

had only been cleared to a depth of 3,097 ft. For a considerable distance prior to reaching the 3,024 ft. mark the well was in caving shale, but from this point to 3,178 ft. it passed through calcareous glauconitic sandstone. Some water came in at 2,996 ft., and there was a heavy flow of salt water at 3,025 ft. Gas was noticed at 2,996 ft., also at 3,050 ft., while at 3,122 ft. the gas-pressure increased to a marked extent. Some of the sandstone was found to be hard and firm, but most of it caved badly, resulting in progress being very slow and much difficulty being experienced in keeping the wall clear. Cleaning out the well to the old bottom at 3,180 ft. proved a difficult task, owing to the continuous caving of a bed of fine sand at 3,040–3,050 ft., but the trouble was overcome by mudding up under a pressure of several hundred pounds per square inch, and drilling with the rotary plant then went on fairly smoothly to 3,250 ft., the last 50 ft. of this depth being in hard sandstone. Below 3,250 ft. shales of various types with a few beds of sandstone were penetrated. At several points broken ground that caved badly was met with, and difficulty in keeping the well open was increased by incoming water. Gas in small quantity, but at high pressure, showed continuously below 3,250 ft., and was particularly active at 3,750 ft. At a depth of 3,860 ft. the drill-bit seized, and a twist-off occurred, the bit, a 20 ft. drill-collar, and about 25 ft. of drill-pipe being left in the hole. Repeated efforts to recover these lost tools were made, but although they were lifted a little it was found impossible to bring them to the surface. An effort was then made to side-track them, and in this way the well was eventually deepened to 3,910 ft. From 3,860 ft. to 3,895 ft. the drill passed through broken ground and sticky shale, and at the latter depth entered soft sand which continued to bottom. During this part of the drilling continual trouble was experienced, the drilling-tools frequently sticking fast and only being released with great difficulty, and finally the drill-pipe parted near the bottom, leaving the bit and part of the drill-collar in the well. It was then recognized that it was impracticable to drill the well any deeper, and operations were suspended. At the time of the loss of the first set of tools at 3,860 ft. it was found necessary, while fishing operations were being carried out, to take steps to prevent circulation of mud behind the casing, and this was accomplished by placing in 24 tons of cement. When it was found the lost tools could not be recovered, it was decided to run a string of casing, and swab the mud out of the well in order to determine whether there was sufficient volume of gas to cause it to flow, and perhaps bring in a flow of oil. The result showed, however, that gas was not present in any quantity, but that what there was evidently occurred at high pressure. Samples of the sand from 3,895 ft. to 3,910 ft. are said to have given definite reaction for oil on being treated with chloroform. Before closing down on the 4th April a heavy charge of blasting gelatine was fired in the sands between 2,635 ft. and 2,690 ft., which had been cased off, but nothing of value was disclosed.

It was then determined by the company to drill in the Whatatutu area, on what is known as Waitangi Hill, roughly about 40 miles north from the Gisborne No. 2 well. In this area a number of strong seepages of oil and gas occur, and in past years a number of shallow wells were drilled there, from one of which, drilled to a depth of 1,478 ft., a flow of 6 barrels of oil per day is said to have been obtained at a depth of 664 ft. The rotary plant used at the Gisborne No. 2 well was shifted to the new site, which is four miles north-east of the Township of Whatatutu, in the County of Waikohu, the only difference being that owing to the inaccessibility of the new location, and the high cost of transport to it, the steam power used at Morere was replaced by two 125 h.p. petrol-engines with suitable reduction and reversing gear. Drilling of the new well, known as Waitangi No. 1, was commenced on the 6th December, and by the end of the year the well had been carried down to a depth of 373 ft. Stove-pipe casing, 22 in. diameter, was set at 45 ft., and 16 in. ordinary casing was run and set at 368 ft. A good show of oil was got at 232 ft. The country penetrated was sandy shale with numerous hard limey bands. An average of seventeen men was employed.

