

REPORT FOR THE YEAR ENDED 31ST MARCH, 1914; TOGETHER WITH STATEMENT
OF ACCOUNTS.

Presented to both Houses of the General Assembly pursuant to Section 10 of the Hauraki Plains Act, 1908.

Valuations.—During the year 2,178 acres were subdivided into rural farms and reserves, the valuation of this area being £18,240, making a total of 32,525 acres, valued at £178,250, now settled and revenue-producing. A further area of 2,172 acres, valued at £15,070, will be offered for selection very shortly. This therefore shows a reclaimed-swamp area of 34,697 acres, of a capital value of £193,320. No credit has been taken of the large area of land utilized as roads, drains, &c.

The total expenditure under the Act has now been as follows :—

				£	s.	d.
For the year ended 31st March, 1908	...	..	...	5,070	0	0
" " 1909	...	...	...	11,672	5	6
" " 1910	...	...	...	22,235	2	11
" " 1911	...	...	...	32,103	14	0
" " 1912	...	...	...	40,084	13	1
" " 1913	...	...	...	26,608	1	3
" " 1914	...	...	...	21,467	18	2
Total	...	...	...	£159,241	14	11

At an early opportunity I hope to inspect and visit the works in progress.

I am, &c.,

JAS. MACKENZIE.

The Right Hon. W. F. Massey, Minister of Lands.

Under-Secretary for Lands.

STATEMENT OF ACCOUNTS (AS REQUIRED BY SECTION 10 OF THE HAURAKI PLAINS ACT, 1908) FOR
THE YEAR ENDED 31ST MARCH, 1914.

<i>Receipts.</i>			
1913—31st March.	£ s. d.		
To Balance—Cash in Public Account ..	2,778 5 1		
 1914—31st March.	£ s. d.		
To Land-sales	757 10 0		
Rents	6,718 2 3		
Miscellaneous	659 2 5		
		8,134 14 8	
Advances made by the New Zealand State- guaranteed Advances Office	10,000 0 0		
Debentures issued under the New Zea- land Loans Act, 1908	5,000 0 0		
		15,000 0 0	
		£25,912 19 9	

<i>Expenditure.</i>			
1914—31st March.	£ s. d.		
By Expenditure—			
Travelling allowances and expenses, camp allowances, and general ad- ministration expenses	604 11 9		
Purchase and equipment of dredges and launches, maintenance and working expenses	1,523 19 6		
Drainage-works, clearing channels, building stop-banks, and all ex- penses incidental thereto	13,029 10 4		
Sinking artesian wells	511 9 6		
Thames office, upkeep of	120 9 0		
Compensation for lands acquired	3,202 18 6		
Expenses in connection with debentures issued	0 3 6		
Payments on loans—			
Interest	1,830 4 5		
Repayment of principal	644 11 8		
Balance—Cash in Public Account	4,445 1 7		
		£25,912 19 9	

Loan Account.

1914—31st March.			1913—1st April.		
To Balance..	£	s. d.	By Balance due to Loans to Local Bodies' Account (on original loan of £31,000)	£	s. d.
	134,741	10 3		36,118	4 10
			1914—31st March.		
			By Year's interest at 4 per cent. per annum	1,444	14 7
			Advances made by the New Zealand State-guaranteed Advances Office—		
			No. 1 loan—Balance ..	4,746	5 0
			No. 2 „ „ ..	4,746	5 0
			No. 3 „ „ ..	4,784	7 6
			No. 4 „ „ ..	9,568	15 0
			No. 5 „ „ ..	24,109	7 6
			No. 6 „ „ ..	9,717	10 0
			No. 7 „ „ ..	9,801	5 0
			No. 8 „ „ ..	9,801	5 0
			No. 9 „ „ ..	4,934	7 6
			No. 10 „ „ ..	4,969	3 4
			No. 11 „ „ ..	5,000	0 0
			Debentures issued under New Zealand Loans Act, 1908 ..	5,000	0 0
<u>£134,741 10 3</u>			<u>£134,741 10 3</u>		

REPORT BY LAND DRAINAGE ENGINEER.

SIR,—

I have the honour, in accordance with the provisions of the Hauraki Plains Act, 1908, to report upon the various operations carried out during the year ending on the 31st March, 1914.

As in past years, the development and maintenance of the land-drainage system has been actively carried on, and existing drainage and road-formation improved as much as possible.

As no county rates are payable upon Hauraki Plains lands, and no special maintenance levy has as yet been made, the upkeep of roads and drains, &c., has so far been a charge upon special grants and the Hauraki Plains Settlement Account.

During the past year a further area of 2,392 acres was made available for selection and is now in occupation. To date the total area reclaimed and settled is 32,402 acres, and this area is occupied by some 227 settlers.

This transformation of previously useless swamp into drained farms will result in a valuable addition to the dairying land of the province.

The settlers are making great improvements in every direction, and the whole area of the swamp is very rapidly changing into good dairy farms. Naturally it is a big fight for new settlers, but they are very energetic and progressive, and the Department strives to assist them in every reasonable way.

In each particular work dealt with hereafter, totals are given showing the position the various works have reached as at the 31st March, 1914, and details of all classes of work executed during the financial year are shown separately under the heading of "Works performed."

It will be neither possible nor economical in the future to bring in large areas for settlement yearly, as this would prove costly. A large portion of the swamp will gradually improve itself by reason of existing drains, and this is preferable to going in for a "forcing" policy. The result will be the same in the end, but at less cost.

PRIESTMAN DREDGERS.

During the past year two Priestman dredgers have been engaged in completing the widening of the Piako River between the Waikaka Canal and Kerepeehi. This work was commenced during 1912, and during March, 1914, the widening of this stretch, a distance of very nearly 5 miles, was completed, the river for this distance now averaging 66 ft., whereas formerly it was in places not more than 30 ft. wide.

The effect of this work is especially noticeable at the Narrows, just above the Puhanga Canal, where the flood-waters always were congested, whereas now the water is not retarded to nearly the same extent, and an even flow is assured. During the fresh of December, 1913, this result was particularly emphasized, for, although the river was very high at Tahuna, the water round Kerepeehi did not rise within several feet of its former height. After the fresh began to subside the water fell remarkably quickly, instead of remaining at the same level for weeks, as was formerly the case.

All the spoil excavated was deposited on the banks of the river, and will provide material for a good road-formation and stop-banks at a later date. The stop-bank from Kerepeehi to the south end of the Puhanga Canal was strengthened considerably by the spoil being shifted back against the existing bank, and when this work is completed this portion, which formerly had to withstand the biggest strains in flood-time, will be rendered absolutely safe.

The amount of spoil removed for the year was 147,740 cubic yards, costing 3·2d. per cubic yard. This cost covers all charges, including wages, supplies, repairs, idle time, and holidays.

Owing to the strike curtailing the supply of coal, both dredgers were idle for some weeks, and advantage was taken of this opportunity to completely overhaul No. 2 dredge. This dredge was dismantled with the exception of the chutes, and all worn parts were renewed. The heaviest work was the placing in position of a new wheel-race, which weighed over a ton, the original one being worn through in several places. All the lifting of machinery was accomplished by

No. 1 dredge, which also was overhauled, but did not require so much attention. The cost of this overhaul was about £200, and has been charged against the work. Since the overhaul No. 2 dredge has been working more efficiently than previously, and I consider that the repairs could not have been carried out better than they were.

In about a year's time No. 1 dredge will require an overhaul of a similar nature, as the wheel-race is showing signs of wearing through.

WAITAKARURU—MAUKORO CANAL.

Owing to both dredgers being engaged on the Piako River improvements, no dredging was undertaken on this canal during the past year. However, a drain 10 ft. wide on top was constructed as far as Torehape, a distance of 6 miles 20 chains from the Hauraki Gulf. Of this distance, 189 chains has been dredged, whilst for 85 chains, 5 ft. of peat has been sluiced out to a width of 40 ft., leaving a distance of 2 miles 46 chains of 10 ft. drain constructed.

