the banks of the river has altered very much. Although I am bounded by the river I am compelled to fence to keep the cattle out. When fences got covered I took top wires off and used them again. I consider I am losing £30 a year by the loss of this land. That is what I should make out of it. The depositing of silt on my land still goes on. It has increased during past year. Former years we never had floods in the river unless we had three days' rain: now, after a night's rain my boat might be gone in the morning. I have had several tons of firewood brought up in launches. I have been agent for Northern Steamship Company until two years ago. Steamers traded from Auckland to Paeroa. The p.s. "Paeroa" came up to near where the bridge is. Then the steamers went to Wharf Street Wharf. Then they went to Junction. Now they go to the Puke. When the steamers ran to the Junction there was 12 ft. of water at the wharf. I have been on the steamer and seen them stirring up the silt: been on when they have been ploughing through the tailings. If steamers ceased running for a week they would not be able to get up again: channel would close up. River is tidal. When upflow meets downflow the tailings are deposited. I can see tailings covering other people's lands, and tailings are destroying the pasture. We have to pay our rates and taxes on the area covered with tailings. If works are erected to treat these tailings and grind them fine, I expect the river will be stopped up by the works. The tailings do not appear as if they would float away. Near Junction there is a deposit of silt. Ohinemuri River runs dirty and full of tailings. Waihou flows alongside it for some distance, quite clear. Plain line of demarcation between them.

Cross-examined: I have never seen the process carried out by applicant company at Waihi. I want all tailings removed and no more put into the river. That is the substance of my objection. I would object to any mining company taking up land and putting tailings into the river. I was here when river declared sludge-channel. I did not put in any objection. Never put in any claim for compensation for injury done to my land. I never objected to any claim being granted. I have seen no difference in the tailings lately. I know difference between rough and fine tailings. I have not noticed any fine tailings as the result of the company's recent treatment of the tailings. I do not know of any obstruction to the river except mining. I consider the willow-trees protect the banks. I do not say that the willow-trees do not hold the tailings. I am not qualified to say if they prevent the escape of the tailings. I am aware that the Ohinemuri County Council and River Board have no objection to this application; and more shame for them. I am aware, now you remind me, that the Government, in making the railway and the tunnel, put all the *débris* into the river. I have seen large boulders put into the river. Do not know anything about Roach's drain at Te Aroha. Have not been travelling much recently. Had very indifferent health last twelve months: not fit to go and examine works at Waihi. I do not know where they are. Did not find any boulders on my property. Know condition of river about here at present time. In Ohinemuri County Council cannot say how many goldfields members and how many farmers. I think the farming members predominate. The Ohinemuri Council is the River Board.

Samuel Jameson Laughlin, sworn: Farmer, Netherton. Been farming there about eleven years. Prior to taking up farming I was a certificated mine-manager, battery-manager, and amalgamator.

I do not claim to be an expert on tailings, but I claim to have a fair knowledge. Been twenty-four years in that occupation. I know position of present claims. My farm is below these claims—below the junction of Ohinemuri and Waihou. The damage is done at Netherton, principally by the Junction being blocked up, so far as I can see, by tailings, causing an overflow above the Junction by the flax-mill. The water flows over the land and rejoins the river at Netherton. January flood, two years ago, killed all the grass and a good many cattle. My income was from £3 to £3 10s. a week. After the flood it fell off to nothing. My neighbours were more or less in the same boat. In summer the ground is so hot that if water goes over it it scalds the grass and causes it to die. I attribute that flood to the tailings forming at the junction of the river. Along the banks of my place, from a chain to two chains in, my land is covered with 3 in. of the tailings, which I ploughed in. That, of course, made land poorer. It is a continual cost to keep the mouth of my drains clear of tailings. That causes me to lose some of my land. The only damage I can see is going on every day. River is rising, and encroaching on the sides. I think all the settlers are in the same boat as myself. There is a farm opposite Mr. Thorp's point where you can get tailings 4 to 6 chains inland. After January flood I counted five dead cattle on the land. All settlers suffer more or less, but I am speaking of my own. Tailings I saw were crystal tailings, and slimes which are of a lighter material. I have examined tailings many times on my land, and found they were tailings that had come through a mill—quartz tailings. I am satisfied that if present things go on we shall go under. Think I understand what present company are going to do. My opinion is that 60 per cent. will accumulate close to where it is dumped into the river. I have ground tailings as fine as the company propose to grind them, and I find that the finer you grind them the further they will travel, but when they settle the harder they will become. I think they will get a chance of settling, seeing that they are put into a tidal river. At high tide the water is perfectly still in the river: no current up or down. If the works are put a mile above the Junction, the Junction is going to have a bad time. I should say the drift in will carry the tailings as well as the drift out; hence they will settle. You will not get a quarter of a mile of straight river a mile above the Junction. That would not make much difference to the tailings: they would go so long as the river is moving. These tailings form a very solid mass, particularly where they shelve into the river. The tailings on the banks are more of a slimy, flowing kind. I have examined these shelving banks. The steamer used formerly to come alongside the bank; now her bow catches before she can get up to the bank. This result is not confined to my farm. You will find it in a hundred places along the river. The shelving bank of tailings is very hard. After a few days' rain these banks of tailings increase. Things are getting worse. In many parts of the river you will find pot-holes; they are gradually getting filled up. I measured them some time ago. I found a body floating in the river where it is now dry land. There seems to be a steady growth on the sides, and not so much on the bottom, which I attribute to the propeller of the steamer going up and down in the gutter. I remember when it was a river with beautiful clear water—that is, the Waihou. I cannot say as much for the Ohinemuri. The fine tailings, I have found in my experience, set harder than coarse tailings. I have two samples which I can produce. These are two samples sent by Mr. Aitken, manager Waihi-Paeroa Gold-extraction Company. These were sent to me in a dry state in two packets to Netherton. I placed them in two medicine-bottles and put water in them, to see the action of water on each of them. After shaking the finer sample well up I could notice in about five minutes a settlement of sediment. The coarser sample settled almost immediately. The finer sample very seldom goes clear. The samples are just as I got them from Mr. Aitken, only I have put them with water into the bottles. I have had twenty-four years in charge of batteries; not always in charge, sometimes boss. I put in several years as mine-manager. You can make little or no impression on the bank by pushing against it with an oar. My farm is free land, Land Transfer title. The companies are saving money by putting tailings in the river. I consider the companies have a right to put their tailings into the river because it has been proclaimed a sludge-channel. It should be remedied out of goldfields revenue. I object to this company getting a right to return their tailings to the river. The Council agreed to take no action in the matter at all; that they should remain neutral. They put in no objection therefore. The largest proportion of the Council members belong to a mining district. I cannot say what proportion of the members are miners by occupation or interest. I recognize the photograph produced as representing the state of the river after flood. I recognize various points of the river by the photographs; they are something like the parts of the river. If this license is granted without restrictions as to returning tailings to river, I want to know what we are to do for water for our cattle to drink. I expect to see the river coming down like oatmeal gruel. In very dry weather the cattle are forced to go to the river. Cattle can drink the water of the river now. If they can get other water they prefer it, but the river is drinkable. If these fine tailings are liberated into the river the cattle will not be able to drink the water anywhere near where they are put into the water. There is no deposit of tailings that I know of lower down than Karangahake in the Ohinemuri River, but the Komata Company is depositing tailings in the Komata Creek, which find their way into the Waihou River.

(Adjourned to 9.30 a.m. Resumed 18th February, 1910, 9.30 a.m.)

Cross-examined by Mr. Cotter: I have been eleven years farming, and I was mining for twenty-four years. I have been farming solely for the past eleven years. I bought the land in July, 1894. The heaviest flood I remember was January, two years ago. Do not remember any particular flood in 1897. I remember what is called the "Old Man Flood" about that time. My land was under water for five days. That was caused partly by the silting-up of the river. I consider we should not have had the quantity of water if the Junction had been clear. There is a large accumulation of tailings at the Junction. There was at that time a small island forming about the Junction on the Thames River. I do not think the tailings had anything to do with the

formation of that island. Not prepared to say it was caused by the *débris* in the river. The water did go over land at a place where it could have been affected by tailings. At Netherton, if it had not been for the tailings, the flood of 1907 would not have remained on the land for more than half the time it did. That flood was not local. According to the papers it was all over the Waikato. I suppose it spread over lands where the tailings had nothing to do with it. I believe it did. I attribute the damage done to my place partly to the tailings. I believe it would have been flooded even if the tailings had not been there, but not for so long. When I was employed in the battery at Thames and Ohinemuri, some tailings were sold to other grinding-mills, some were put into the sea, sometimes into the river. We stacked a good bit of our tailings at Karangahake in the Ivanhoe. I never made objection to the sludge-channel, because I knew nothing of it. I never afterwards made any application for its cancellation. Never made any claim for compensation. I knew I could put in a claim, but I knew I should get nothing if I did, so I did not bother. I am a member of Council and River Board. Mr. Kingswell invited me to come out and look at his works. I have not done so. I did not go because I had no business to go. I think I thanked Mr. Kingswell, and told him I had no time. Do not remember saying I knew the tailings would stay in the river, and I would not go. My objection is to returning the stuff to the river by Mr. Kingswell. The only remedy I can see is to get part of the gold revenue and convey the tailings to the west coast or to some waste piece of land, and keep them out of the river. The discontinuance of this river as a sludge-channel appears to me to be the only remedy. My opinion is that this company's operations will not improve the state of the river. My experience of gold-mining is all I have to go on. I know what tube mills are, although I have never worked them. I have ground with machinery that ground as fine, but not as quickly. I think we could grind as fine with the machinery I have mentioned as with the tube mills. I should be surprised to hear any witness say that this company's operations are clearing the upper Ohinemuri River. I know Waihi Company are putting into the river about 1,000 tons a day, and, of that, 60 or 70 per cent. are very finely powdered quartz. I should expect a certain percentage of it to remain in the river. About 60 per cent. remains in the river, and 40 per cent. goes out to sea. I think it is the very fine slime part that goes out to sea. I do not think the fine crystal quartz goes out to sea. [Two samples of ground ore put into witness's hands.] I cannot say on my oath whether this is tailings or not. I would like to see it in water. I think the more finely ground sample is slimes. I should say the finer stuff is more likely to be carried to sea. I cannot say that I have seen any deposit of even 2 in. or 3 in. of the finer stuff anywhere in the river or land adjoining. I produce a sod off my land. I say it is quartz tailings—mining tailings. It appears to me as fine as the finer sample put into my hand; appears to be as fine at the grass-roots as it is in the basin [comparing samples]. I brought this sod to show the soil under the silt. The silt is only about ¼ in. in thickness. I cut that 37 ft. from high-water mark—not from the highest or lowest place on the land. So far as I can see, the coarser stuff sinks to the bottom of the river, and the finer stuff, which I call the "slimes," gets over the land. I consider a great proportion of those tailings in the sod near the grass-roots is slimes. I can show you where, a little distance from the river, slimes are deposited on the land. I cannot show a deposit on any part of the river where the action of the water takes place. I have noticed alteration since the Waihi Company began fine crushing. More deposited on the land. The coarser remains in the river. My land is 217 acres. Very little of my land is affected by the tailings—perhaps 2 acres: not our complaint altogether. I complain that the tailings conduce to floods in the river. My land is no more low-lying than any property about. In places I believe the banks of the river are higher than my land; in other places it is about level. I never had any difficulty in draining land. I never experienced any difficulty in draining my land. Had trouble in clearing my drains of tailings. My land cost me about £3 an acre; not bought cheap because it was low-lying and subject to floods. In my opinion, taking out the coarse tailings and converting it into fine slimes would not be beneficial. If collected from various parts of the river and dumped or tipped into the river—a slow tidal river—it will accumulate where it is put into the river and cause an overflow. The drift to and fro of the tide will cause the fine tailings to settle in a hard mass in the river. That is my opinion. I have had no proof in practice. That is not the reason I did not go to Mr. Kingswell's works. I never asked any member of the River Board what they had seen and what opinion they had formed. I do not remember having any discussion with Mr. Kingswell. Cannot say how long ago this was; may be six months ago. I have had no conversation with any member of the Board about the Paeroa reduction operations. I knew the Council had consented to removal of conditions, provided coarse stuff was not returned to the river. I did not consent to this. The Council determined to take no action in this case—to remain neutral. I never had any conversation with any of the members. I do not remember the Chairman reporting results of his investigation to the Council. Water is always easily obtainable at Netherton. I got water after sinking 17 ft. I know two artesian wells that are working well, but they cost a good deal to put them down. Cost about £40. Do not know anything of experiments at Ruakura. The part that I ploughed affected by tailings is not as good as the part ploughed without tailings.