*Blenheim Oil-well Reclamation Co., Ltd.*—Operations were continued at No. 2 Blenheim well, New Plymouth, which was drilled to 2,096½ ft., at which depth steps were taken to shut off water by introducing 4½ tons of Wilsonite. When drilling a few feet below the shoe of the casing to admit of a test of the shut-off, the cable broke, leaving the drilling-tool in the well. Fishing operations were started, and the tool was got hold of, but repeated efforts to get it to the surface failed. It was raised to within about 1,186 ft. of the top, but could not be got any further, and eventually it was driven back to the bottom and an attempt made to side-track it. A wipstock was put in at 2,044 ft., and a start made to cut through the casing, and this operation was still in hand at the end of the year.

*Coal-oil (N.Z.), Ltd.*—Erection of the drilling-plant was completed, and, various necessary appliances having at last come to hand, the drilling of Omata No. 1 well, at Omata, New Plymouth, was begun on the 25th April. On 17th May 293 ft. of 21½ in. casing was set and cemented with 4½ tons of Wilsonite. The well was then continued as a 19½ in. hole to 1,971 ft., where the 16 in. casing was set on 28th July, and cemented with 6 tons of Wilsonite. Drilling operations were then delayed till the 8th September, waiting for a 14½ in. Hughes Simplex bit. The well was then continued to 2,917 ft. with the intention of setting the 11½ in. casing at that depth. The work of casing this portion of the well was delayed, however, pending the testing of several light oil and gas shows by shooting at 2,305 ft.–2,308 ft. and 2,645 ft.–2,652 ft. After shooting the well at both of these points without any increase of oil or gas, the 11½ in. casing was lowered to 2,460 ft. and worked down with considerable difficulty to 2,525 ft. It was then found that the formation at this depth was squeezing in, and as the casing had a round nose guide on the end it was withdrawn to change to a cutting shoe to allow the casing to cut its way through the squeezing formation. After pulling the casing, the well was remudded, and a bit run to the bottom to clear the well. Whilst withdrawing the bit, it stuck at 2,527 ft., and could not be pulled loose, and at the end of the year operations were in hand to side-track it at that depth. The average number of men employed was seventeen.

*Moturoa Oilfields (N.Z.), Ltd.*—Operations were begun at this company's Moturoa No. 1 well in February. The rig was erected on a location close to Paritutu on the Harbour Board reserve at Moturoa, New Plymouth. Drilling was started on 31st March, and by the 18th November the well had been drilled to 3,310 ft. In drilling, no oil of any consequence was got till the horizon 2,600 ft.–2,700 ft. was reached, and from here some five to six barrels per day were baled for some days. No gas came from this horizon, and as the management was not very optimistic about getting any very great supply of oil from it the decision was come to to drill the well on to 3,300 ft., some old records seeming to indicate that at a corresponding horizon in one of the old Taranaki Oil Co.'s wells a certain amount of oil was got. In the Moturoa No. 1 well, however, no faintest indication of either oil or gas was got after passing 2,700 ft., and when the well had reached 3,310 ft. drilling was stopped. In the meantime, before drilling of the well onward from the 2,700 ft. mark had been resumed, the 6 in. casing was run in and seated at 2,542 ft., and some days later a flow of oil came up behind it, and between it and the 8 in. casing. The presumption was that this oil came from a horizon at about 2,300 ft., or from between 2,110 ft. and that point, but as no sign of oil had been got in drilling this part of the well the actual depth from which it came could only be guessed at. It was clear, however, that the oil that came up in this way was not from the 2,600 ft.–2,700 ft. horizon. After stopping drilling at 3,310 ft., the management decided to come back and make some tests above the 2,700 ft. mark to see what production could be obtained. The result of these tests seemed to indicate that the well could probably be made to produce from fifteen to twenty barrels of oil daily, but as this would entail the installation of a pumping unit, and the small production for an initial well did not seem to justify the expenditure in securing the necessary plant, it was decided to leave the casing intact so that when further wells are drilled this one can be operated. It is estimated that about two hundred barrels of oil came from the well during the drilling and testing, but this was not all saved. Before the end of the year it was decided to start the drilling of a second well, and the rig was dismantled for this purpose. On an average eight men were employed.

*New Plymouth (N.Z.) Oil-wells, Ltd.*—This company erected a drilling-rig, including a fine steel derrick 80 ft. in height, and started on 9th December the drilling of a well at a point about 650 ft. south-south-easterly from Moturoa Trig. Station in Paritutu Survey District, New Plymouth, and almost in direct line between Moturoa No. 1 well and