The latter portion of the country traversed by this drain is very solid peat country. The fall from the end of this drain to the sea is over 20 ft., and therefore renders it impracticable to construct a canal with a dredge for a large portion of this distance. However, every endeavour has been made to utilize this drain as a catchment-drain, and at the present time there are only two streams that require outlets in order to complete the purpose for which it was intended. These two are the Waikumete and the Torehape, both of which will be tapped during the coming year, as the Department will construct the Torehape outlet, whilst the Waikumete outlet will be accomplished by private enterprise, as the land through which it passes is freehold.

WAIKAKA CANAL.

This canal, which was completed in 1911, has been standing remarkably well, as all the traffic up and down the river passes through this waterway. Some further improvements to this canal are contemplated as opportunity offers.

PIAKO AND WAITOA RIVERS IMPROVEMENT.

The works detailed under the heading "Priestman dredgers" describe all the works that have been carried out in the above connection, for which a special vote of £2,000 for two years was obtained in 1912.

In the year ending 31st March, 1913, the sum of £465 was expended in dredging the Piako River, being only for a period of four months, whilst during the year under review a sum of £2,073 13s. 5d. was expended, practically all in dredging, a small sum being utilized in removing spoil from alongside the river-banks.

As mentioned before, the work that has been carried out has been especially beneficial to the reaches above Kerepehi, and as a result the flood-waters do not become so congested as formerly, and are got rid of very quickly.

It has not been possible, so far, to undertake any work in connection with the removal of the hard bars in the Waitoa River, but it is hoped to do so shortly.

STOP-BANKS.

The total length of stop-banks (or levees) that has been constructed is 27 miles 50 chains, a length of 8 chains having been completed along the Waitakaruru Stream during the year. In addition the Department constructed 71 chains of stop-bank along the Waitakaruru Stream, where the Waitakaruru Loan Block has frontage to the stream. This was not constructed out of Hauraki Plains funds, but forms part of the whole scheme for preventing the flood-waters from the stream overflowing the adjacent Crown land.

During the year there has not been a case where the banks have been washed away, as, where they are exposed, special protections have been constructed from time to time. Wherever necessary the banks have been strengthened, and this policy will be carried out in the future.

FORMED ROADS.

The total length of formed cart-roads, in most cases with a drain on each side, is now 53 miles 78 chains, the distance formed for the year being 3 miles 50 chains, all the work being new formation.

In addition some 3,000 cubic yards of sand was utilized in blinding and raising peat roads within the Waitoa Block, drays and scoops being the method of carting. This has practically completed the road-formation within the Waitoa Block, although in a few low places it will be necessary to raise the roads still further.

A special vote of £1,595 was obtained to assist in the construction of the Waikaka Tramway Road, and during the past year the sum of £402 has been expended on this work. Over a mile of drain was constructed, and in February the actual road-construction was commenced. Before spreading the spoil, which is obtained from the upper end of the road, fascines had to be laid to ensure a solid foundation. Six trucks were built and are being used continually on the tram-line, which at the same time is being moved to the centre of the road instead of being on the side, as previously. At the end of the year over 1,600 cubic yards had been trammed and utilized in the preliminary ballasting.

During the summer six drays have been engaged continually in carting spoil for the Pate-tonga Road, which passes through peat country. This has been very heavy work; the amount of spoil required per chain has in some cases been as high as 60 cubic yards.

All roads are being maintained as well as possible.

ROAD-BANKS.

The total length of road-banks—i.e., spoil from road-drains removed about 4 ft. from the edge thereof and spread—is still 13 miles. During the year nothing has been done to convert any of these into cart-roads. Quite half of the above distance is not required for the subdivision of the land, and has been left mainly as a reserve. This distance will be reduced, as at Waikaka some of the roads will be ballasted during the coming summer.

DRAINS IN OPERATION.

The total mileage of drains in operation is now 302 miles, and includes stop-bank drains, subdivisional drains, road-drains, service-drains, and outlets of all descriptions. This is an increase of 26 miles during the year. At Waitoa and Waikaka very heavy timber was met with while constructing the main drains, and consequently the work was slow and costly.

SNAGGING.

The work carried out under this heading has been confined solely to the Waitoa River, the total distance snagged to date being 18 miles 17 chains, of which 2 miles 22 chains has been covered during the past year. Of this a distance of 1 mile 22 chains was snagged by day labour, which completed the clearing of the river as far as the Piranui Stream. From this point onwards to the Waihekau Stream, a distance of 3 miles 45 chains, a contract was let in December, and up to date a distance of 1 mile has been completed. The balance of this work will be completed during the coming year.

At present the Department's punt is being utilized in weeding the river from the Ohine Stream southwards to the junction with the Piako River. This work will be an ever-recurring one, as, owing to the sluggish nature of the stream, the growth of weeds and water-lilies in a season is prolific.

No work of this nature has been carried out on the Piako River during the year.

All the above work has been done by special vote. The expenditure for the year was £523 2s. 4d.

WHARVES.

The total number of wharves constructed to date is fourteen, none having been constructed during the year.

The Patetonga Wharf, which was purchased in the previous year, was redecked and strengthened.

Various small improvements and repairs to the wharves were attended to as required.

A small wharf will be erected at the south end of the Puhanga spillway.

FLOOD-GATES.

The total number of gates now in use is fifty-four, three having been removed during the year owing to their being no longer necessary. This was due to the water that was formerly sent down certain outlets being diverted into fresh channels, so as to endeavour to keep a continuous flow of water and so keep the outlets for the gates free from silt.

At the outlets of five of the gates flumings were erected, which have the effect of rendering the gates more efficient and not so liable to damage from erosion.

As usual, all gates have been inspected regularly and repairs effected.

BRIDGES, CULVERTS, ETC.

The total number of sill bridges to date is ninety-two, small bridges on piles eight, one two-span bridge, and five culverts.

During this coming year it is intended to construct a permanent bridge across the Waitakaruru-Maukoro Canal at Waitakaruru.

PRIVATE TELEPHONE-LINE TO WORKS.

As usual, this line has been of great assistance in facilitating the progress of the works, as it saves an unnecessary amount of travelling. The total distance of this line, which extends from Kerepehi to Waitakaruru, is 14 miles.

BUILDINGS.

The total number of buildings on the works is thirty-eight, which are used as quarters, stores, wharf-sheds, &c.

One wharf-shed was erected during the year, whilst additions were made to the foreman's hut at Waikaka.

All buildings are in very fair order.

FLOATING PLANT.

This plant consists of the following: Two Priestman grab dredgers complete, one steamer, three oil-launches, six pontoons, and sundry small punts. Since last report one launch has been transferred to the Rangitaiki drainage-works, whilst three pontoons have been procured in order to carry out the metalling scheme for the plains. All have been kept in good repair.

ARTESIAN BORING PLANT.

During the year twenty-three bores were sunk by the Department's plant, bringing the total up to eighty-two. The flows of water obtained have varied from 1,680 gallons to 96,000 gallons per diem. No unmineralized water has been struck, nevertheless the mineralized water does not seem to have any detrimental effect on stock.

All bores have been sunk for the settlers on very easy terms, extending over periods suitable to themselves, whilst in case of a transfer of section arrangements have been made so that the cost is refunded before the transfer is obtained.

The total cost of the bores sunk to date, including wages, material, &c., is £1,707 19s. 7d., whilst the sum repaid so far is £474 1s. 6d., some £263 14s. 10d. of this being repaid during the current year.

Schedules of all bores sunk during the year are attached, and disclose the fact that the country in each locality has its peculiar strata.

As pointed out in the last report, a distance of 90 chains of the Turua Road was let by tender at a cost of £1,002 7s. 6d., whilst last November a further section of 76 chains was let at £877 16s. This work was completed during March, and a very satisfactory job has been carried out by the contractors. This is all the metalling that has been done on the eastern side of the Piako River.

On the western side of the river a contract was let for the supply only of gravel for the Pipiroa-Waitakaruru Road, the tramping and spreading being undertaken by the Department's own plant and day labour. Altogether 2,650 cubic yards of shingle was delivered at Pipiroa, and this sufficed to metal 160 chains of the above road.