Re-examined: There is in the river what the captains call the gutter; that has not filled up, but towards the banks the river is shallower. Where the pontoon crosses the river at the Puke we have lengthened the wharf within the last twelve months. Down a little past where I live there are places I can almost walk across until I come to the gutter; that is pretty deep. I think the fact that the river is tidal tends to cause the deposit of the tailings. The slower the river runs, the quicker the deposit. The willows come down to the river in places. From Mr. Kingswell's proposed works to the Junction I should say the rise of tide is 3 ft. or 4 ft.; above the Junction the tide remains stationary about three-quarters of an hour. Cannot say I have found any slimy stuff in the river. It is generally a chain or two back.

William Bettis (called for defendant, to allow him to return to his steamer), sworn: Am captain of "Waimarie." My boat is trading between Auckland and Puke. I have been in that trade, or having knowledge of the river, for thirty years. For last twenty years been going up and down daily. I know Mr. Laughlin's place. Over six months since I called at his place. I was able on that occasion to go right up to the bank. I think I could do it now. In the last thirty years I have noticed no change in the channel of the river: it is much the same as it was thirty years ago. I am able to make my ordinary trips just the same as ten or fifteen years ago: there is no difference. Since the Ohinemuri River has been proclaimed a sludge-channel I find no more difficulty in making the passage than before. Above the Puke the tailings have affected the river; below that, not affected it in the slightest. I call at twelve places, or more, along the river-bank. I have not had any occasion to give up any places of call since river proclaimed sludge-channel. I have increased places of call in that time. River has always been a shoal river. If there had been any decrease in the depth of the water I must have noticed it. Both "Taniwha" and "Waimarie" were designed specially on account of the shallow water in the river. I have not found any shoaling to the entrance of the river. There has always been a shoal place where the buoy is. Find no difference there. From Puke down do not find any diminution in width of river. There may be some places where banks have fallen in. We always turn around according to the tide; therefore cannot speak of depth other than in channel. I do not think the fishing has been affected in any way in the river. Nearly all the fish is sent to Auckland. There is no decrease in supply from Turua and Kopu. Fishing-boats have increased in number. I have drunk water out of the river at the Puke prior to this river being declared a sludge-channel. The land at Netherton is much the same as it has been for thirty years, except that portions of it have been drained. Before it was proclaimed a sludge-channel, river was always very muddy from Hikutaia to the mouth, on account of action of tides. River was always very muddy in flood-time. If we are a bit late on the tide we always touch on the river-bottom: always have done. There is no difference in the river now. I have not been stuck for three years and a half in the river. Do not think the cutting of the bush or drainage of the land should have any effect on the river. Sometimes we use poles. Have never found any difference in the bottom of the river. Shoal places form and are washed away; these shoal places are always changing, but I have found no change in the bed of the river. I know Mr. Buttle's place in the river. There has always been a bank in front of his place since I have known it. River is practically the same to-day as thirty years ago.

Examined by Mr. Earl: Silt has had no perceptible effect on the river; the channel is just the same. I refer to the river as a whole. We leave with two or three feet of ebb water sometimes. We leave Puke when the water has risen about 9 in. Fifteen years ago we ran to the Junction. The "Paeroa" used to run to wharf at Wharf Street; this part of the river is very much filled up. The "Ohinemuri," drawing 6 ft., used to go to the town wharf. River is now filled up, as far as I know, with sand—tailings, I suppose. The "Ohinemuri" could not get up there now. I have not been there for years. Light-draught paddle steamers used to come up to the bridge. I know the river up to this wharf has been prejudicially affected by the tailings. First we used to come to town wharf; then to the Junction. Water was getting shallower, and boats were getting larger. From the Junction we went to the Puke because the river was shallowing up. Did not see tailings in the bank until six or seven years ago. Cannot say if the shoal at the Junction has caused the river to back up. Local body put groins at the Junction many years ago to deepen the water—fully ten years ago. No difficulty in getting up to Te Puke. Far as channel we use river has not changed. Would not like to say what the effect if our steamers ceased running for a fortnight. Motion of our screw has tendency to keep channel open. Go to Netherton full speed up and down. The mouth of the Waihou has not been affected. We never could get in at low water, not even thirty years ago. Width of river changes from 50 yards at Netherton to a mile lower down. Waihi Company are good customers of the Northern Company. I have never grounded a vessel in the portion spoken of by Captain Bayldon in his evidence. Without knowing the position I cannot say if I agree with his evidence. About three weeks ago, when opposite the Goods Wharf at the Thames, in the channel, I had occasion to use the pole, and found the bottom quite soft. I do not agree with Captain Bayldon that in time the river will not be navigable. I do not agree with Captain Bayldon that the fishermen have been driven to deep water. The other night we saw a fleet of fishing-boats stretching across to the Miranda, fishing in the same place as they used to fish twenty and thirty years ago. I remarked to the mate on the number of lights. Frequently see lights there, but not so many. I know Mr. Kerby owns a boat drawing 15 in. of water; I disagree with his statement that he cannot navigate the river as well as formerly. I know Reddish, a fisherman; I do not agree with his statement, that there are not as many boats fishing as formerly, or the decrease in the quantity of fish. Fishing has not been interfered with to my knowledge. I do not know anything of any hard substance forming on the bottom. Cannot say anything about his statement of not being able to use poles in fishing on account of hardened bottom. I will contradict Reddish's statement. We take as many fish as formerly. Unless the fish were caught in the river they would not come to us.

Examined by Mr. Miller: Takes an hour and a quarter to get to Hikutaia, where we meet the high tide. Takes about two hours from Hikutaia to Kopu. From Paeroa to Kopu we pass Hikutaia at high tide. Go down with the ebb. Mr. Kerby goes over banks that we could not cross. He can navigate parts of the river that we never go into outside the channel. No current in the river when the tide is changing. Full in river is on an average about 9 ft. To the mouth is about twenty-five miles. Sometimes we come early on the tide, and we graze along the bottom; we can tell if bottom is hard or soft. The channel is sand, and has always been. Number of fishing-boats has increased. Years ago the boats were sailing-yachts; now they are motor-boats. That may be the reason more boats employed in fishing. We keep away from the bank at Buttle's.

Cannot say if there has been any change in that bank. Do not think the bank has risen. Hardly any tailings below the Puke. I have not seen any bank of tailings at Netherton Wharf; may have been a bit of bank formed from the big drain. Generally within 3 ft. of high water when we get to Netherton. Thames Harbour Board limits extend to Turua. Between Puke and Netherton there is a little tailings on the banks—very little. There are a number of places in the river where we cannot land. We go five miles an hour; when we get into deep places go about eight.

Re-examined: There have always been difficulties with regard to this river. Thorp's Bend has always been a difficult one to get around. Been running six years from Puke. Start at nearly low water. There has been no shoaling in the river. We have a mark on the Puke Wharf; when the river rises to that mark we leave. We have had to vary no more in our passage down the river than we have always done. Always had to vary a little. I have no interest in this case one way or the other. Most of the settlers' stuff is brought up and down in our steamers. When it is high water at the Junction it has fallen four or five feet at Kopu.

By Court: When I say there have been no changes in the river I speak of the river generally, and not of the channel in which the steamer runs only. I have had experience of floods in the river. I have seen 3 ft. of water round the Junction mill in time of flood. Eighteen years ago very high flood came over Paeroa Wharf. When I saw water going over at the mill there was no bank formed at the Junction: the river was in its natural state.

(Examination of witnesses for objectors resumed.)

William Marsh, sworn, saith: Am owner of lands near Mackaytown. [Documents of title produced.] Claims Nos. 8 and 9 affect my property. I own half the river. I measured the distance of the pegs from the bank of the river, and found one peg 2 chains and 40 ft.; another peg a chain; and another less than a chain. There was a slight angle trench cut. I did not notice the mark on the peg. I could see trenches had been cut; might be 3 ft. Will swear that some were under 5 ft. in length. I never gave consent to any one to put pegs in my land. No application was made for my consent. I have been in occupation of the land thirty-four years. Years ago I could farm the whole of that land; always plenty of feed on the banks of the river. All tailings now. Ten acres along bank of the river is spoilt with tailings. Water is in same position, pretty well, as it was years ago; in one place the water has encroached on my land. I am not including that in the 10 acres covered with silt. There is a whole paddock of 10 acres covered over at Wairere. That is 20 acres I have lost by the tailings. Every fresh that comes you have to put up a new fence. There are tailings in places 20 ft. deep; some 10 ft. or 12 ft. deep. I object to river claims being granted at my place. Will not be an improvement to the conditions. The damage is increasing; worse the last three years. I reckon £50 a year would not compensate me for loss of pasture and different things. Cattle sink in the tailings, and get out with difficulty. Heard evidence of Mr. Hubbard and Laughlin. The piling of the tailings at the Junction will bring things to a crisis; every settler would have to clear out. Used to take three days' rain to cause a flood. Fourteen hours' rain will now cause a flood.

Cross-examined by Mr. Cotter: I object totally to this application, and I object on my own account. I object to the bed of the river being granted, because half the river is mine, and what is there is mine. I got Mr. Miller's advice. I took no steps to assert my right.

Re-examined: There have been no mining operations carried on on my ground.

By Court: I object to the application because the claims applied for are part of my land; I claim half the river-bed.

(Adjourned to 2 p.m.)

Tukukino, sworn, saith: I have lived all my life at Paeroa. I have had experience in a battery; not working in a battery now. Was lately working in the Komata battery for three years. I have experience in tailings. I was there when Mr. Brown began his operations. Twenty-one trucks, each containing 4 tons, were put through daily. I know the difference between coarse and fine tailings. Those that go through the filter are heavy and settle quickly; they are fine as flour. If there is a quantity of water, they will go down the river; if only a small quantity of water, they will settle. They will settle in the form of cement. It was my duty to clean out the shoot at the battery. When the stuff broke away from the vats I would have to go and clean it with a 2 in. hose. Used to put nozzle on hose and flush it away. Had considerable work to clear this stuff away. Effect of the company taking out tailings, treating them, and putting them back at the works, the current there will be very slight, and the tailings will settle; the bottom of the river will be raised up; I think floods and freshes would remove a very small portion. I know of one place at the junction of the Ohinemuri and Waihou Rivers where a bank has been formed by the Waihou River pushing the tailings over. Part of tailings would go away with water. If the weather was fine the tailings would form a sandspit. The turnings of the tide would cause the stuff to move about and settle. Settles quickly where there is no current. There was a period at the battery in my experience when the tailings were ground fine; it took all the pressure of the 2 in. pipe to remove these tailings.

Cross-examined by Mr. Cotter: I speak from my experience during the three years. [Examines samples of tailings shown him; points out the fine-ground tailings.] It is both of these. The slimes hold the other that are deposited in the river. That is the case when tailings are deposited all down the river.

Re-examined: The finer stuff collects the coarser as they are going down the river—that is, when the fine settles.

Alfred Kenyon Alexander, sworn, saith: Am a farmer at Netherton, and chairman of New Zealand Farmers' Union Netherton Branch. I own land a little below Netherton. I supply milk to Netherton Creamery. I have a wharf at my place; I put that up three years last November.

When I put up the wharf the bottom of the river was soft mud; I had to wear gum boots. Bottom of river is now hard and firm; composed of tailings. Do not have to wear gum boots now. Cattle walk on it. The river has shoaled at the wharf, I reckon, about 18 in. last two years; caused by sand and mining tailings. My wharf is two miles and a half below Netherton Wharf. Steamers stay at Netherton Wharf. My wharf considerable distance below Puke Wharf—ten to twelve miles. There is a sandbank below my wharf. It was used for concreting; it was taken out in flat-bottomed boats by settlers. That bank is still there; it cannot be used now because it is intermixed with mining tailings, coarse sand, and fine tailings. When I went there this bank was all sand; it is now very firm. I have an oil-launch on river every day. I have noticed shoaling-up of the bottom and the drawing-in of the banks. My launch draws 22 in. empty and 2 ft. 10 in. when loaded. I find difficulty in navigating the river with the launch. Where the launch lies is 4 ft. 6 in., and 25 ft. away from that, either across the river or up the river, I have a difficulty in getting out. I noticed the difference since the last flood in September, 1909. Number of other settlers have launches. They use them in connection with their business. Thirty-five chains of my property fronts the river. I have not suffered any damage from the overflow of the river, but I have from the overflow of the Hikutaia Creek at the back. Last September flood was not as high as one in 1907. Floods practically destroyed 150 acres of grass, reduced my milk cheques considerably, and forced me to sell cattle that otherwise I could have held over for the winter. River is 250 yards wide at my place—high tides. I travelled up river at all times of tide. I have had difficulty in getting up river. I have seen tailings for several hundred yards on both sides right up to the Junction—the old Junction Wharf. I have seen tailings below the Puke Wharf. Certainly, if Bettis says there are no tailings below Puke Wharf, he is wrong. I can show him tailings, provided he goes down at low tides. I have tailings, that I can show the Court, taken in my presence at Netherton Wharf, nine miles and a half below Puke. [Sample produced.] Taken by my son. At the present time, in dry weather, the cattle have to use the river. It is not good drinking-water. It is very much discoloured. The cows do not care about drinking it at all. I produce the report of Chemistry Division, Agricultural Department, containing analysis of water taken from river at Cock's farm (1909, p. 462). As chairman of Netherton Branch of Farmers' Union, I have lodged objection that granting of these claims will injure farms at Netherton, and I may say at Komata as well. I confirm what Messrs. Laughlin and Hubbard say.