Owing to the excessive cost of the gravel delivered by scows, and also to the fact that the sea-beach gravel does not bind too well, it was decided to build punts and convey the gravel from the Kauaeranga River at Thames. The strike in November and December, however, interfered with these plans, and in spite of the timber being ordered in November, it was not till after the New Year that the construction of the punts could be put in hand. Two punts were built by contract, whilst a third was purchased. The cost of the three punts was £610, and these can each hold on an average 30 cubic yards when the tides are suitable. On the wharf at Pipiroa a hoisting-winch was erected for unloading the punts direct into the trucks. The loading has been done by contract, whilst an oil-launch tows the punts to Shortland Wharf, where the s.s. "Hauraki" takes them in tow to Pipiroa. This work was undertaken late in March, and consequently only 82 cubic yards was punted across during that month.

The expenditure under this heading out of special grants was £4,095 3s. 4d., of which details are as follows: Bagnall Bros.—Contract 3M, Turua Road, £1,002 7s. 6d.; Bagnall Bros.—Contract 3M, extension Turua Road, £602 18s. 3d.; Winstone Limited—Contract 4M, supply at Pipiroa, £1,126 9s. 3d.; wages for Pipiroa-Waitakaruru Road, £627 14s. 3d.; supplies, £36 3s. 2d.; punts, &c., £699 10s. 11d.: total, £4,095 3s. 4d.

SURVEYS.

During the year some 2,392 acres were surveyed into sections at Waikaka and Kerepehi for settlement purposes. Various other small surveys were completed, whilst at the present time the field-work of 2,000 acres at Ngarua and Waitakaruru is in hand.

The surveys of the Patetonga and Kerepehi townships are also in hand, and will be completed during the winter.

Wherever necessary for the carrying-on of the works, engineering surveys have been completed for present and future requirements.

VALUATIONS.

During the year 2,178 acres were subdivided into rural farms and reserves, the valuation of this area being £18,240, making a total of 32,525 acres, valued at £178,250, now settled and revenue-producing. A further area of 2,172 acres, valued at £15,070, will be offered for selection very shortly. This therefore shows a reclaimed-swamp area of 34,697 acres, of a capital value of £193,320. No credit has been taken for the large area of land utilized as roads, drains, &c.

WORKS EXPENDITURE DURING THE YEAR

Piecework contract absorbed the sum of £5,484 13s. 6d. from the Hauraki Plains Settlement Account, and £1,377 12s. 5d. from special grants. Day labour absorbed a sum of £7,764 3s. 2d. from the Hauraki Plains Settlement Account, whilst £3,263 10s. 7d. was spent out of special grants. All the above were paid from local imprest.

PRINCIPAL WORKS PROPOSED.

The principal works to be carried out during the next financial year are as follows:—

- (1.) Improvements to Piako River.
- (2.) Continuance of cart-road formation (mainly at Waikaka).
- (3.) General drainage development, so as to bring in new areas for settlement.
- (4.) Prosecution of metalling of main roads.
- (5.) Maintenance and improvements to existing works.
- (6.) Formation of access roads leading to Hauraki Plains.

LAND FOR TOWNSHIP AND VILLAGE SITES.

During last year 175 acres were purchased at Kerepehi, and also 25 acres at Waikaka, in order to provide town and village allotments in the above localities. The survey of both these areas is in hand, and will be completed shortly, and they will then be available for sale. These lands were purchased out of the Hauraki Plains Settlement Account.

LAND PROPOSED TO BE OPENED.

During August an area of 2,172 acres in the vicinity of Waitakaruru and Ngarua will be available for selection. In addition an area of about 2,000 acres at Ngarua and Mangawhero should be far enough advanced for selection before the end of the next financial year.

Work has been commenced on the Awaiti Block at Netherton, containing about 2,000 acres, and I consider that this will be available for settlement during the year, provided the Public Works Department carry out their scheme to stop-bank the Waihou River, which at the present time floods this particular block.

In my last report mention was made of a block of hill and swamp land adjoining the Hauraki Plains at Waitakaruru, which it was proposed to open up for selection. Unfortunately this could not be carried out, but, without fail, this area will be available during the coming spring. The main roads to this block have all been constructed, whilst the by-roads are now under construction.

GENERAL.

Office, draughting, and field staffs have been kept very busy during the past year, and a considerable amount of engineering and section surveys have also been made. The attached plan shows the present position of operations, and no effort is being spared to give effect to the Government's policy of making swamp lands available.

My thanks are due to Mr. R. G. Macmorran, Assistant Land Drainage Engineer, who is in local charge, and to Mr. H. A. Joyce and all other members of the drainage staff, who have worked so hard and loyally to ensure success of all operations.

I have, &c.,

J. B. THOMPSON,

Land Drainage Engineer

The Under-Secretary, Department of Lands and Survey.

APPENDIX.

ARTESIAN BORE NO. 60: SECTION 1, BLOCK II, WAIHOU. (MR. WHITE.)

Depth in Feet.	Details.	Depth in Feet.	Details.
69	69 ft. clay.	163	17 ft. pumice sand.
73	4 ft. rotten timber.	166	3 ft. rotten timber.
88	15 ft. sand.	180	14 ft. pumice sand.
102	14 ft. rotten timber.	185	5 ft. clay.
137	35 ft. pumice sand	195	10 ft. sand.
146	9 ft. rotten timber.	201	6 ft. rotten timber.

Total depth, 201 ft. Flow, 9,600 gallons per day.

ARTESIAN BORE NO. 61: SECTION 2, BLOCK II, WAIHOU SURVEY DISTRICT. (CRAWFORD BROS.)

Depth in Feet.	Details.	Depth in Feet.	Details.
56	56 ft. clay.	139	10 ft. pumice sand.
61	5 ft. sand.	141	2 ft. rotten timber.
74	13 ft. clay.	153	12 ft. pumice sand.
82	8 ft. drift sand.	158	5 ft. clay.
90	8 ft. rotten timber.	177	19 ft. pumice sand.
98	8 ft. white clay.	180	3 ft. rotten timber.
108	10 ft. pumice sand.	209	29 ft. pumice sand.
110	2 ft. rotten timber.	221	12 ft. rotten timber.
126	16 ft. pumice sand.	261	40 ft. pumice sand.
129	3 ft. rotten timber.		

Total depth, 261 ft. Flow, 4,800 gallons per day.

ARTESIAN BORE NO. 62: SECTION 1, BLOCK XI, THAMES. (MR. HIGGINS.)

Depth in Feet.	Details.	Depth in Feet.	Details.
110	110 ft. clay.	223	2 ft. rotten timber.
122	12 ft. drift sand.	245	22 ft. pumice sand.
150	28 ft. shingle.	247	2 ft. rotten timber.
158	8 ft. clay.	288	41 ft. sandstone.
173	15 ft. pumice sand.	298	10 ft. rotten timber.
175	2 ft. rotten timber.	302	4 ft. pumice sand.
191	16 ft. pumice sand.	307	5 ft. rotten timber.
195	4 ft. clay.	318	11 ft. pumice sand.
203	8 ft. pumice sand.	323	5 ft. rotten timber.
205	2 ft. rotten timber.	337	14 ft. pumice sand.
213	8 ft. drift sand.	340	3 ft. clay.
218	5 ft. rotten timber.	350	10 ft. black sand.
221	3 ft. shingle.		

Total depth, 350 ft. No flow obtained.

ARTESIAN BORE NO. 63: SECTION 1, BLOCK XI, THAMES. (MR. HIGGINS.)

Depth in Feet.	Details.	Depth in Feet.	Details.
133	133 ft. clay.	333	4 ft. rotten timber.
137	4 ft. rotten timber.	334	1 ft. rock.
148	11 ft. clay.	338	4 ft. rotten timber.
161	13 ft. sand.	355	17 ft. clay.
163	2 ft. rotten timber.	357	2 ft. shingle.
180	17 ft. clay.	385	28 ft. pumice sand.
225	45 ft. drift sand.	398	11 ft. clay.
228	3 ft. rotten timber.	414	16 ft. pumice sand.
245	17 ft. pumice sand.	416	2 ft. rotten timber.
247	2 ft. rotten timber.	427	11 ft. pumice sand.
266	19 ft. clay.	432	5 ft. rotten timber.
269	3 ft. rotten timber.	467	35 ft. pumice sand.
275	6 ft. sand.	472	5 ft. clay.
280	5 ft. shingle.	487	15 ft. pumice sand.
296	16 ft. sand.	495	8 ft. clay.
301	5 ft. rotten timber.	499	4 ft. rotten timber.
329	28 ft. pumice sand.	520	21 ft. pumice sand.

Total depth, 520 ft. Flow, 17,280 gallons per day.

ARTESIAN BORE NO. 64: SECTION 6, BLOCK XI, THAMES. (MR. CHRISTIE.)

Depth in Feet.	Details.	Depth in Feet.	Details.
60	60 ft. clay.	262	4 ft. sand.
79	19 ft. rotten timber.	273	11 ft. clay.
100	21 ft. clay.	277	4 ft. rotten timber.
103	3 ft. sand.	285	8 ft. sand.
109	6 ft. rotten timber.	286	1 ft. rotten timber.
130	21 ft. clay.	292	6 ft. sand.
145	15 ft. rotten timber.	295	3 ft. rotten timber.
148	3 ft. sand.	303	8 ft. clay.
151	3 ft. rotten timber.	307	4 ft. rotten timber.
179	28 ft. pumice sand.	317	10 ft. sand.
185	6 ft. rotten timber.	325	8 ft. clay.
212	27 ft. pumice sand.	345	20 ft. pumice sand.
221	9 ft. rotten timber.	350	5 ft. rotten timber.
238	17 ft. pumice sand.	396	46 ft. pumice sand.
241	3 ft. rotten timber.	404	8 ft. rotten timber.
248	7 ft. pumice sand.	469	65 ft. pumice sand.
251	3 ft. rotten timber.	504	35 ft. clay.
258	7 ft. clay.		

Total depth, 504 ft. Flow, 9,600 gallons per day.

ARTESIAN BORE NO. 65: SECTION 13, BLOCK XI, THAMES. (MR. CREAN.)

Depth in Feet.	Details.	Depth in Feet.	Details.
58	58 ft. clay.	313	17 ft. pumice sand.
63	5 ft. rotten timber.	323	10 ft. rotten timber.
71	8 ft. clay.	337	14 ft. pumice sand.
74	3 ft. sand.	342	5 ft. rotten timber.
129	55 ft. clay.	352	10 ft. pumice sand.
148	19 ft. sand.	358	6 ft. rotten timber.
158	10 ft. clay.	365	7 ft. pumice sand.
165	7 ft. sand.	367	2 ft. rotten timber.
248	83 ft. clay.	370	3 ft. sand.
255	7 ft. sand.	372	2 ft. rotten timber.
262	7 ft. rotten timber.	378	6 ft. clay.
294	32 ft. pumice sand.	420	42 ft. pumice sand.
296	2 ft. rotten timber.		

Total depth, 420 ft. Flow, 2,880 gallons per day.

ARTESIAN BORE NO. 66: SECTION 22, BLOCK XI, THAMES. (MR. R. CONNOR.)

Depth in Feet.	Details.	Depth in Feet.	Details.
52	52 ft. clay.	145	21 ft. pumice sand.
63	11 ft. sand.	147	2 ft. rotten timber.
74	11 ft. white clay.	149	2 ft. sand.
82	8 ft. rotten timber.	154	5 ft. rotten timber.
99	17 ft. pumice sand.	162	8 ft. pumice sand.
112	13 ft. rotten timber.	166	4 ft. rotten timber.
118	6 ft. sand.	169	3 ft. pumice sand.
124	6 ft. rotten timber.		

Total depth, 169 ft. Flow, 2,640 gallons per day.

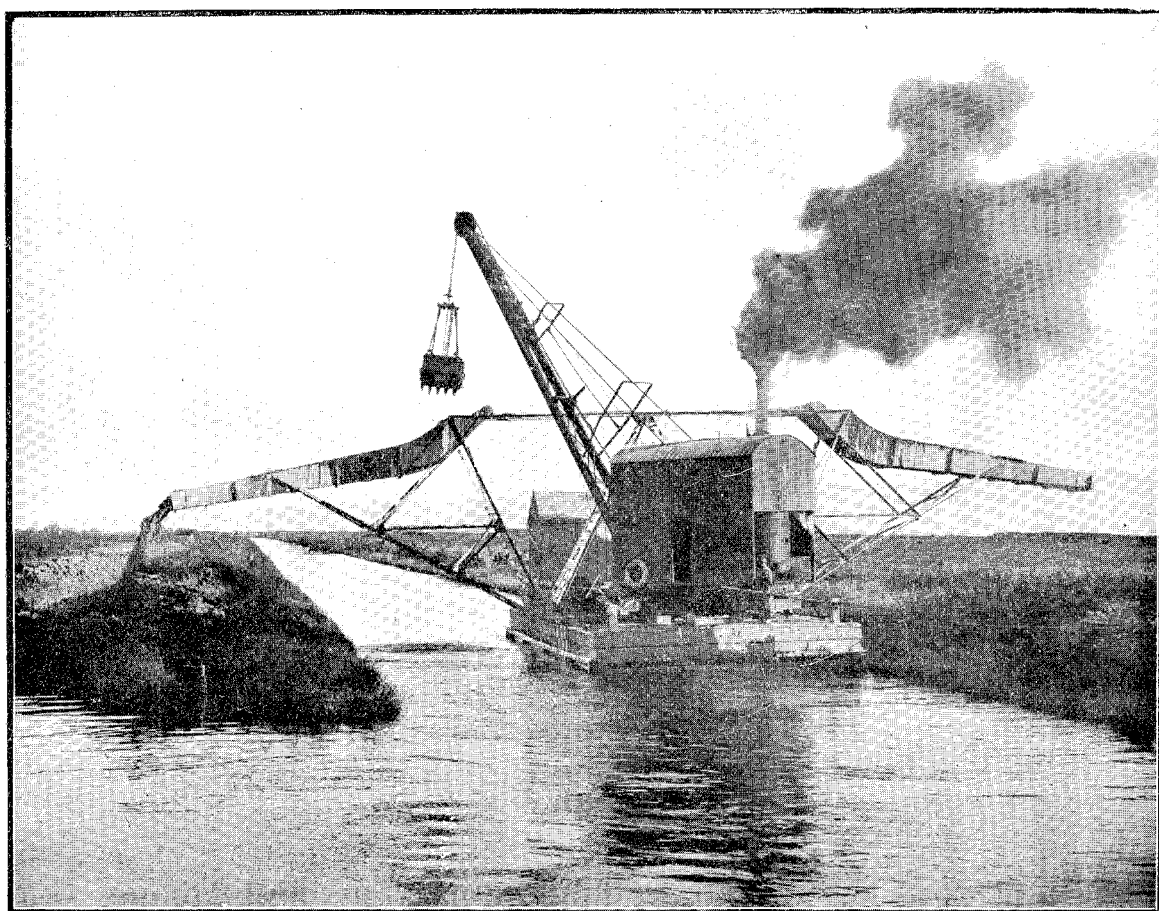
ARTESIAN BORE NO. 67: SECTION 38, BLOCK X, THAMES. (MR. PALMER.)

Depth in Feet.	Details.	Depth in Feet.	Details.
38	38 ft. clay.	136	13 ft. pumice sand.
44	6 ft. sand.	140	4 ft. rotten timber.
52	8 ft. clay.	174	34 ft. pumice sand.
60	8 ft. sand.	184	10 ft. clay.
67	7 ft. rotten timber.	218	34 ft. drift sand.
89	22 ft. drift sand.	223	5 ft. shingle.
92	3 ft. rotten timber.	231	8 ft. clay.
102	10 ft. pumice sand.	239	6 ft. drift sand.
104	2 ft. rotten timber.	245	6 ft. rotten timber.
118	14 ft. pumice sand.	254	9 ft. shingle.
123	5 ft. rotten timber.		