Cross-examined: I have been in Court while evidence was given. Heard Bettis's evidence. He calls in at my wharf whenever I ask him to do so. His boat has not always been able to call in when I wanted him: tide prevented him; he was a bit early on the tide. My wharf is a chain and a half above the large drain. I have been there three years and eight months. I bought before—about two months before. I bought with full knowledge that this river was proclaimed and being used as a sludge-channel. Now I am anxious to have that altered. I have heard Captain Bettis say that before it was a sludge-channel there were frequent banks and bars produced in the river. Ashes from the Netherton Factory are not thrown into the river. Floods I refer to, first one was not local, second one was. First one did slightly more damage than second. My opinion from my observation is that the finer the tailings are, the closer they will stick. I can point out several places where the fine slimes are more than 2 in. thick. I cannot say thickness because I have never measured it. I know by the depth of water. Slimes I have seen are very fine and firm. The coarser tailings you can take up, and it will run through your fingers. I assume that the rise in the river is caused entirely by the slimes.

Re-examined: The fine tailings consolidate, and the coarser ones will shift. Captain Bettis could have got up to my wharf with the "Waimarie" three years ago easier than he could now, because there was more water. There are fine tailings at Waimarie Bend consolidated together, and the same at Netherton Wharf. Fine tailings also at my wharf. Where launch lies now you cannot put a boat-hook into it: should say five or six inches deep of tailings. Only been like that the last six months. From my place to Netherton Wharf, some places boat-hook sinks, some places it is like striking a rock.

William Moore, sworn: Reside at Paeroa; farmer. On 3rd January, 1910, public meeting held at Netherton to consider objecting to these applications. I was instructed to object on behalf of the residents. Above twenty persons present—settlers at Netherton. I bought my farm 25th June, 1879. Been there since—practically twenty-seven years; was three years at Paeroa. Then it was as beautiful a river as you would wish to see. Steamer could come alongside my bank: banks perpendicular. I do not remember names of steamers, but they drew more water than present steamers. Now the banks are all shelved off from the Netherton Creamery right up to the Junction: Junction very much filled up. Filling-up consists of tailings principally. The Junction is so much filled up that in a flood the water runs up the Waihou River a mile and a half, and you can see tailings along that part of the river. The backing-up of the Waihou causes the damage to Netherton. Netherton does not suffer from the tailings itself. First damage by flooding 15th January, 1907. Every settler in Netherton lost practically all his crops. River is filled up so much at the Junction that the river overflows at the mill in the Waihou, and floods the country. The filling-up at Junction is caused by tailings. After the flood the cattle all went dry; no grass for them to eat. The grass after the flood was all killed. Actually killed the fern. The crops—every particle went. I lost oats, hay, potatoes, cattle; my loss amounting to over £1,000 —£384 for sowing and ploughing: loss at creamery, £300; cattle died of starvation, £6 each. We all suffered more or less. In 1909 had another flood—a double flood. I do not think the tailings had any effect in keeping the water on my land. Did not stop it from going off. If the Junction had not been filled up, the flood would have subsided sooner, because it would have gone away down the river. Flood continued three weeks. Until the Waihou went down, Ohine-

muri River was affected by the flood. Had a record flood in 1909—two floods, one a week after the other. Crops were all housed, and settlers did not suffer so much. The grass was also killed; on this occasion boiled out. When the flood goes down to 6 in. the sun heats the water until it is quite warm and kills the grass. This happened in September, but not so bad as in January. Lost practically all my grass and clover. Attribute that flood to the filling-up of the Junction. We get no trace of tailings, because the water comes three miles through the bush. On the banks of the Waihou you can find traces of tailings a mile and a half up the river. Only floods on my land were 1907 and 1909. Previous to those floods the tide used to come up about 2 chains on the front, but it never did us any harm. By taking the tailings from the upper reaches of the river and dumping them at the Junction, the river will be filled up and practically ruin all the settlers at Netherton. They are all dairying now. Floods in dairying land are serious.

Cross-examined: Have owned my farm thirty years. During that time had only two floods to do any harm. First flood, 1907, was more general than local. I do not know that stock was killed in the Waikato. Did not know that passengers had to be carried by boat at Mercer Station. Cannot swear if sample produced is tailings or anything else. The second sample [fine] does not look like tailings. There is a big tailing-bank at Junction. Do not see it at high water. I have been on it and over it. I have never taken samples of the bank at the Junction. I can tell tailings by sight on the bank. I cannot say how deep they go down. Think they are of considerable depth in several places. Thirty years since I have had to do with mining. Know changes have taken place in grinding: tailings ground finer than they used to be. I never saw tailings ground as fine as that. Tailings at the Junction are like the coarser kind. During the last two years the bank at the Junction has increased considerably. I know Captain Bettis. Would not say if I believe his evidence. Know Captain Sullivan. Would not give any opinion about him. Bank at Junction dams up the Waihou River. Row of willows there has good deal to do with damming back the river; they keep back the tailings. Do not know where tailings came from—from Ohinemuri, I suppose. Tailings have done no harm to the river at Netherton: the injury was done by flood, by water lying on the land. At high tides (spring) the tide now comes up 2 chains over the land—not all along, but where land is hollow. This does no harm. There is a little silt at Netherton: would not call it "tailings." My farm, when I bought it, was kahikatea swamp and bush. I have cleared it, at £10 an acre; I have made it a dairy farm. Netherton is best dairying district in New Zealand. Land would have considerably increased but for the floods. Dairy been there six years. Had only one flood that was a local one in that time. Do not know anything about the "Old Man Flood."

Re-examined: There are three classes of tailings—viz., mineralized tailings, quartz tailings, and slimes, which are the rotten rock and pipeclay. When the fine tailings sink in water they will set harder, but they will not sink so soon.

Cornelius Whitmore, sworn: I am a landowner on the banks of the Waihou River, a mile below the Junction. Most decidedly, I complain of the floods in the river. I attribute the floods to the filling-up of the river with tailings. There are some bad places, and some very bad. There is a filling-up at the Junction of tailings and general mining *débris*. There have been so many floods that I could not count them. These floods are caused by the tailings in the river. I took pictures of the floods from my verandah. I produce a photo taken during last September flood. Cannot say when photograph [Rye Lane] was taken—within three or four years. Took all the photos myself. On the banks of the river, after the flood has gone down, there are 1 ft. to 2 ft. of tailings on the bank, and in the paddocks at the back they are covered with a very fine deposit. Formerly three weeks required to make a flood; now ten hours will do it, and take fourteen days to go down. I have to turn out my cows because they are dry, and buy milk to sell again. The big flood killed the grass—boiled it. I heard Mr. Moore's evidence. I agree with him. I say there is a deposit of tailings on the bank a long way past the Puke. There was a sandbank opposite Innes's place, near Puriri, where scows used to come to get sand. Now they have to shovel the tailings off to get at the sand. I have been living on the river-bank seven years. Facilities for navigation are getting worse. Never more surprised in my life than to hear Captain Bettis's evidence. When I came here first steamers used to come to the Junction; after that they had to go to Puke. There are tailings all over the place after flood, and there are 4 ft. of tailings on the bank that used to be grass. There is no landing at my place Junction Wharf is not used by the steamers. Smaller steamers can manage to scrape along.

Cross-examined: Bought place seven years ago. I came from Turua, lower down the river. Was at Turua about twenty years. I have had a definite knowledge of the river for twenty-seven years. I was not up and down the river. Went up the river as far as Te Aroha occasionally for a trip. Always been floods, but they did no damage, and soon ran off. The reason the damage was nil was because there was no tailings dumped into the river twenty-seven years ago to spoil the water and to contaminate and poison the land. Since present company has been at work near Waihi the evil has been intensified. Tailings are ground finer, and will spread further over the land. I have noticed that the re-treated tailings have spread further over the land than tailings used to do, because they are finer, and spread further, and do more damage. Damage has been intensified by the finer grinding generally. I could not bring a sample off my own land because the deposit is so fine, and after the first shower they are washed into the ground. The tailings on the bank of the river are mixed and coarse. I do not know that there is a layer of the fine sand to be found over the coarse: they are mixed. Cannot remember exact date I first saw fine tailings on my land: was within three or four years. First two or three years I was there the water that came was clear; after that, contaminated and poisoned with tailings. That is my chief objection—not so much to the floods as that the water is contaminated with the tailings. Most decidedly, my land was always liable to flood, but formerly it took a lot of rain to make a

flood, but now a flood is made after ten hours' rain. There is other *débris* than mining coming down the river, but not enough to do much damage.

Re-examined: As an experiment, the willow-trees were cut by order Ohinemuri County Council. Effect of that was that it gave freer course for tailings over the land. While willows were there they held back the tailings. It is not a benefit to cut willows away in one isolated place. The white deposit was composed of fine tailings.

By the Court: I should think cutting away the forests would have a tendency to cause floods more frequently in the river.

Frederick Adams, sworn: Am a farmer at Netherton; been there twenty-one years. I live back about 10 chains from the river. I know the river fairly well. The banks of the river have come in a considerable lot from the Junction to the Puke, and it is the same below the Puke. I have seen tailings in the river below the Puke—pretty well all along. I noticed them down as far as Hikutaia. I am on the river occasionally in a launch. Not much change as far as the channel goes: outside the channel the banks have got shoaler. The reason the channel is not altered is because the steamers go up and down regularly every day. If steamers left off running for a fortnight, I think the channel would shoal up as well. At low places you will see tailings on the bank. At Netherton the tailings do not come over the land. Residents at Netherton are damaged by loss of grass, and cattle, and crops because of the bank at the Junction, which causes the river to overflow, and the water runs down to Netherton. Farmers there have been seriously damaged. Heard evidence of Mr. Alexander: support that. Heard Bettis's evidence: cannot say if I support it. He comes up at high tide: does not see it all. I have seen fine tailings below the Puke Wharf.

Thomas Marion Robinson, sworn, saith: Am a farmer at Netherton; been there about ten years, may be more. I travel up the river once a day at every time of the tide in a launch. Up to two or three years I have gone to the creamery every day without any trouble; now at the same time the boat will shoal unless I am careful to keep in the channel. Cause of that shoaling, I should surmise, is the tailings. I see tailings all along the river. There are tailings near my place; seven miles from the Puke to my farm. I tried the tailings with tar, and it set all right. Without tar it makes a good enough yard in winter, but in summer it is too dusty after milking. I went out and took up a handful of tailings off my land, and there it is [producing it]: taken off a chain and a half from the river-bed. In September, 1909, the flood went over my land, and across for 40 chains backwards to Mr. Alexander's: previous floods had not gone there to my knowledge. I have been there ten years. Five years I rowed the milk to the creamery, and to keep out of the current I would keep close to willows on Netherton side; now I could not get within half a chain of the place, owing to a dry bank of tailings. I consider it a serious part of the river, a very sharp bend, and in times of flood water cannot get away fast enough, and runs over my property. That, I consider, is the cause of floods recently on my property.

Alfred Joshua Thorp, sworn, saith: I am a farmer residing on the banks of the Ohinemuri River, Paeroa. I have heard the evidence of the witnesses in this case. I think Mr. Alexander's evidence admissible, and all the other witnesses gave true evidence. The steamer "Lenia" came up to Paeroa many years ago. Boats drawing 7 ft. of water went up to my place—a mile and a half or two miles above the bridge. Last flood the water went over everybody's land—a thing it had never done before. That was in last September. Floods are attributed to silt from the batteries filling up the river. I know the Junction. In old days it used to be a good width and deep water. The island formed there now is caused by silt coming down the Ohinemuri and being blocked by the water from the Waihou. I have known floods before, but they never used to last any time. The flood of 1907 was an exceptional flood. It did damage because it came in the summer and killed the grass; had to resow. The flood would not have stayed so long if it had not been for the tailings. River has not the same carrying-capacity. People on low-lying land have dug their drains to the river, and these have become blocked up. Been living thirty years at Paeroa. I heard Captain Bettis's evidence: I do not agree with him. We used to go up and down the river in cutters. Understand what is projected by this company. My opinion is that the fine tailings is worse than ever: it will go down the river, but where it settles there it will stop. The effect of discharging such large quantities at the works will be, in my opinion, to block the river.

George Buchanan, sworn: Am a farmer on Thames Road, Paeroa, about a mile from the river. I am also interested in property about half a mile above the Ohinemuri Traffic-bridge. Been here eighteen years. When we first came here the Ohinemuri was a deep, clear river, carrying no signs of tailings up till about ten or twelve years ago. The willow-trees were growing on the banks of the river. You could see the bottom of the river, and an occasional snag. Water was drinkable by man and beast. About sixteen or seventeen years since the tailings began to come down. The capacity of the river from the Puke up as far as Karangahake is greatly lessened on account of deposit of tailings. Tailings are in some places 10 ft. deep on banks of river; in some places half a chain wide and 3 chains long. When river is in flood, capacity is very much diminished. When we came here first the p.s. "Te Aroha" and p.s. "Patiki" came up as far as Snodgrass's Landing, 200 yards above old Wharf Street landing. The site of the old wharf is completely covered with tailings, and at low water a bank of tailings, about a quarter to half an acre, extends into the river at Pereniki's Bend. Almost impossible to get small launch over bar formed there at low water. The banks of the river are much the same down to the Junction. There is another large shoal at the Junction which has been formed within the last five or six

years. About two miles up Waihou River tailings are to be found on both sides of the river. Above that you find the willow-trees growing as they did eighteen years ago without impeding the flow of water, except at a place about eight miles up, where a willow has formed an island in the middle of the river. About October 1 went to Netherton in a launch, and was surprised to find that the tailings had formed considerable banks on either side of the river. At Waimarie Bend there is a point of tailings running out into the river about 40 ft. I did not test any tailings except some on the Waihou. Found them practically the same as the tailings above the bridge—mixed, finer than they were years ago. I think there is no doubt that the floods are in part greatly caused now by the incapacity of the river to carry off the water. I believe the present company's finer tailings will go further. The coarser would settle almost at once. When the finer settle they will be very much harder. The fine tailings are unlikely to block up at the Junction, but will be likely to be deposited lower down the river. I have ridden up the Waihou. Furthest point at which you can find tailings is two miles up the Waihou. Conclude they come from the Ohinemuri River. Have been boating in the river. I know very little of the navigation below the Junction: I mean above the Puke.

William Aitken Nicholl, sworn: Am a journalist residing in Paeroa, and secretary to Paeroa Silting Association. These letters and telegram [produced] were received by me from the Under-Secretary for Mines. Have known this river about fifteen years. I can pretty well corroborate what Mr. Buchanan says. Know floods have occurred within last few years. Attribute them to the filling-up of the river. Do not think floods of last year would have been so great only for the silting-up of the river. I have observed this river for fifteen years. Have observed the Junction. There is a fair-sized island at the Junction. It has been formed during the last ten years. Consists of mining tailings, and willows growing on them. Remember the river when no island there. That island is an obstruction. I think it backs up the Waihou. I have found silt on Mill Road, Paeroa, that has been flooded. Have never seen tailings so fine as the fine sample in Court, but rather finer than the coarse sample. When I came here we always came as far as Wharf Street in the steamer "Ohinemuri."

(Admitted that J. W. Thorp will, if sworn as a witness, corroborate the evidence of A. J. Thorp, and that Harry Charton will corroborate Buchanan's evidence. Evidence formerly taken at Thames put in.)

William Frank Grace, sworn, saith: Am superintendent of Waihi Grand Junction Company. I have been three years in science schools at Brighton, England; then took course at Royal School of Mines, London. Been a Fellow of the Chemical Society of London for twenty-six years, and am a Member of the Institute of Mining and Metallurgy. I have had twenty-five years' experience in mining and metallurgical processes, and in gold and silver, in Spain, South America, South Africa, Victoria, Queensland, Western Australia, and the United States of America. I came over here as consulting engineer in July last. I have followed crushing from old-fashion type up to present time in every one of its branches. In our treatment at the Grand Junction it is all-slimes process. In reducing the ores to slimes about 95 per cent. would pass the 200-mesh screen. We discharge these tailings into the sludge-channel: we have a small channel coming down to the main channel. Tailings are in a very thick slurry when they leave our battery. It is put into a flocculent state before it leaves the mill. The fine slimes will travel very much further before settling. When it does settle it settles in a state not so solid as sand or coarser tailings. If left long enough in still water it would all settle, but it would take a very, very long time for this to take place. I suppose the finer you grind the closer it would pack, but much the same as when water is on it. I cannot see how it will pack from my experience of it. At the battery, if you drop a stone into two or three feet of it, it will make a splash. It has practically no adhesive properties: that is all destroyed in the mill. The term for certain substances, clays and suchlike, sticking together is "colloidal action." There is no colloidal action left in the slimes when they leave the mill. It is destroyed in the mill to enable the particles to separate sufficiently to treat. I cannot see how that slurry cast into a river could form a bar or bank or obstacle to navigation. I know the process to be adopted by this company, and I have heard in Court the objection raised to such an operation. In my opinion, it would be a great advantage to the river to have that process carried out. I have not seen any signs of this slurry settling in the river, though it does in the small channel by which it reaches the river. This is cut right through the first rain, and is taken right away. If allowed to dry it would blow all over the place. I do not know of any means by which these tailings can be treated and not returned to the river. You could not heap it. If you put it on the ground it would simply run about. You would have to compound it, and after the first rain you would have that all over the place. If the water was evaporated from it it would blow all over the place. I know the Great Boulder Mine, Western Australia. The tailings are stacked, but they are crushed by a different process, and are not crushed so fine. They are having great trouble with them now: blowing all over the place: no water to carry them away. The finer you grind, the more difficult it is to stack or impound the tailings. It is contrary to all milling practice that finely ground tailings will settle before the coarser ground. The fine will not carry the coarse with it, and both settle together. Will not do this in a river. Not possible to grind so fine that it will not settle: it will take a long time. It will settle in still water: will not settle while any motion in the water. In dealing with our ground ore, and getting it in order for pressing, we have to add lime or it would not settle. If neutral ore, we add about 6 lb. per ton on an average. I do not think it would make any difference whether in salt or fresh water if the lime has been added, for the lime has already coagulated the colloidal substance. Would not like to say what this is [Robinson's sample]. It has a lot of organic matter. It may be tailings, or slimes, or earth. Cannot tell from feel if

any pumice in it. If it was slime from the mine that Robinson put in his yard, it would not set down hard. [Examines sample brought by Alexander.] This is fine slimes or something of the kind, but not nearly so fine as we grind them. [Examines bottles containing tailings produced by Mr. Laughlin.] It is not a fair test in the bottle. They should be put in equal bottles, then stirred up and poured into a glass to see which would settle first. If this slime settled in still water and the water after a time began to move, the slimes would be stirred up again. Know present works of company at Waihi. I have only been there once. If the company takes up and treats the tailings as proposed, there will not be the slightest injury to the river. There will be an improvement.

Cross-examined: We are using the sludge-channel. Question of keeping it open is a large question to us. In Queensland we had the right to run down a creek. Had the right at Charters Towers. We were treating 240 tons a day—very much more difficult to treat and to settle. It went down the river: did not heap up on the banks. Went through pastoral country, but the river had more fall. Should say the Ohinemuri runs a mile and a half an hour. I suppose that was about half-tide. Know current runs up-stream with the tide. River I speak of in Australia flowed about three miles an hour: not subject to tides. This stream emptied itself into the Burdekin River. Our tailings were carried four miles and a half. It is entirely a different proposition from the present one. We had a very rough river-bed in the sludge-channel I have spoken of. We were not crushing for slimes, but for ore: contained clay matter which made slimes without crushing. We were crushing with 97- to 100-mesh screen. Considered then (fourteen years ago) fine crushing. All this was carried to the river without sticking to the banks. Only slimes went down. Our tailings were stored. Trouble to get sand to travel down the creek, but we made the slimes travel down. Very little coarse sand went down our sludge-channel. We had no complaint. Settled district—dairying district. Settlers did not depend on that creek for watering their cattle. In Tabasco, in Mexico, we discharged direct into a river. Native settlement: very wet country. Had big, rapid river. The fine-grinding process in the Grand Junction Mills started, I think, about eighteen months ago. I was not there. Could not say how long the fine-grinding process has been in vogue in this district. The fine slime put into the river must be carried much further to the sea: eventually will reach the sea. Cannot say how long it will take any particle to reach the sea: might be a month. In some cases might be years before it reached the sea. I will not say we are not adding anything to the bed of the river. Tailings now in the river are old deposits. I have roughly examined the tailings in the river near the bridge. I say a large amount of the fine stuff is vegetable matter. I would not call that "slimes." Foreign matter may deposit slimes to a small degree. Cannot tell slimes from the mill from slimes from the soil without examining with a microscope. We add quicklime; becomes carbonate of lime before we put it into the river. Lime is put in to settle the tailings. It assisted when it was lime, but will not cause to settle in the river, because it is no longer quicklime. I have never seen any of our stuff settle down like that in the bottle [Mr. Laughlin's]. I have never seen fine stuff settle as hard as that in the bottle. The fine stuff has set harder than the coarse in these two bottles. I have not examined the river to see if any settlement of the "slurry." My evidence is given on twenty-five years' experience, but is not based on experiment in a river such as this. The facts that the river is tortuous, is tidal, and is lined with willows would have less effect on the slimes than on the coarse tailings. I went to the river under the bridge. I did not recognize the superficial deposit there as slimes. The finer we crush, the less there is left in the river. There would always be stuff in the river. We crush 200 or 300 tons of ore a day. About 1,600 or 1,700 tons a day are put into the river. May be months before our output of to-day reaches the sea. You cannot agitate sand. Sand will always settle. Sand will settle down almost dry. "Slurry" will not settle down in the mill. As regards the river, I cannot say. Ninety-four per cent. of our ore is ground to the 200-mesh. The same practice is adopted by the other companies. All the damage that is being done to the farmers on the river is being done by the old tailings and not by the fine ones. Fine grinding has been adopted about eighteen months. I should say there cannot have been an accumulation of tailings from our tailings for past eighteen months. If you get rid of the coarse tailings in the river, there will be no more trouble in the river. If the Waihi Company are only grinding fine 60 to 70 per cent., the coarse tailings coming down may still cause trouble. Extraction Company are going to adopt slime treatment. I understand they have a tubular mill, and will grind to a slurry. The stuff being taken out and returned as slimes will not cause any obstruction at the Junction. I believe it will clear away the obstruction in time.

Cross-examined by Mr. Miller: Immediately the slurry gets into still water it will begin to settle. It is settling all the time, but if there is motion it is stirred up again. In a river like the Thames River, where the tide affects it and there is still water, the settling will be going on all the time, and in still places the settling will be going on. Do not know mining regulations in Victoria prohibit slimes being deposited in the river. Had no experience of working Sludge Abatement Board in Victoria. Could not carry on our work without grinding fine. I do not know of any means of stacking the slurry; it is practically impracticable. It could be stored in tanks. Could be impounded at great expense. Do not know site of proposed extraction-works. Mere question of expense, the stacking of the slurry. I do not think Mr. Baker is correct in saying that slimes could be impounded behind a wall, and that after they had once set they would not shift. You could not handle this stuff on an elevator. I do not know how it could be done.

Re-examined: You would have to have an iron or steel wall to impound the slimes. It is an impossible operation, in my opinion. The coarse sand referred to at Charters Towers was coarser than we saw on the river-bank to-day. I do not think the slimes would have time to settle between tides. The finished product of grinding—the slurry—overflows over the lip of the receptacle. The coarser drops through to be reground. We use cyanide right through from beginning to end. When this slurry is discharged from the works it contains a very small amount of cyanide—not enough to injure fishes or vegetation.

Ernest Feltus Adams, sworn, saith: I am licensed surveyor and mining engineer. Been carrying on business at Thames over twenty years. I am well acquainted with the Thames Har-

bour. I have, in the course of my duties, made frequent examinations of the harbour. I have made a thorough survey of the portion within the Port of Thames. That does not include any portion of the Ohinemuri River. Goes up Waihou River a mile or so above Bagnall's. Found tailings from the mouth of the Thames River to the Kurunui tip—the whole foreshore in front of the town. Those mining tailings came from the Thames mines, in my opinion. The harbour is part rather steep banks, part are mud-banks at low gradient, and part the channels of the Thames and Piako Rivers. Some of the banks of the river below high-water mark are hard, and others are so soft it is dangerous to walk on them. The position of the river has altered. It has encroached on the original boundary of the Opaie Block to the extent that where the high-water mark was thirty years ago is now the low-water channel. I take my data from Mr. Goldsmith's survey of Okaka Block. The banks, where soft, are where the deposit is going on continuously. The hard is where the scour has cut into the original high-water mark. I have not taken any depths and compared them with the chart. The Thames foreshore has risen—from tailings, *débris*, &c. I have not ascertained anything as to the depths of the river. The width is about the same. I have not found anything to lead me to suppose that tailings have made any difference in the river. Found no evidence of hardening of the mud in the Port of Thames. Naturally the rivers had *débris* brought down from works carried out on them, from drains, from bush being cut down, and from mining operations. The Piako Swamp is furnishing a considerable amount of material. I have taken out the area of the waterway from Te Puke to the mouth of the river, opposite Opani Point. It is 3,015 acres. This area is taken from the Government map. I know the proposal of the applicant company. I should say such an operation would be beneficial to the river. Eventually the slimes would be deposited over the gulf, thirteen miles wide. I am a mining engineer, and I give this as my considered opinion on the matter. I think, possibly, there would be light deposits in the time of floods. That would eventually go away. There would necessarily be some damage, but I think it will be reducing the damage to a minimum. It would take 608,000 tons of slime to cover the river-bed at high water in the tidal portion with slimes to the depth of 1 in.