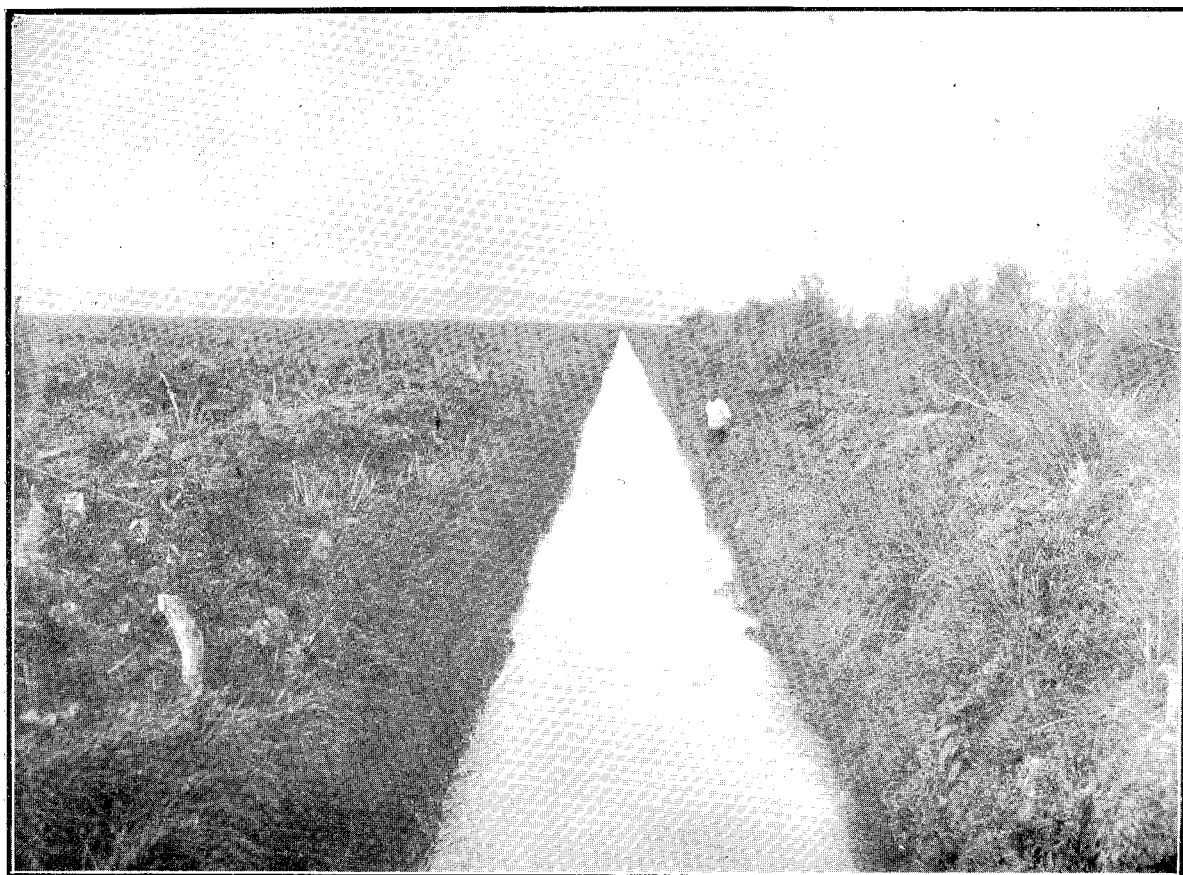
Total depth, 254 ft. No water obtained.

ARTESIAN BORE NO. 68: SECTION 38, BLOCK X, THAMES. (MR. PALMER.)

Depth in Feet.	Details.	Depth in Feet.	Details.
43	43 ft. clay.	81	5 ft. sand.
61	18 ft. sand.	85	4 ft. rotten timber.
72	11 ft. rotten timber.	87	2 ft. sand.
76	4 ft. clay.	90	3 ft. clay.



A TYPICAL VIEW OF DREDGING-WORK.



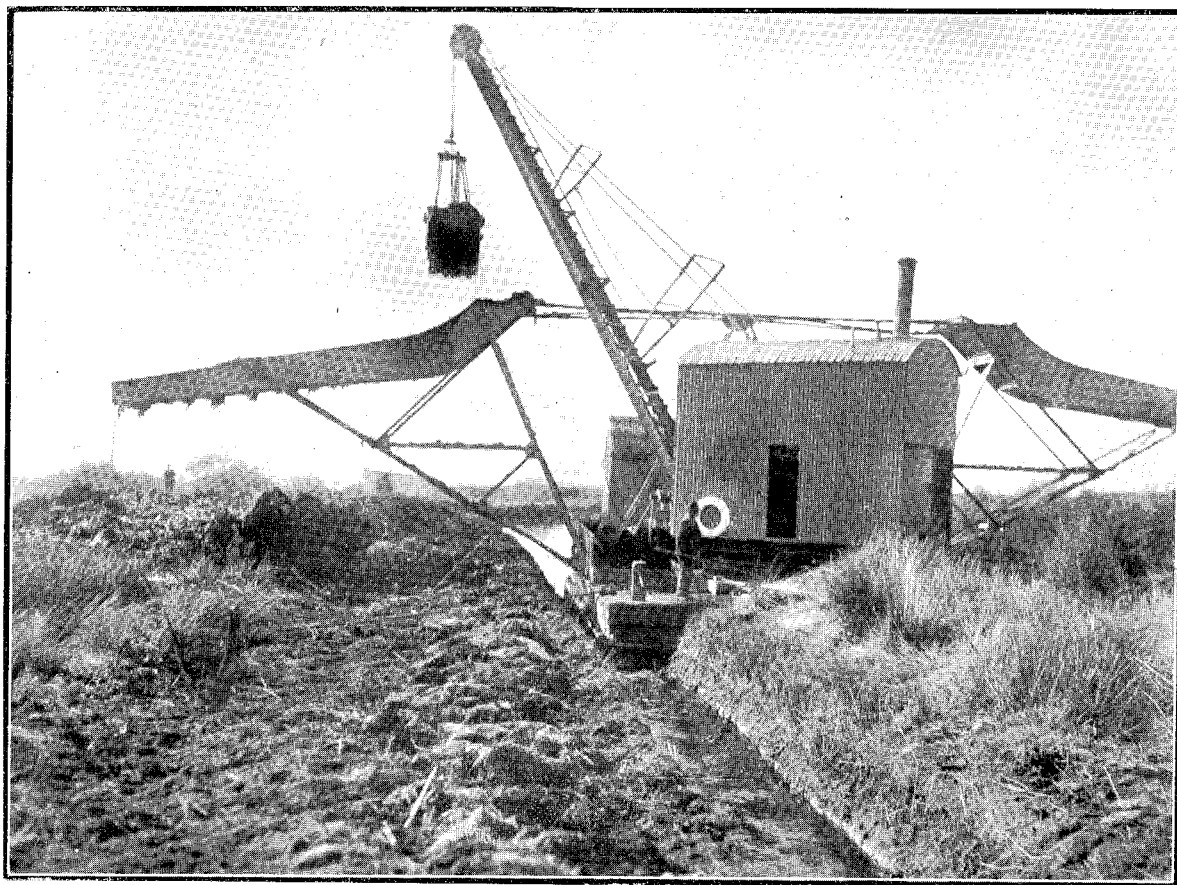
WAIKAKA CREEK OUTLET, SHOWING LAND RECENTLY BALLOTTED FOR.