Cross-examined by Mr. Miller: I am satisfied no crust has formed in the Port of Thames. It must be a very limited extent, indeed, to have escaped my notice. I know of Mr. W. Reddish. Between Kopu and the mouth of the river, on the right bank, it is all soft mud; on the left bank it is a hard, compact clay, where the river has encroached on the land. I absolutely contradict Reddish and other witnesses that a hard crust had formed in the bed of the river. I could see no crust in the channel, and no extensive crust could have escaped my notice. [*Re* Bayldon's evidence.] There is a moving sand all along the channel of the river outside the mouth. I have made detailed examinations within the last two years: not before that. That also applies to the river from Opani Point to Kopu. It is nearer four than two years. The scour sets against Buttle's place, and would scour the soft mud out. There are sand-bars which show at very low springs. The slimes would distribute over the Firth of Thames. Part of that is under protection of Thames Harbour Board.

Cross-examined by Mr. Earl: I have had no experience of dealing with tailings. I have made no experiments myself. I base my opinion on the evidence of Mr. Grace and other experts as to the condition of the slimes when they leave the battery. Railway-station at Waihi is 333 ft. above high-water mark. The fall in the Ohinemuri River from Paeroa Bridge to the Junction is practically nothing. It is the action of the current that will shift the tailings. I have made no examination of the tailings in the river. I know the river is being filled with tailings. It is doing damage: covering land with silt that grass will not grow through. It blocks up the drains, and if not stopped will eventually fill the river. Tailings are, no doubt, a contributing cause.

Re-examined: But not the sole cause. The tailings I refer to are the coarse tailings we can now see on the banks of the river. I have never seen this slurry deposited. I have seen it lying temporarily under the Karangahake Bridge. I certainly think there is enough motion in the river to carry away the slimes or slurry if put into the river in the condition described by Mr. Grace.

(Adjourned to 9.30 a.m. to-morrow.)

Robert Mark Aitken, sworn: I am a mining engineer, and manager for the Waihi-Paeroa Gold-extraction Company, the applicants, and have been since its inception in charge of the works at Waihi. I hold first-class certificates from the Thames School of Mines in surveying, mining, metallurgy, and all branches of mining. I hold first-class battery-superintendent's certificate. I was for eight years and a half Lecturer to the School of Mines on the West Coast of the South Island, and metallurgist to a number of companies for about eight years—principally the Keep-it-Dark Company. I have been connected with all forms of battery treatment, and also with bucket dredging in the rivers. Pretty well the whole of the eight years on the West Coast was spent in treating slimes and tailings; also the two years I have been in this district. For two years—a little over—I have been in charge of Waihi-Paeroa reduction-works at Waihi. First of all, the tailings are dredged from the river by air-suction dredges, and conveyed down the river in barges. Floated into hoppers, cleaned in vanners, and screened and ground in cyanide-solution in tube mills. The whole will pass a 200-mesh screen—40,000 holes to the square inch. That is the fineness of the coarse particles. From 60 to 70 per cent. would probably pass a 300-mesh screen and 30 per cent. would probably pass a 400-mesh screen, or possibly finer. After you get past the 200-mesh screen you cannot get any finer mesh, and we judge the fineness of the slimes by the rate at which it will settle in water. It is only an estimate when I speak of a fineness beyond the 200-mesh screen. After passing the tube mills it goes into the separation-boxes. These separation-boxes are from 5 ft. to 7 ft. deep, conical shape, and the finely ground slime has to rise in these boxes to overflow; rises through the cyanide-solution in the boxes, any coarse material separating out. Any material that is not actually slimes is returned to the mills from the bottom of the separator-boxes by gravitation. This underground—an insufficiently ground—portion is constantly returned to the mills for regrinding until slimed sufficiently to overflow the separator-boxes. Every particle that will not pass the 200-mesh contains enough gold to make it worth while to regrind. No force is used to make slimes overflow. They rise in the still water and overflow. The overflow that is going into

the boxes—the sludgy matter—after passing through the mills, is diluted with a small amount of cyanide-solution to cause the necessary overflow. The cyanide-solution is very weak—2 lb. of cyanide dissolved in 1 ton of water. When sufficiently ground, lime, or lime-water, is added to coagulate the slimes and facilitate the settling in the settlers. The thickened slime from the bottom of the settlers is pumped into tall tanks for agitation. When the bullion is dissolved the sludge is drawn off for the vacuum filter, which extracts the cyanide-solution, washes the slimes, and the slime is then discharged. It is washed in cyanide-solution or water before being discharged. We just dump it down on the ground, and a small trickle of water over it washes it into the main river. It goes into the main river just above the Waihi Company's dam. Our dredges are working in the main river. We dump the slimes just below where we take the coarse tailings out of the river—not more than 20 yards from the elevator. We dredge from the elevator for two miles up the river. We have treated about 33,000 tons since we started operations—about sixteen or eighteen months. At times the water overflows the dam, but only in flood-time, because the Waihi Company practically take all the water in the river excepting in wet weather. We have dumped thousands of tons of tailings into the river, and there has been no overflow from the dam at all, and those slimes have remained in the dam for months. They will not go away unless there is an overflow from the dam. As soon as an overflow occurs we can see the thickened sludgy water going over the dam, carrying away these slimes. The Waihi Company has 90-stamp mills discharging into the river. The Junction Company and the Union Mill (40 stamps) both also discharge into the river. [Draws sketch-plan of locality, which is put in.] The depositing of all that sludge has never blocked up the river except in dry weather: it remains in the bed of the river. When rain comes it all goes away: it does not interfere with our dredges or pontoon. All that remains in the river from other batteries is the coarse sand. The slimes are all gone. They travel on down the river. The slimes have never, so far as I know, interfered with the Waihi Company's water-race. A fairly large portion of them must go down the water-race. After rain there is no sludge left at the back of the dam. When it has been lying there four or five months it has gone clean away as soon as there is water enough to carry it over the dam. The Waihi Company's race is very flat, and I have not known them clean it out since I have been there. I have been all the way down the river. Not been there all the time; but examined it here and there all the way down. I have been all over these nine claims now applied for. We went over them, and bored them at regular intervals, and took samples of sand for testing. I had two assistants. Took fortnight or three weeks; made thorough examination. I cannot find any slimes in the river at all; very, very small percentage of slimes; all the deposit is sand (coarse tailings), with small percentage of river-sand. Our operations have cleared the river considerably. Taken large quantity of coarse sand out of the river, and we can now go up and down without any trouble. When we first started we could not work our barges over the coarse sand; now we have no trouble even in dry weather. We are going to put our works three-quarters of a mile or a mile above the junction of the rivers. We intend to install much the same plant, but we intend to grind finer. The finer the grinding, the better extraction. Pays us to grind finer. After my experience at Waihi I am certain tailings from our Junction works will go away down the river. Tailings will be in the form of sludge. I think we shall very shortly clear the river of tailings, and in three years I expect the boats will be able to come to Paeroa. Our operations will result in benefit to the river, most undoubtedly. In dry weather practically no flow at Waihi at all. In rainy season varies according to quantity of rain. I should say, if anything, the river here flows faster than at Waihi. Of course, at turn of the tide river is still. I have travelled this river several times. I have noticed a little slime on the banks. Roughness of banks and little eddies cause slimes to settle, but not to any extent. I see no reason why this should not go away with the water. It must go away, or there would be much larger deposits there. I am quite satisfied the slimes go to sea. We have never tried stacking slimes in large quantities. It would not be impossible to stack slimes, but it would be impracticable. If dry, they would blow all over the place. Could never hold them in a dry state. I believe the works at Paeroa will cost between £40,000 and £50,000. We have our plans and specifications drawn out, and we have made estimates of the cost. As far as I can understand, the company is already formed to provide the capital. I sent the samples to Mr. Laughlin. I sent a fine sample to each member of the Ohinemuri County Council, to show the degree of fineness to which we were grinding at Waihi. I told them then it was our intention to grind very much finer. That sample was a very fair average of the slime at that particular time, and the coarse sample was a sample of our coarse river-sand at the time. About six months ago, I think, that I gave these samples. We are really grinding finer now. We were in midst of our experimental stage then. I could not send the slimy mass, so I dried the slimes on the boiler before sending them down, not thinking they required slimes as a test to their settling. The fact of drying these slimes on boilers spoils the flocculent condition of the slime. If made very hot would cling together; if made hot enough would fuse. Slime that has been dried cannot be worked in our plant until we add more lime to give it a flocculent condition. Slimes we put in the river are never sun-dried; they are always in the water. I would not say that slimes dried on the river-banks in the sun would not settle. I think the drying of the sample I sent produced the condition in which it now is in the glass. I think the addition of lime would alter the condition now. But I do not know that it would bring it back to its original condition. I do not know exactly what effect heat has on the sample, but it has an effect upon it. I have samples here of our treated stuff in a dry state. May be a little finer ground than Laughlin's sample. This sample has been mixed with lime. [Two samples, wrapped in paper, produced.] The other sample has not. [Experiments made to show that lime causes slimes to settle at once.]

Cross-examined: Slimes of any fineness must necessarily settle at some time. I cannot tell the rate of settlement of 200-mesh-ground slimes and 300-mesh. Slimes that pass 200-mesh and slimes that pass 300-mesh will settle, but the finer will take longer. No doubt, the river running in small eddies will cause settlement. It probably alters its condition coming thirty-three miles. Distance by river from Paeroa to our works is only about twenty miles. If it settles, there is no doubt it

goes away afterwards. Saw deposit of 1 in. or more yesterday. Would not be surprised at 6 in. deposit in small holes. Every day they are uncovered and subjected to action by sun. Subjecting to action by sun consolidates them to a certain extent. At our Waihi works the river-bed is steeper than it is here. There are rocky bars in places. I think the bed is all rocky. We have tried the depth of the dam. Tried last winter, and could not find any deposit there. We tried last winter to dredge out stuff from the dam with our dredges, but we could not find anything in the dam. Water is dammed back a mile or a mile and a half. I do not think it is practicable to stack these slimes. If Mr. Kingswell promised to stack these slimes, he did not understand the difficulty. We have a piece of ground bought to stack these tailings. If we are compelled to do so, we shall have to make an attempt to do so. It is possible to discharge these tailings below the Junction, but we should have to pump the water to send them down. We shall be treating about 500 tons a day: produce same quantity of slime. From my experience I do not think these tailings will cause the river to bank up. There is no tide at Waihi. I do not think that bar at the Junction has collected sand. I do not think it has collected slime. I cannot tell you what chemical change the slimes underwent from drying them on the boiler, but they did undergo a change. There is a chemical and physical change. The glass containing the sample that is sooner settling represents the condition in which the slimes leave the mill. You would never see slimes at the mill in the muddy condition that you see the water in the other glass. I realize that slimes do deposit hard on the river-banks, but I dispute that they remain there. Personally, I know nothing of the financial condition of the company. It is called a new company, but I think it is same shareholders as the old company. I am certain our operations will be a benefit to the river. When I have gone up and down the river I have gone in a steamer, not at low water in a small boat. Mill had been running six or eight months when I sent the sample to Mr. Laughlin. Sent it about six months ago. Would have been in operation twelve months at the time. We were still experimenting at that time. I know that the water has no effect on the slimes between Paeroa and the Junction. There are no slimes there. Did see small quantity of slimes yesterday, but very small proportion. I know they go away because they do not accumulate. I have made no examination to ascertain if the slimes in the river differ in any way from the slimes we put in at the works. I think a slime that settles slowly is a slime that settles the hardest.

Cross-examined by Mr. Miller: If slimes settle slowly they settle hard. That does not mean they are hard to shift. You have only got to disturb them and they are gone. Every time they are shifted they settle hard again. The finer the grains of sand the closer they will settle, but they will be that much more easily shifted when water comes on them. If you have a large body of water travelling at a slow rate it will carry away more slimes than a faster current with less volume. Rain will carry it away if there is sufficient fall. By "sea" I mean Thames Harbour, and a long way out into the harbour. The probability is that it would remain in the harbour in some form or another. Know site of works—surrounded by low-lying country. We do not know what quantity we should have to stack. We shall go on as long as the company keeps up the supply and as long as the present accumulations exist. As far as I know, the company will continue to send tailings into the river.

Re-examined: If these slimes were ever going to settle they would have settled in the still water of the dam; but we could not get any deposit whatever to dredge there. Slimes are very difficult to dry: take forty-eight hours on the top of a boiler to dry. Would dry quicker in thin cakes. Suppose the sun would dry them to some extent, but I cannot say to what degree. If long exposed, they would dry and the surface blow away.

William Sullivan, sworn, saith: Am master of the s.s. "Taniwha." Have known this river for twenty-seven years. Have been actively engaged in navigating the river for last twenty-seven years. I corroborate the evidence given by Captain Bettis.

(It is admitted that the evidence of Mr. Barry, Waihi Company; Mr. Stansfield, manager, Talisman; Mr. Brown, formerly manager Grand Junction, now manager of the Komata; and Mr. C. Banks, metallurgist and engineer for present applicant company, will corroborate evidence given by Mr. Grace and Mr. Aitken.)

Percy Nicholl Kingswell, sworn, saith: Am managing director of Waihi-Paeroa Gold-extraction Company. Have recently reconstructed the company, increasing the capital from £40,000 to £100,000, and the whole of the fresh capital has been subscribed by the same shareholders. Shares are all subscribed for and application-money received. Heard evidence of Mr. Aitken as to treatment of tailings, and their beneficial effect upon the river. I will go further than Mr. Aitken, and say, soon as you remove coarse sands from the river you widen the channel, giving the treated ore an easier get-away, and enable a larger volume of water in time of fresh to come down the river, and it has been proved that the greater volume, the more slimes it will take away. I cannot say that I have examined the island at the Junction. I have gone round in a boat. Evidently a willow has fallen in from the bank and held *débris* coming down the Waihou, and it has caught the tailings coming down the Ohinemuri, making a deposit of tailings round the edge. There is no slimes or slurry on this island. I had sampled the river before Mr. Aitken came. I have since superintended the boring of the river from a little above the Junction to the dairy factory. We put in forty-one bores, and at the lower end near the Junction there were absolutely no slimes up as far as I went. There may have been traces. From the Junction to Pereniki's Bend there was 39 to 41 per cent. of pure river-sand, and the rest very coarse tailings. Have walked up both sides of the river to the whole of the claims. Sieve tests have been made of both bed and banks of the river throughout the whole nine claims, and, commencing from the top claim at Mackaytown to the lower one, both on the river and on the banks, the sieve test has proved that the sand gets finer as you go further down the river, but you can find no slimes. When the river is low I have seen slimes on the top, but I will not say those slimes are quartz slimes; they may be produced naturally from the soil on the banks of the river. In the Buller River I have

seen material just like it several feet thick. Whenever there is a flood there is invariably a deposit of slime where the river has overflowed on to the banks. That is my experience of nearly all the rivers in New Zealand. For two years have been trying to get place for works, and in seeking to get a place free from floods I came here frequently after floods, and have selected a piece of ground above the reach of floods. At that time no sand near site I had selected. Since then, through the opening-up of the big drain above the plant-site, two or three acres have been covered, by the backing-up of the Ohinemuri in time of flood, with deposit from the flood of coarse river-sand, but absolutely no slimes have been deposited there—only sand. Some two years ago, on behalf of my company, and again some twelve months ago, I made an offer to the Government for a bonus of £30,000 to take out of the river within a period of seven years from that date and store on the ground I have since acquired, up to 2,000,000 tons of tailings. Could I have offered at that time to undertake to take all the tailings coming down the river, regardless of quantity, in a given number of years, I was led to believe by Mines Department that an offer on that basis would be very favourably entertained. I did not consider it practicable to stack all that came down the river. We did not intend to stack them; we intended to put them into the ground—to plough it in. We have the option over that freehold to this day.

Cross-examined by Mr. Miller: I have been managing director ever since 1907. In 1908 the condition was put on that I was not to put tailings back into the river. Only arranged on certain condition. On the Ohinemuri County Council rebating to me out of gold duty the cost of any dumping-ground on which to deposit the tailings, and in view of the fact that every promise was made that they would assist me to get the subsidy of the £30,000—that they would use their best endeavours to get it for me—I relied on their promise that they would assist me to get the £30,000, and on their promise about the dumping-ground—I obtained an option over certain lands for depositing tailings. The property is still under option. We have gone into the matter of profit and loss. Detailed plans have been prepared for the machinery, but they are held back pending the result of this case. If we are debarred from putting sands into the river, a much smaller plant will be ordered, because we could not handle the quantity. Would take double our quantity. In that case we should not strip the banks, but dredge from the centre of the river. To put tailings in the dumping-ground would necessitate the treatment of rich tailings. I have seen lots of rivers where there are slimes. After floods there is always a deposit of silt over land covered by water. I have never seen any slimes on my freehold. I have only seen Netherton land from the steamer. Have seen a little deposit now and again. In none of our bores could we find any deposit of slime—not even a layer. If we had got slimes we could not have bored. Could not have pulled rod up, because slimes are more sticky We were boring by hand. I saw no deposit of slimes—I mean, a deposit four or five inches. I will not say there was not anywhere a deposit. I did see a deposit under the bridge yesterday. I do not call that a deposit of any dimensions. I am not sure if that was quartz slimes. I believe the deposit was in places 2 in. thick. In small holes may have been 6 in. Never saw any deposit 3 in. on flat bed near water's edge. May have been 1½ in. deposit of silt at the bridge yesterday. In certain places there may be similar deposits along the river. I can only swear I have not seen deposits of slimes below the Junction. Slimes we saw at the bridge were not caused by a flood. They were there because no flood to take them away. Think about 1,500 tons of tailings put into the river per day. In my opinion, that is going out into the gulf. Always a certain percentage of it travelling down the river, and a portion deposited on the banks of the river—deposited to-day and taken away to-morrow. Depositing would go on quicker at bend of the river. Rivers not dammed up at the Junction. About a couple of chains wide, I should think. I cannot tell you the width of the channel. Large part between those banks filled up with sandbanks. That sandbank would not form a dam to prevent our stuff from flowing down the river. Similar in its action to the dam at our works at Waihi. There would be a stream of slimes running out of our plant. There would be absolutely no deposit when the river was running out. May back up when the tide came in, but would all go out when the tide turned. The class of slime we saw yesterday will not get harder. I never made a statement to a man in Paeroa that if slimes deposited for three months it would require dynamite to move them. The evidence I have given I have given as a man with knowledge. When I made the offer to the Government I had not the same experience as I have now.

EXHIBIT 97.

OUTLINE OF SCHEME BY MR. BARRY PFUNDT FOR BUILDING BARRIERS ON RIVERS.

DEAR MR. CHAIRMAN,— Waikino, 13th June, 1910.

I trust that this letter, and the article accompanying it (I would like the paper posted to me when finished with), will be of some practicable help or use to your Commission. The scheme under consideration is not a wild-goose one, and, as the enclosed article testifies, is in practical operation at the present moment in the Yuba River district, in California, a district whose history and social developments are identical with the district here, the physical and meteorological conditions being very similar.

Briefly, the scheme I would propose is to build a barrier (with gates, normally closed) over the river, thereby raising the level of the river to a sufficient height to flood a large low-lying area of land to a depth of, say, 4 ft. This area of land will of necessity be enclosed by stop-banks, either natural or artificial, and of such a height as to top any future flood-level of the river. Also, the inlet bank will be provided with gates: these will have to be closed entirely for all abnormal flows in the river, which will, of course, then resume its original course through the gates in the barrier, and also over the top of the barrier.

With an area of three-quarters of a mile wide and three miles and a quarter long, and with an average flow of water of, say, 300 cub. ft. per second, and a depth of 4 ft., the silt-laden water will move at a rate of 1·136 ft. per minute, or 10½ days the entire length—ample time to deposit all the suspended slime: and clear water will run off at the far end of the basin into the river.

Battery tailings average 29 cub. ft. per ton; therefore, at 2,000 tons per day = 2,148 cubic yards per day, = 644,400 yards per year (300 days); and an area of 2½ square miles, 3 ft. deep of slimes = 7,744,000 yards—sufficient capacity for twelve years at 2,000 tons per day.

The great main principle of the scheme is to slow down the speed of the river where deposits are wanted, and to increase the speed where deposits are not wanted. The former can be done only by expanding the river on to a comparatively large area, and whether the area—about 1,600 acres—is available and suitable I do not know. The latter can be done by confining the river to its banks.

For removal of existing *débris*, Mr. Kingswell's scheme of dredging might be used.

Hoping that this will be of some use,

I am, &c.,

BARRY PFUNDT.

The Chairman of the Ohinemuri and Waihou Rivers Silting Commission.

[Paper referred to is *Scientific American* Supplement, No. 1507, page 24152.]

EXHIBIT 98.

STATEMENT SHOWING QUANTITY OF QUARTZ CRUSHED, AND VALUE THEREOF, BY WAIHI COMPANY, FOR YEARS 1892–1909; AND GOLD-PRODUCTION IN HAURAKI MINING DISTRICT FOR YEARS 1909 AND 1908.

STATEMENT SHOWING THE QUANTITY OF QUARTZ CRUSHED BY THE WAIHI COMPANY FROM THE YEAR 1892 TO 1909.

Year.	Tons of 2,000 lb.	Value.	Year.	Tons of 2,000 lb.	Value.
		£			£
1892	20,492	46,219	1902	201,023	521,574
1893	22,182	64,345	1903	259,028	658,393
1894	27,846	83,023	1904	291,176	683,882
1895	37,710	120,335	1905	298,531	728,521
1896	38,539	135,156	1906	328,866	837,927
1897	45,658	144,041	1907	356,974	878,485
1898	87,280	256,494	1908	393,214	930,511
1899	114,667	302,525	1909	416,813	924,145
1900	125,453	317,902			
1901	178,444	461,205		3,243,896	8,094,683

MATTHEW PAUL,
Inspector of Mines.

SUMMARY OF GOLD-PRODUCTION IN HAURAKI MINING DISTRICT FOR 1909.

Locality and Name of Mine.	Average Number of Men employed.	Quartz crushed.	Gold obtained. Amalgamation.	Gold obtained. Cyanide.	Estimated Value.
		Tons cwt. qr. lb.	Oz. dwt.	Oz. dwt.	£ s. d.
Waihi Borough ..	1,947	500,432 0 0 0	114,963 0	1,640,221 15	1,034,043 10 8
Ohinemuri County ..	470	60,356 12 1 4	53,744 18	277,907 5	234,801 12 11
Piako County ..	5	5 0 0 0	14 0	..	17 10 0
Coromandel County	115	709 7 2 11	2,414 5	71 15	6,916 19 4
Thames County ..	241	11,966 13 3 2	7,777 11	3,192 3	25,221 19 4
Totals, 1909 ..	2,778	573,469 13 2 17	178,913 14	1,921,392 18	1,301,001 12 3
„ 1908 ..	2,933	546,904 14 1 11	198,058 18	1,872,289 16	1,302,665 0 0
Decrease ..	155	..	19,145 4	..	1,663 7 9
Increase ..	..	26,564 19 1 6	..	49,103 2	..

During the year [1909] 222 men were employed on unproductive works.

EXHIBIT 100.

LETTER FROM F. R. W. DAW AS TO THE SILTING OF THE OHINEMURI AND WAIHOU RIVERS AND OTHER MATTERS.

New Zealand Crown Mines Company (Limited),
Karangahake, near Auckland, N.Z., 25th June, 1910.

DEAR SIR,— Re *the Silting of the Ohinemuri and Waihou Rivers.*

I wrote on Monday, 20th instant, in reply to your letter of the 16th, and informed you that I would write again *re* the silting of these rivers.

The farmers who reside on, or own properties near, the banks of the Ohinemuri and Waihou Rivers have during the recent visit of the Royal Commission drawn attention to certain areas of land said to have been damaged by silt. They gave no definition of the word "silt," but I believe they led the Commission to understand that it is finely ground quartz carried down the Ohinemuri River, in suspension, from the mines. The word "silt," however, is generally defined as "fine earthy sediment." Whenever we have rains in this district waters flows down the sides of the mountains, and are highly charged with fine humus, earthy matter, and sand, and during a freshet these matters are carried along by the principal rivers in suspension.

The velocity, or, I should say, the natural velocity, of these rivers is checked by impact against boulders, sloping banks, or when they overflow a plain. It is then that the silt and sands held in suspension by the motion of the water sink by their own gravity to the bottom. It is well known geologically that in this manner layers of sand and mud are thrown down one upon another wherever they enter a large river, lake, or the sea. Such formations are sometimes called, when they enter a lake, "lacustrine" deposits, and the deposits are generally found in regular layers.