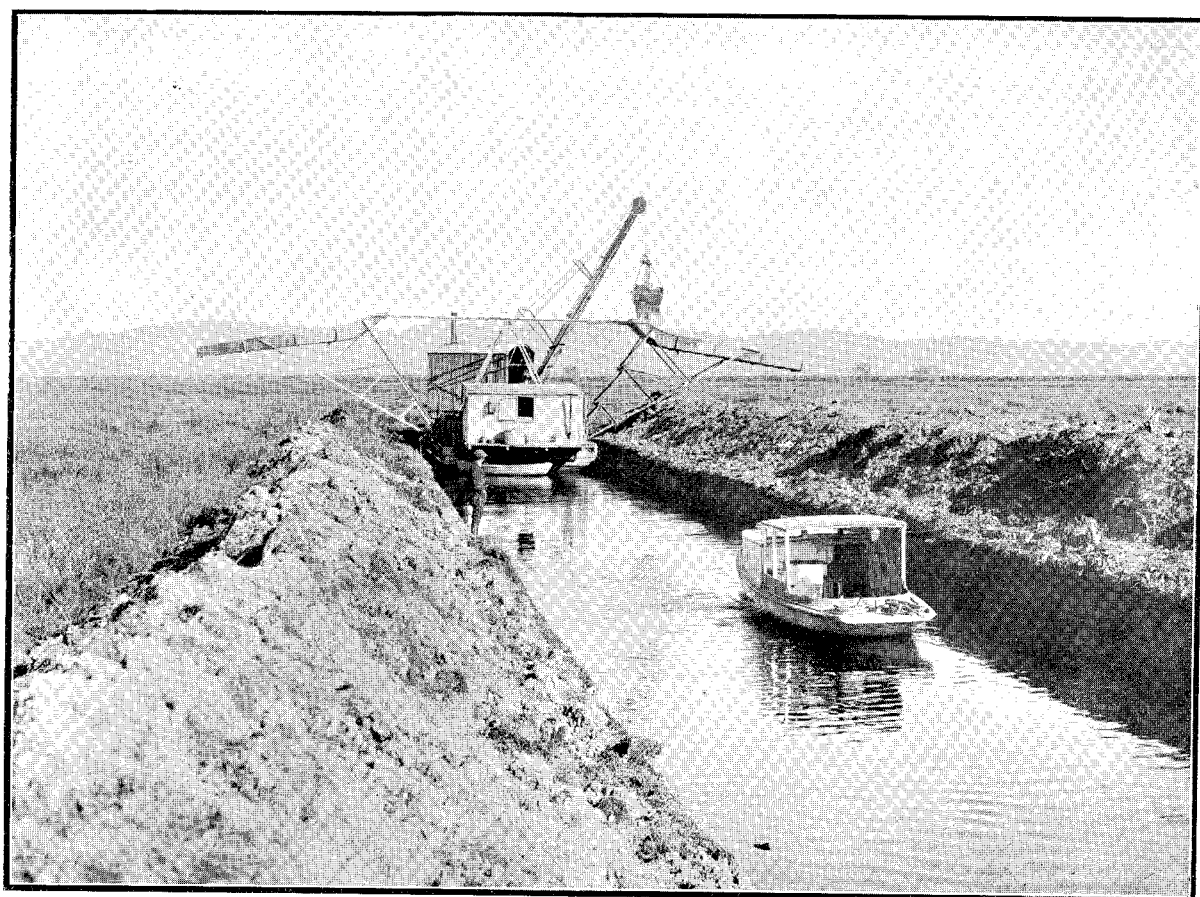
MR. P. FLYNN'S HOMESTEAD AT SHELLY BEACH.
Four years ago this country was covered with raupo 12 ft. high.



MANGOLDS GROWING ON RECLAIMED SWAMP LAND, WHERE RAUPO 12 FT. HIGH GREW FOUR YEARS AGO.



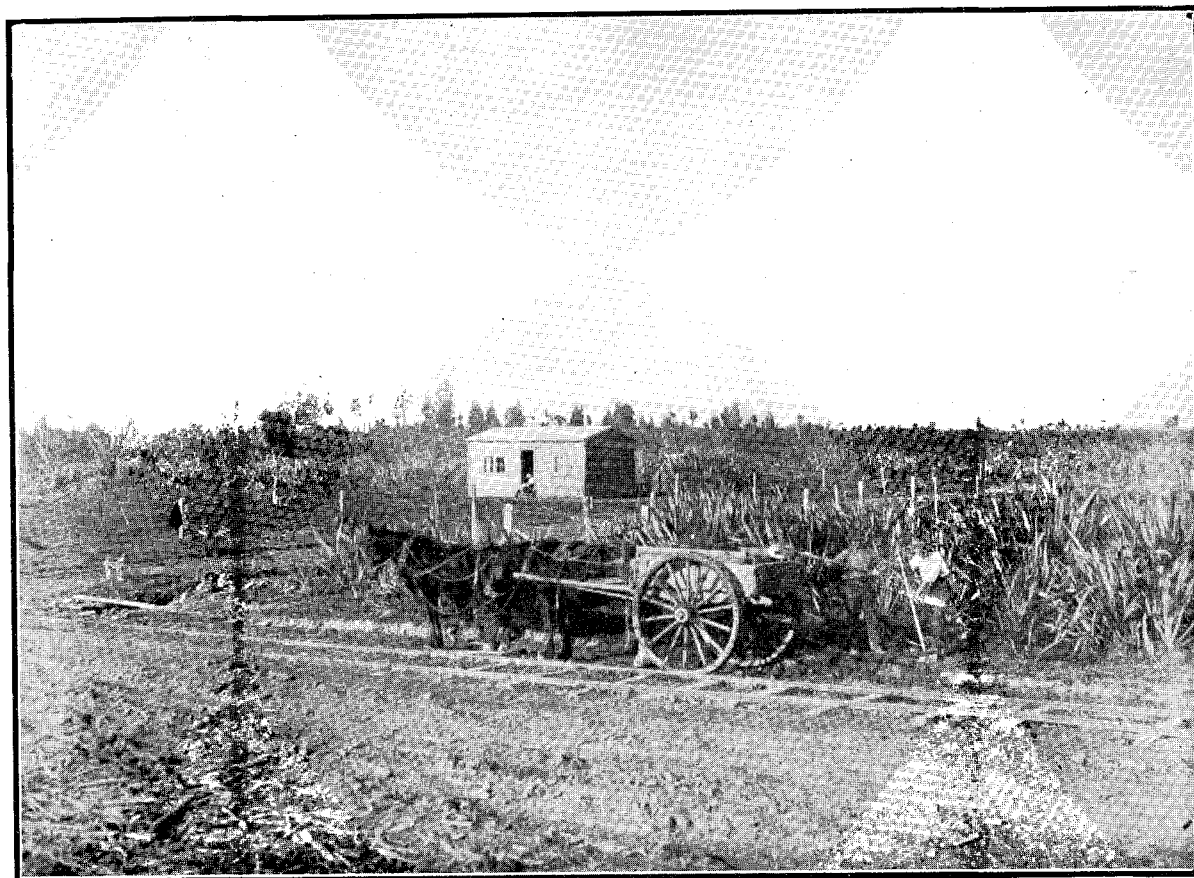
NO. 2 DREDGE EXCAVATING SPOIL FOR WAIKAKA TRAMWAY ROAD AT PIAKO RIVER TERMINUS.



NO. 1 DREDGE ENGAGED ON NGARUA CANAL.



BALLASTING WAIKAKA TRAMWAY ROAD.



JUNCTION OF PATETONGA AND WAIKAKA TRAMWAY ROADS.—A TYPICAL VIEW OF WAIKAKA COUNTRY.

ARTESIAN BORE NO. 68: SECTION 38, BLOCK X, THAMES—*continued.*

Depth in Feet.	Details.	Depth in Feet.	Details.
102	12 ft. sand.	160	12 ft. pumice sand.
105	3 ft. rotten timber.	166	6 ft. clay.
116	11 ft. pumice sand.	168	2 ft. hard sand.
124	8 ft. rotten timber.	171	3 ft. rotten timber.
142	18 ft. pumice sand.	181	10 ft. pumice sand.
148	6 ft. rotten timber.		

Total depth, 181 ft. Flow, 2,880 gallons per day.

ARTESIAN BORE NO: 69: SECTION 24, BLOCK XI, THAMES. (MR. BOND.)

Depth in Feet.	Details.	Depth in Feet.	Details.
37	37 ft. clay.	258	3 ft. rotten timber.
52	15 ft. rotten timber.	262	4 ft. shingle.
92	40 ft. clay.	271	9 ft. drift sand.
97	5 ft. rotten timber.	278	7 ft. shingle.
109	12 ft. sand.	280	2 ft. rotten timber.
131	22 ft. clay.	284	4 ft. clay.
135	4 ft. sand.	297	13 ft. pumice sand.
144	9 ft. rotten timber.	302	5 ft. rotten timber.
149	5 ft. clay.	327	25 ft. sandy clay.
162	13 ft. pumice sand.	332	5 ft. rotten timber.
174	12 ft. clay.	337	4 ft. white clay.
177	3 ft. rotten timber.	343	6 ft. sand.
180	3 ft. sand.	345	2 ft. clay.
200	20 ft. clay.	363	18 ft. sand.
203	3 ft. sand.	373	10 ft. rotten timber.
205	2 ft. rotten timber.	398	25 ft. pumice sand.
213	8 ft. clay.	403	5 ft. rotten timber.
222	9 ft. drift sand.	413	10 ft. pumice sand.
245	23 ft. rotten timber.	425	12 ft. clay.
251	6 ft. clay.	453	28 ft. pumice sand.
255	4 ft. sand.	457	4 ft. rotten timber.

Total depth, 457 ft. Flow, 12,000 gallons per day.

ARTESIAN BORE NO. 70: SECTION 12, BLOCK XI, THAMES. (MR. MCKENZIE.)

Depth in Feet.	Details.	Depth in Feet.	Details.
74	74 ft. clay.	217	4 ft. sand.
87	13 ft. rotten timber.	243	26 ft. clay.
90	3 ft. clay.	249	6 ft. rotten timber.
96	6 ft. sand.	265	16 ft. pumice sand.
104	8 ft. clay.	281	16 ft. white clay.
111	7 ft. rotten timber.	310	29 ft. pumice sand.
121	10 ft. clay.	312	2 ft. rotten timber.
157	36 ft. drift sand.	327	15 ft. shingle.
165	8 ft. clay.	330	3 ft. rotten timber.
175	10 ft. drift sand.	342	12 ft. pumice sand.
185	10 ft. rotten timber.	345	3 ft. clay.
189	4 ft. drift sand.	383	38 ft. pumice sand.
197	8 ft. shingle.	389	6 ft. rotten timber.
199	2 ft. rotten timber.	406	17 ft. pumice sand.
210	11 ft. shingle.	420	14 ft. clay.
213	3 ft. rotten timber.		

Total depth, 420 ft. Flow, 17,280 gallons per day.

ARTESIAN BORE NO. 71: SECTION 3, BLOCK XI, THAMES. (MR. LINDSAY.)

Depth in Feet.	Details.	Depth in Feet.	Details.
71	71 ft. clay.	265	20 ft. drift sand.
80	9 ft. rotten timber.	273	8 ft. shingle.
114	34 ft. clay.	279	6 ft. rotten timber.
119	5 ft. sand.	306	27 ft. clay.
124	5 ft. rotten timber.	309	3 ft. rotten timber.
128	4 ft. sand.	345	36 ft. pumice sand.
132	4 ft. rotten timber.	354	9 ft. clay.
147	15 ft. sand.	371	17 ft. pumice sand.
151	4 ft. clay.	373	2 ft. rotten timber.
158	7 ft. sand.	393	20 ft. pumice sand.
161	3 ft. clay.	403	10 ft. clay.
212	51 ft. drift sand.	416	13 ft. pumice sand.
220	8 ft. shingle.	424	8 ft. clay.
227	7 ft. rotten timber.	429	5 ft. pumice sand.
229	2 ft. sand.	439	10 ft. rotten timber.
245	16 ft. white clay.	451	12 ft. pumice sand.

Total depth, 451 ft. Flow, 17,280 gallons per day.

ARTESIAN BORE No. 72: SECTION 2, BLOCK XI, THAMES. (MR. FLYNN.)

Depth in Feet.	Details.	Depth in Feet.	Details.
105	105 ft. clay.	311	23 ft. rotten timber.
110	5 ft. rotten timber.	318	7 ft. clay.
123	13 ft. clay.	328	10 ft. pumice sand.
132	9 ft. sand.	331	3 ft. rotten timber.
140	8 ft. rotten timber.	347	16 ft. shingle.
148	8 ft. clay.	349	2 ft. clay.
162	14 ft. sand.	383	34 ft. pumice sand.
170	8 ft. clay.	387	4 ft. clay.
183	13 ft. drift sand.	413	26 ft. hard sand.
199	6 ft. sand.	419	6 ft. rotten timber.
209	10 ft. clay.	429	10 ft. pumice sand.
222	13 ft. rotten timber.	439	10 ft. clay.
227	5 ft. clay.	445	6 ft. pumice sand.
239	12 ft. pumice sand.	447	2 ft. rotten timber.
241	2 ft. rotten timber.	465	18 ft. pumice sand.
288	47 ft. pumice sand.		

Total depth, 465 ft. Flow, 28,800 gallons per day.

ARTESIAN BORE No. 73: SECTION 7, BLOCK XI, THAMES. (MR. PEAT.)

Depth in Feet.	Details.	Depth in Feet.	Details.
67	67 ft. clay.	109	5 ft. rotten timber.
69	2 ft. sand.	117	8 ft. sand.
93	24 ft. clay.	121	4 ft. rotten timber.
96	3 ft. rotten timber.	128	7 ft. sand.
104	8 ft. sand.	136	8 ft. clay.

Total depth, 136 ft. Flow, 2,880 gallons per day.

ARTESIAN BORE No. 74: SECTION 8, BLOCK II, WAIHOU. (MR. KNEEBONE.)

Depth in Feet.	Details.	Depth in Feet.	Details.
44	44 ft. clay.	87	6 ft. sand.
51	7 ft. pumice sand.	102	15 ft. rotten timber.
55	4 ft. clay.	112	10 ft. clay.
62	7 ft. sand.	130	18 ft. drift sand.
68	6 ft. clay.	133	3 ft. clay.
72	4 ft. sand.	137	4 ft. rotten timber.
81	9 ft. clay.		

Total depth, 137 ft. Flow very small.

ARTESIAN BORE No. 75: SECTION 10, BLOCK II, WAIHOU. (MR. A. WHEELER.)

Depth in Feet.	Details.	Depth in Feet.	Details.
50	50 ft. clay.	145	3 ft. clay.
60	10 ft. rotten timber.	164	19 ft. pumice sand.
73	13 ft. clay.	172	8 ft. clay.
80	7 ft. rotten timber.	175	3 ft. pumice sand.
84	4 ft. sand.	178	3 ft. rotten timber.
98	14 ft. rotten timber.	180	2 ft. sand.
110	12 ft. sand.	185	5 ft. clay.
114	4 ft. rotten timber.	195	10 ft. pumice sand.
131	17 ft. pumice sand.	200	5 ft. rotten timber.
135	4 ft. rotten timber.	227	27 ft. pumice sand.
142	7 ft. pumice sand.		

Total depth, 227 ft. Flow, 1,680 gallons per day.

ARTESIAN BORE No. 76: POUND-SITE, KOPUARAHI.

Depth in Feet.	Details.	Depth in Feet.	Details.
65	65 ft. clay.	153	5 ft. rotten timber.
72	7 ft. sand.	159	6 ft. pumice sand.
76	4 ft. clay.	162	3 ft. rotten timber.
83	7 ft. sand.	227	65 ft. pumice sand.
98	15 ft. rotten timber.	229	2 ft. rotten timber.
101	3 ft. clay.	232	3 ft. pumice sand.
104	3 ft. sand.	234	2 ft. rotten timber.
111	7 ft. clay.	251	17 ft. pumice sand.
139	28 ft. drift sand.	254	3 ft. clay.
144	5 ft. clay.	270	16 ft. pumice sand.
148	4 ft. pumice sand.		

Total depth, 270 ft. Flow, 4,320 gallons per day.

ARTESIAN BORE NO. 77: SECTION 9, BLOCK II, WAIHOU. (MR. MURDOCH.)

Depth in Feet.	Details.	Depth in Feet.	Details.
53	53 ft. clay.	157	3 ft. clay.
72	19 ft. pumice sand.	162	5 ft. pumice sand.
81	9 ft. rotten timber.	164	2 ft. clay.
97	16 ft. pumice sand.	170	6 ft. pumice sand.
100	3 ft. clay.	176	6 ft. clay.
111	11 ft. sand.	201	25 ft. pumice sand.
114	3 ft. rotten timber.	205	4 ft. clay.
117	3 ft. sand.	227	22 ft. sand.
119	2 ft. rotten timber.	229	2 ft. clay.
154	35 ft. pumice sand.	270	41 ft. pumice sand.

Total depth, 270 ft. Flow, 4,320 gallons per day.