The great fires, and the timber required for building, and for mining and other purposes, have denuded large areas of forest land, and now, when heavy floods occur in this district, immense quantities of earthy and other matter are washed into the rivers, and when they overflow their banks these matters, together with the finely ground slimes from the mines, do damage to certain areas of land situate along the banks of the Ohinemuri and Waihou Rivers. Farmers, however, are not the only members of the community who suffer damage from flood-water. The company I represent have lost thousands of pounds during the past twelve years from freshets, and the Talisman Company, during the last flood, had a large portion of their iron flume destroyed.

The bed of the Ohinemuri River consists of huge boulders for the greater part of the distance between Paeroa and Waihi, which offer considerable obstruction to the natural flow of the water, and they assist very materially in allowing silt and sand to deposit in hollows and where the bed is very nearly level. The banks are also very rugged, and check the velocity of the water considerably. When a freshet takes place the water becomes highly charged not only with what is then carried into the river from the sides of the mountains, but also with matter that has accumulated as a result of the obstructions by boulders.

The distance from Waihi to Paeroa is about thirteen miles, and for this distance there is an approximate fall in the Ohinemuri River of about 26 ft. to the mile. If the average width of the river be taken at 50 ft. under normal conditions, and the average area of transverse sections at 50 sq. ft., the hydraulic mean depth is 1 ft.; then the velocity under these conditions works out at 7·95 ft. per second, whereas the actual mean velocity is not more than 3·5 ft. per second.

In August, 1904, we commenced taking careful daily measurements, for a year, on the sill of a dam erected across the Ohinemuri River near the Government bridge at the eastern end of the Karangahake Railway tunnel. The width of the dam during the twelve months the measurements were taken was 120 ft., but it was afterwards reduced by the Government to 103 ft., when constructing the railway formation-level. The measured sill-depths of water varied considerably from day to day. The greatest depth measured on the sill was 34 in., on the 28th October, 1904. On that day 113,349 cub. ft. of water per minute flowed over the dam; to this quantity must be added about 1,200 cub. ft. of water per minute that was drawn off through a pipe-line then owned by the Woodstock Company; or, the total quantity of water flowing in the river on that day was 114,549 cub. ft. per minute. The smallest measurements were taken on the 8th, 9th, 11th, 12th, 14th, 15th, and 16th April, 1905, when the sill-depth measured 1 in. The greatest measurement taken during that month was 2¾ in. The smallest quantity of water that flowed over the sill in that month was 572 cub. ft. per minute; and if we add the quantity taken through the pipe-line, the total quantity of water flowing in the river was, on those days in April, 1,772 cub. ft. per minute.

The average quantity of water that flowed in the Ohinemuri River, estimated from measurements taken every day from the 23rd August, 1904, to the 22nd August, 1905, was 10,210 cub. ft. per minute; and for this quantity of water to flow at, say, 6 ft. or 7 ft. per second means blasting the boulders and lessening the width of the bed of the river.

Cutting the branches of the willows will also accelerate the flow. I, however, could not recommend the removal of the willows entirely from the banks of the rivers, as the roots bind them together and protect them from wash-water; and, further, if the trees were removed, the channels would in time become wider, and the velocity of the water be reduced. In the Suez Canal steamers are not allowed to exceed a certain speed (if I remember rightly, of four knots per hour); otherwise the banks would soon be destroyed by the wash-water projected against them.

A cubic foot of fresh water, at 60° Fahr., weighs 62·331 lb., and a cubic foot of sea-water 64·14 lb. Fresh water, charged with silt and sands, when it meets the flow of a tidal river, or when it mixes with sea-water, or water of greater density, is sure to cause a deposit of earthy and arenaceous matter; and during freshes, such deposits, in various places, would probably again become suspended in the water, and redeposit on to the bed of a river lower down. This may account for the shifting of so-called banks of silt in the navigable part of the river between Paeroa and Thames.

The responsibility for all natural occurrences in respect to the silting of these rivers should, in the opinion of the farmers, be borne by mining companies. Some have asked that the Proclamation of 1895, proclaiming certain rivers as sludge-channels, should be revoked; others think they should receive compensation for loss caused by act of God: but, before making a suggestion to meet somewhat the difficulty that has arisen in respect to the silting of these rivers, let us see what benefits are being conferred on the agricultural by the mining industry; and I hope you will not consider that I am unduly trespassing upon your time if I go somewhat fully into this side of the question, and show that the damage the farmers have sustained by the deposition of silt upon their lands has been compensated for by the markets made near the farms for their produce. These markets have been brought into existence by a large expenditure of capital and

the employment of a considerable number of miners and others on the goldfields. The expenditure of goldfields revenue and gold duty by local bodies in the construction of roads and bridges has also benefited the farmers, enabling them to transport all that is required, on land, in connection with their industry.

The "New Zealand Official Year-book" shows that the capital value of land has considerably improved in the Dominion since the year 1891. The value of land in the Thames County in 1891 was £253,013, and as at the 31st March, 1909, it amounted to £463,304. In the Ohinemuri County the capital value of land in the year 1891 was £204,704, and as at the 31st March, 1909, £840,283.

The above figures do not include the capital value of land in the Thames and Waihi Boroughs.

Now, these improvements in capital values could not have taken place unless the farmers had been making substantial profits, and these profits could not have been made unless they had markets near at hand for their produce.

According to "The New Zealand Official Year-book," 1909, pages 458 and 459, there were, as enumerated in 1908–9, 536,629 dairy cows in the Dominion, and the production of butter was approximately estimated, and given on page 459. The result is as follows:—

	Lb.
Consumed in the Dominion	20,013,620
Exported	30,907,072
Total	50,920,692

And $\frac{50,920,692}{536,629}$ = 94·88 lb. of butter per dairy cow per annum.

There are approximately 2,200 miners employed in the upper Thames district, and, assuming that they and their families consume ½ lb. of butter per day, then 2,200 × ½ × 365 = 401,500 lb. of butter per year, and, if the average yield from all the dairy cows in the Dominion is 94·88 lb. of butter per annum, then $\frac{401,500}{94·88}$ = 4,232 dairy cows, or the number required to supply the miners and their families with butter. The number of dairy cows in the Thames County is 2,967, and in the Ohinemuri County 3,764—a total of 6,731; or, in other words, about 63 per cent. of the total number of cows in these counties is required to supply the miners and their families with butter. The value of 401,500 lb. of butter at 1s. per pound is £20,075, and the value of the dairy cows at £8 each is £35,688. It is very probable that half the number of cows could supply the butter required if they were continually producing: such, however, is not possible, hence the low average yield per cow.

At the Waihi and Karangahake abattoirs the approximate number of cattle, sheep, and pigs slaughtered per annum, and their value, is as follows:—

	£	s.	d.
Cattle, 2,260, valued at £6 10s. each	14,690	0	0
Sheep, 10,752, ,, 13s. each	6,988	16	0
Pigs, 792, ,, £1 10s. each	1,188	0	0
Total	£22,866	16	0

The approximate weight of the slaughtered cattle is,—

	Tons	cwt.
Cattle, 2,260, at 6½ cwt. each	734	10
Sheep, 10,752, at 60 lb. ,, ...	288	0
Pigs, 792, at 90 lb. ,, ...	31	16
Total	1,054	6

According to Mulhall's Statistics, 4th edition, page 192, the amount of food required per annum, estimated by Keleti, is as follows:—

	Lb.
Man	1,600
Woman	1,200
Child	900

A man's food is made up thus:—

	Lb.
Animal	290
Vegetable	1,310
Total	1,600

And 1,600 lb. × 2,200 = 3,520,000 lb., or 1,571 tons, of animal and vegetable food required for the *miners only* in the upper Thames district.

	d.
Now, 290 lb. of animal food at 6d. per pound	= 1,740
and 1,310 lb. of vegetable food at 2d. per pound	= 2,620
Total	4,360

Or £18 3s. 4d. per annum; and this amount, multiplied by 2,200 = £39,966 13s. 4d., the value of the food consumed by the miners.

Now, if we assume that out of the 2,200 miners, 1,650 of them are married and 550 unmarried, and that each married man has a family of three—viz., a wife and two children—and further assume that Keleti is correct in stating that the wife consumes 75 per cent. and a child 56 per cent. of the amount consumed by a man per annum, then the details of the expenditure on animal and vegetable food are as follows:—

	£	s.	d.
Value of the food consumed by the man per annum	18	3	4
,, ,, woman per annum	13	12	6
,, ,, two children per annum ...	20	6	10
Total	£52	2	8

	£	s.	d
And £52 2s. 8d. × 1,650 married miners	= 86,020	0	0
and £18 3s. 4d. × 550 unmarried miners	= 9,991	13	4
Total	£96,011	13	4

Assuming one-third of this amount is net profit to the farmer—viz., $\frac{£96,011\ 13s.\ 4d.}{3}$ = £32,003 17s. 9d. (say, £32,000)—and capitalizing at twenty years' purchase, the amount is £640,000.

The annual amounts expended by the miners for food leave a profit sufficient for the farmer to meet interest accruing on an amount of considerably over half a million of money, or interest at 5 per cent. on over three-fourths of the total assessed value of the improved and unimproved land in the Ohinemuri County as at the 31st March, 1909.

I have not taken into consideration merchants and others who are not miners, but who reside at Waihi, Waikino, Karangahake, and Paeroa, and who are more or less dependent upon the mining industry for their living, neither have I included merchants and others residing in other centres, who also earn a considerable income from the mines. I, however, believe it is quite safe to assume that the food consumed by persons who are not actually miners, but who reside in close proximity to the mines, would amount fully to the same value as the figures already given for the miners and their families; and, if so, the farmer, instead of earning a net profit on animal and vegetable food of £32,000 a year, is earning at least a profit of £64,000 a year, which, capitalized at twenty years' purchase, amounts to £1,280,000.

Banks, during the past eighteen years, have advanced considerable sums of money to farmers and others: it is difficult to say what amount has been advanced, but the total appears to be, from "The New Zealand Official Year-book," about 22½ millions. I am of the opinion that farmers residing near the goldfields have been greatly assisted in this direction when mortgaging their properties to raise moneys for improvements. Advances could not be safely made by banks unless they were satisfied that the farmers could realize a satisfactory profit on further outlays, and this profit must be obtained by the sale of the greater part of their produce on the goldfields.

I will now show that the farmers derive considerable benefits from the expenditure of goldfields revenue and gold duty by local bodies in various parts of the Dominion.

I have taken from the New Zealand Budgets an account of the receipts and expenditure of goldfields revenue and gold duty for a period of fourteen years. The total amount paid into the Consolidated Fund as goldfields revenue was £397,164 16s. as at the 31st March, 1909, and as gold duty £280,762 4s. 11d. The Government paid from the Consolidated Fund to local bodies £392,908 15s. 4d. of goldfields revenue, and £280,781 19s. 11d. of gold duty. The total amount of the receipts was £677,927 0s. 11d., and the total amount paid over to local bodies £673,690 15s. 3d., or, in other words, the local bodies received practically the whole of the amount paid into the Consolidated Fund: the difference between the receipts of goldfields revenue and the amounts paid over was only £4,236 5s. 8d.

The annual average receipts of goldfields revenue and gold duty for the period given was £48,423 7s. 3d., and the annual average amount paid to local bodies £48,120 5s. 5d.

Now, if we assume that an average annual revenue of £48,000 will be paid over to local bodies during the next ten years, and capitalizing this amount, allowing interest at the rate of 5 per cent., and a sinking fund of 3 per cent. compound interest, we find that the local bodies have a capital interest in the mines which amounts to £349,776 9s. 1d. The annual interest on this amount at 5 per cent. is £17,488 16s. 5d., and the annual sinking fund to be set aside for its redemption at 3 per cent. compound interest is £30,511 3s. 7d. The interest and sinking fund together equal the total annual income of the local bodies.

Reasoning a little further, and assuming that the mines will have a life of twenty years, and capitalizing at the same rates as before, the local bodies' interests in the mines will then amount to £550,359 11s. 6d. The annual interest on this amount at 5 per cent. is £27,517 19s. 6d., and the annual redemption fund, at 3 per cent. compound interest, is £20,482 0s. 6d., and these amounts together are equal to the total annual revenue of £48,000. But the local bodies would no doubt go a step further, and assume that this revenue will continue for all time: if so, then the capital value of their interests in the mines, at twenty years' purchase, is £960,000.

If you turn to page 199 of the Year-book, 1909, you will notice that the local bodies received from the Government during the year ended 31st March, 1908, £202,185 16s. 4d., and of this amount £47,018 1s. 1d. was goldfields revenue and gold duty; or, out of the total amount which these bodies received from the Government, 23¼ per cent. came out of the mining industry.