ARTESIAN BORE NO. 78: SECTION 1, BLOCK II, WAIHOU. (MR. WHITE.)

Depth in Feet.	Details.	Depth in Feet.	Details.
40	40 ft. clay.	184	1 ft. rotten timber.
42	2 ft. sand.	190	6 ft. pumice sand.
49	7 ft. clay.	194	4 ft. rotten timber.
60	11 ft. sand.	202	8 ft. pumice sand.
62	2 ft. clay.	204	2 ft. rotten timber.
70	8 ft. pumice sand.	246	42 ft. drift sand.
79	9 ft. rotten timber.	249	3 ft. rotten timber.
84	5 ft. pumice sand.	291	42 ft. pumice sand.
86	2 ft. rotten timber.	295	4 ft. rotten timber.
111	25 ft. pumice sand.	307	12 ft. pumice sand.
114	3 ft. rotten timber.	311	4 ft. rotten timber.
128	14 ft. pumice sand.	323	12 ft. pumice sand.
130	2 ft. rotten timber.	325	2 ft. rotten timber.
134	4 ft. pumice sand.	339	14 ft. pumice sand.
143	9 ft. clay.	340	1 ft. rock.
147	4 ft. sand.	344	4 ft. sand.
183	36 ft. clay.	346	2 ft. rotten timber.

Total depth, 346 ft. Flow, 3,600 gallons per day.

ARTESIAN BORE NO. 79: SECTION 20, BLOCK XI, THAMES. (MR. DARROW.)

Depth in Feet.	Details.	Depth in Feet.	Details.
82	82 ft. clay.	239	2 ft. clay.
94	12 ft. sand.	253	14 ft. pumice sand.
98	4 ft. clay.	257	4 ft. rotten timber.
102	4 ft. rotten timber.	262	5 ft. pumice sand.
104	2 ft. sand.	264	2 ft. clay.
112	8 ft. rotten timber.	270	6 ft. pumice sand.
136	24 ft. sand.	273	3 ft. rotten timber.
141	5 ft. rotten timber.	277	4 ft. pumice sand.
158	17 ft. pumice sand.	279	2 ft. clay.
162	4 ft. rotten timber.	294	15 ft. pumice sand.
186	24 ft. pumice sand.	296	2 ft. rotten timber.
194	8 ft. clay.	322	26 ft. pumice sand.
196	2 ft. sand.	326	4 ft. rotten timber.
200	4 ft. rotten timber.	337	11 ft. pumice sand.
207	7 ft. pumice sand.	340	3 ft. clay.
218	11 ft. clay.	388	48 ft. pumice sand.
225	7 ft. pumice sand.	392	4 ft. rotten timber.
229	4 ft. rotten timber.	407	15 ft. pumice sand.
237	8 ft. pumice sand.		

Total depth, 407 ft. Flow, 3,840 gallons per day.

ARTESIAN BORE NO. 80: SECTION 37, BLOCK XI, THAMES. (MR. SCHWARZ.)

Depth in Feet.	Details.	Depth in Feet.	Details.
42	42 ft. clay.	187	45 ft. pumice sand.
52	10 ft. sand.	190	3 ft. clay.
56	4 ft. clay.	202	12 ft. pumice sand.
64	8 ft. sand.	204	2 ft. rotten timber.
68	4 ft. clay.	219	15 ft. pumice sand.
100	32 ft. pumice sand.	222	3 ft. rotten timber.
109	9 ft. shingle.	248	26 ft. pumice sand.
112	3 ft. rotten timber.	250	2 ft. rotten timber.
115	3 ft. sand.	255	5 ft. pumice sand.
118	3 ft. rotten timber.	257	2 ft. rotten timber.
130	12 ft. pumice sand.	261	4 ft. pumice sand.
142	12 ft. clay.	264	3 ft. rotten timber.

ARTESIAN BORE NO. 80: SECTION 37, BLOCK XI, THAMES—*continued.*

Depth in Feet.	Details.	Depth in Feet.	Details.
309	45 ft. pumice sand.	344	6 ft. clay.
312	3 ft. rotten timber.	346	2 ft. sand.
320	8 ft. pumice sand.	352	6 ft. clay.
323	3 ft. rotten timber.	366	14 ft. sand.
331	8 ft. pumice sand.	377	11 ft. clay.
334	3 ft. clay.	378	1 ft. shingle.
338	4 ft. rotten timber.		

Total depth, 378 ft. Flow, 96,000 gallons per day.

ARTESIAN BORE NO. 81: SECTION 11, BLOCK XI, THAMES. (MR. CLEVELY.)

Depth in Feet.	Details.	Depth in Feet.	Details.
33	33 ft. clay.	232	3 ft. pumice sand.
36	3 ft. rotten timber.	247	15 ft. clay.
66	30 ft. clay.	248	1 ft. sand.
69	3 ft. rotten timber.	252	4 ft. rotten timber.
75	6 ft. sand.	258	6 ft. pumice sand.
79	4 ft. rotten timber.	261	3 ft. clay.
89	10 ft. sand.	267	6 ft. sand.
95	6 ft. clay.	285	18 ft. white clay.
106	11 ft. sand.	300	15 ft. pumice sand.
112	6 ft. clay.	303	3 ft. rotten timber.
114	2 ft. rotten timber.	332	29 ft. pumice sand.
154	40 ft. drift sand.	334	2 ft. clay.
157	3 ft. shingle.	352	18 ft. pumice sand.
166	9 ft. clay.	357	5 ft. rotten timber.
173	7 ft. sand.	366	9 ft. pumice sand.
186	13 ft. clay.	368	2 ft. rotten timber.
190	4 ft. sand.	417	49 ft. pumice sand.
210	20 ft. shingle.	420	3 ft. clay.
213	3 ft. rotten timber.	430	10 ft. pumice sand.
227	14 ft. pumice sand.	434	4 ft. clay.
229	2 ft. rotten timber.	448	14 ft. drift sand.

Total depth, 448 ft. No flow.

ARTESIAN BORE NO. 82: SECTION 33, BLOCK XI, THAMES. (MR. CARROL.)

Depth in Feet.	Details.	Depth in Feet.	Details.
47	47 ft. clay.	266	6 ft. pumice sand.
50	3 ft. rotten timber.	268	2 ft. clay.
58	8 ft. sand.	271	3 ft. hard sand.
65	7 ft. clay.	273	2 ft. clay.
74	9 ft. drift sand.	279	6 ft. pumice sand.
80	6 ft. rotten timber.	280	1 ft. rock.
89	9 ft. sand.	287	7 ft. rotten timber.
95	6 ft. rotten timber.	297	10 ft. pumice sand.
102	7 ft. sand.	300	3 ft. rotten timber.
108	6 ft. rotten timber.	339	39 ft. pumice sand.
118	10 ft. sand.	341	2 ft. rotten timber.
123	5 ft. rotten timber.	344	3 ft. pumice sand.
142	19 ft. pumice sand.	349	5 ft. rotten timber.
144	2 ft. rotten timber.	358	9 ft. pumice sand.
149	5 ft. pumice sand.	363	5 ft. rotten timber.
154	5 ft. rotten timber.	386	23 ft. hard sand.
164	10 ft. pumice sand.	389	3 ft. rotten timber.
168	4 ft. rotten timber.	398	9 ft. pumice sand.
174	6 ft. pumice sand.	401	3 ft. rotten timber.
176	2 ft. clay.	411	10 ft. pumice sand.
179	3 ft. sand.	413	2 ft. rotten timber.
191	12 ft. rotten timber.	418	5 ft. clay.
196	5 ft. pumice sand.	423	5 ft. rotten timber.
202	6 ft. clay.	429	6 ft. clay.
207	5 ft. pumice sand.	431	2 ft. sand.
209	2 ft. rotten timber.	433	2 ft. rotten timber.
230	21 ft. pumice sand.	438	5 ft. sand.
233	3 ft. clay.	463	25 ft. clay.
253	20 ft. pumice sand.	469	6 ft. sand.
260	7 ft. rotten timber.	476	7 ft. rock.

Total depth, 476 ft. No flow.

Approximate Cost of Paper.—Preparation, not given; printing 1,300 copies), including plan and illustrations, £37 10s.