The goldfields revenue and gold duty have been and still are being used for the construction of roads and bridges, and also for their maintenance. The farmers residing on the banks of the Ohinemuri and Waihou Rivers have contributed practically nothing towards this expenditure. If rates were levied on the farms for this purpose, the farmers' profits would be less, and their property would depreciate in capital value.

The capital expenditure on roads in the Dominion, as at the 31st March, 1909, was, according to the New Zealand Budget, £8,331,015 13s. 10d., and of this amount the goldfields revenue and gold duty contributed no less than 8·08 per cent.

If the farmers of the Thames and Ohinemuri Counties were to assess themselves, say, at ¾d. in the pound on the unimproved capital value of land, an annual sum of about £2,528 would be forthcoming for the erection of stop-banks and keeping the branches of the willow-trees clear of the rivers.

The unimproved value of land in the Thames County is, according to "The New Zealand Official Year-book," 1909, page 559, as follows:—

	£
Thames County	299,657
Ohinemuri County	509,532
Total	£809,189

and this amount will yield an annuity of £2,528 at the rate of ¾d. in the pound.

When the banks of the Ohinemuri and Waihou Rivers are put in order, this annual sum of £2,528, raised from a small tax on the unimproved value of land, could very well be diverted towards assisting in the upkeep of roads and bridges, which the farmers constantly make use of for the transport of their produce. The amount is not much, but it would be something towards alleviating the unfair taxation of mining companies, who have to pay taxes on what they produce whether any profit is made or not.

I have now to show what benefits the farmers derive from the coal consumed in the upper Thames district.

The Taupiri coal-mines, in the year 1907, had a total output of coal (which includes "slack") of 162,046 tons, as shown in "The New Zealand Papers and Reports relating to Minerals and Mining," published in 1908 in connection with "The Inspection of Coal-mines Report," page 30. The total number of men employed below ground was 286, and above ground 61; so that the average output of coal per man employed by this company was 1·557 tons. The amount of coal consumed by the mines in the upper Thames district and by householders is about 83,700 tons per year, or 279 tons per day for 300 working-days, which is somewhat over one-half of the total output of the Taupiri mines. Now $\frac{279}{1{\cdot}557} = 179$ men required above and below ground to supply the gold-mines and the population on the goldfields with coal. We will assume, as before, that three-fourths of this number are married men and one-fourth unmarried; therefore the married and unmarried are as follows:—

Married	134
Unmarried	45
Total	179

Now, if we suppose that each married man has a wife and two children, the cost of the food can be estimated on the same basis as above:—

	£	s.	d.
134 families at £52 2s. 8d. per annum	6,985	17	4
45 unmarried men at £18 3s. 4d.	817	10	0
Total	£7,803	7	4

And, taking one-third of this amount, and capitalizing at twenty years' purchase, we have

$$\frac{£7,803\ 7s.\ 4d.}{3} = £2,601\ 2s.\ 5d.\ (\text{say, } £2,600);$$

and $£2,600 \times 20 = £52,000$.

So that as a result of the gold-mining industry the farmers reap directly from the coal-miners and their families a net profit of £2,600 a year, which amount is equal to 5 per cent. on £52,000 invested in land.

The carriage of the above quantity of coal amounts to £572 7s. 11d. per week, and, taking 300 working-days (or 50 weeks) for a year, the amount paid to the Government for the carriage of coal amounts to £28,620 per annum.

The evidence of farmers and others before the Royal Commission did not disclose nearly 4,000 acres of land as having been totally or partially injured by flood-water and silt; nevertheless, let us take it at 5,000 acres, and assume the whole of this acreage to be worth £12 per acre, or, the total area, £60,000. In the Thames and Ohinemuri Counties, according to "The New Zealand Official Year-book," 1909, page 468, we have the following particulars, under the heading of "Acreage under Sown Grasses, and Cultivation generally, for each County, as on the 31st October, 1908":—

	Thames. Acres.	Ohinemuri. Acres.
In sown grasses, after having been ploughed	5,855	14,727
In sown grasses, not previously ploughed	7,370	15,396
Land broken up, but not under crop	16	487
Total under crop...	1,105	2,482
In garden	69	275
In orchard	352	101
Plantations of forest-trees	18	25
Totals	14,785	33,493

Now, if you turn to page 559 of the Official Year-book, 1909, the capital values of land and improvements in these counties are as follows:—

Thames County.	£	Value of Improved Land. £
Value of improved and unimproved land	463,304	
Less (unimproved value)	299,657	
		163,647

Ohinemuri County.

	£	Value of Improved Land. £
Value of improved and unimproved land	840,283	
Less (unimproved value)	509,532	
		330,751

And $\frac{£163,649 \text{ (improved value)}}{14,785 \text{ (acres)}}$ = £11 1s. 4d.—the average value of improved land per acre in the Thames County; and $\frac{£330,751 \text{ (improved value)}}{33,493 \text{ (acres)}}$ = £9 17s. 6d.—the average value of improved land per acre in the Ohinemuri County.

But let us take the whole value of the land, as above, at £12 per acre. I think we may safely assume that the whole of the 5,000 acres of land could, if it were purchased, be resold at an average price of £8 per acre under present existing sludge-channel conditions: and 5,000 acres × £8 = £40,000; and £60,000 – £40,000 = £20,000, which is more than the maximum damage sustained by the farmers. If we compare this paltry amount with the benefits that have been conferred upon them by the gold-mining industry we find there is no justification for the complaints made in respect to the injury done to their properties by flood-water and silt.

Now, to purchase 5,000 acres of damaged land from the farmers at £12 per acre it would be necessary to borrow £60,000. Interest on this amount at 5 per cent., with a redemption or sinking fund at 3 per cent. compound interest, to liquidate the loan in twenty-five years, would mean taking from the goldfields revenue annually £4,645 13s. 5d. to pay off both principal and interest within the time.

	£	s.	d.
Interest on £60,000 at 5 per cent.	3,000	0	0
Annual redemption or sinking fund, at 3 per cent. compound interest = 0·027427871 × £60,000	1,645	13	5
Interest and sinking fund together	£4,645	13	5

And if, after the land is purchased, a sale is effected subject to sludge-channel conditions, the amounts realized can be used by local bodies for paying off the loan in a shorter period.

The Government might make a condition that the present holders of properties on the banks of the Ohinemuri and Waihou Rivers shall have the first right to repurchase the lands at a price to be fixed by the Government Land Valuation Department.

Now, as regards "fine-crushing":—

We are crushing our ore through a 30-mesh screen, the particulars of which are as follows:—

Wires	No. 28 S.W.G.
Diameter of wires	0·0148 in.
Width of square holes	0·0185 in.

After crushing through this mesh, an average of from 70 to 75 per cent. of the crushed ore will pass through a 90-mesh. In some of our experiments from 80 to 90 per cent. have passed through a 90-mesh screen after crushing through a 30-mesh. We have no intention of altering our system of crushing, for the simple reason that we could not make any further extraction from our ore. The value of our tailings varies from 2s. 6d. to 4s. 6d. per ton.

Now, I will ask you to refer to Rankine's "Manual of Civil Engineering," page 708, article 468:—

Régime *or Stability of a Water-channel.*—"A water-channel is said to be in a state of *régime* or stability when the materials of its bed are able to resist the tendency of the current to sweep them forward. The following table shows, on the authority of Du Buat, the greatest velocities *of the current close to the bed*, consistent with the stability of various materials:—

	Feet per Second.
"Soft clay	0·25
Fine sand	0·50
Coarse sand, and gravel as large as peas	0·70
Gravel as large as French beans	1·00
Gravel 1 in. in diameter	2·25
Pebbles 1½ in. in diameter...	3·33
Heavy shingle	4·00
Soft rock, brick, earthenware	4·50
Rock, various kinds	6·00 and upwards.

As to the relation between the surface velocity, the mean velocity, and the velocity close to the bed, see article 445, p. 674.

"The condition of the channels of streams which have a rocky bed is generally that of stability. When the bed is stony or gravelly the condition is most frequently that of stability in the ordinary state of the river, and instability in the flooded state.

"When the bed is earthy its usual condition is either *just stable and no more, or permanently unstable*. The former of these conditions arises from the fact of the stream carrying earthy matter in suspension, so that the bed consists of particles which are just heavy enough to be deposited, and which any slight increase of velocity would sweep away.

"The bottom of a river in a permanently unstable condition presents, as Du Buat pointed out, a series of transverse ridges, each with a gentle slope at the up-stream side and a steep slope at the down-stream side. The particles of the bed are rolled by the current up the gentle slope till

they come to the crest of the ridge, whence they eventually drop down the steep slope to the bottom of a furrow, where they become covered up, and remain at rest till the gradual removal of the whole ridge leaves them again exposed.

"When the banks, as well as the bottom, are unstable, the river-channel undergoes a continual alteration of form and position. If the banks are straight, they soon become curved, for a very slight accidental obstacle is sufficient to divert the main current so that it acts more strongly on one bank than on the other: the former bank is scooped away, and becomes concave, and the earthy matter suspended in the stream is deposited in the less rapid part, so as to make the opposite bank convex. A curved part of a river-channel tends to become continually more and more curved: for the centrifugal force (or, rather, the tendency of the particles of water to proceed in a straight line) causes the particles of water to accumulate towards the concave bank; the current is consequently more rapid there than towards the convex bank, and it scoops away both the bank and the bottom (unless they are able to resist it), and deposits the material in some slower part of the stream: thus the *line of the strongest current* is always *more* circuitous than the centre line of the channel, and the action of the current tends to make the concave banks more concave, the convex banks more convex, and the whole course of the river more serpentine. This goes on until the current meets some material which it cannot sweep away, or until, by the lengthening of the course of the stream and the consequent flattening of its declivity, its velocity is so much reduced that it can no longer scoop away its banks, and stability is established. In some cases stability is never established, but the river presents a serpentine channel which continually changes its form and position.

"One of the chief objects of engineering in connection with the channels of streams is to protect their banks against the wearing action of the current, so as in some cases to give them that stability which they want in their natural condition, and in other cases to give them the additional stability that is required in order to resist an increased velocity of current, produced by improvements in the course and form of the channel."

Article 469: Protection of River-banks.—"The most efficient protection to the banks of a stream is a thick growth of water-plants; but, as these form a serious impediment to the current, artificial protection must be substituted for them, at least below the average water-level. Above that level a plantation of small willows forms a good defence against the destructive action of floods; but it is not applicable where there is a towing-path. The means of artificially protecting river-banks may be thus classed: 1, fascines; 2, timber sheeting; 3, iron sheeting; 4, crib-work; 5, stone pitching; 6, retaining-walls; 7, groins," &c.

It is a very simple experiment to prove the facts given by Professor Rankine, on the authority of Du Buat, that gravel 1 in. in diameter will have its stability overcome if there is any increased velocity above 2¼ ft. per second.

Now, in a river that has a normal velocity of about 3½ ft. per second, and which would be increased to 6 ft. or 7 ft. per second if the boulders were removed from its bed, there is no possibility of slimes or tailings remaining other than in suspension during a freshet. Where the river is curved, as Professor Rankine points out, banks will be formed on its convex side—which is practically what does take place in the Ohinemuri and Waihou Rivers.

Professor Rankine draws attention to the fact that willows form a good defence against the destructive action of floods, and to destroy them absolutely would no doubt, sooner or later, result in the destruction of the banks along which they are planted.

In England, by various Acts of Parliament, Boards of Conservators have been established for particular rivers. These Boards exercise the powers of the Crown for the regulation and protection of navigation. They replaced the Commissioners of Sewers, who were originally intrusted with these duties. The usual powers of Conservators are to dredge and scour the beds of streams or rivers, and to make by-laws for the regulation of navigation. They are bound to use the receipts from the navigation of the rivers for the public benefit, and so long as they take tolls they are bound to keep the navigation open and in a proper state of repair. The Conservators are not liable for injury caused by overflow from natural causes, for in English law we learn that an accident or injury of this kind is said to be due to the act of God when, without human intervention, it arises from natural causes of such a kind or degree that no experience or care which can reasonably be expected could have foreseen or guarded against them, such as storms, tempests, lightning, an extraordinarily high tide, or severe frost, or an exceptional fall of snow or rain. In the absence of a special contract, no persons are held liable for damage caused by the act of God.

Yours, &c.,

For the New Zealand Crown Mines Company (Limited):

F. R. W. Daw, General Manager.

W. Ferguson, Esq., C.E., Chairman, Silting Commission, Wellington.

Memorandum.

The Commissioners regret that, although Mr. Daw, general manager of the New Zealand Crown Mines Company (Limited), was present during the inquiry at Paeroa, he did not present himself as a witness, but elected to forward his views after the Commission had closed its public sittings. By this action the Commissioners and counsel have been debarred from cross-examination. The Commissioners publish his letter for what it is worth.

William Ferguson, Chairman.

8th July, 1910.

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