being extinguished, the oil stood at about surface-level. At the time of my visit the oil was about 6in. below the surface of the ground, and I was informed it generally stands about that level, although on some days it stands higher than others.

Annexed is a section showing the material bored through.

The company is now making preparations for the erection of a new derrick and machinery, and as soon as these are completed operations will be resumed. The first thing required is a large supply of storage-tanks, so as to be able to test the supply the well is capable of producing. The minimum discharge anticipated is 4,000 gallons a day, and it is also anticipated that, on a 2in. pipe being inserted in the borehole, which is 4½in. in diameter, the pressure of gas will be increased to such an extent that no pumping will be required for some time.

It has been found by experience in working the oil-wells in America that one bore will only drain from four to five acres. This is a question that has yet to be determined here, as the strata is totally different from that where oil-springs occur in America, as the strata, instead of lying nearly horizontal, is greatly tilted in New Zealand, lying at angles from 20° to the horizontal to 70°, and in some instances nearly vertical. This accounts in a great measure for the difficulties met with in boring. The tilted strata, forming a foot- and hanging-wall on the borehole, and the hanging-wall in soft seams always cave to a certain extent, which greatly retards the boring.

As this is a new industry in the colony, and likely to become a large one, a description of the plant and machinery required for boring may be interesting, as it is very simple, effective, and comparatively inexpensive, the total cost of a complete plant, not including tubing for the borehole, being about £1,600.

Plant.

The plant consists of a steam-engine and boiler, two winding-barrels, one for lifting the sand-pump and another for lifting the rods, a walking-beam for working the rods, derrick, two coils of rope, and the necessary bits and tools for boring, together with about 54ft. length of rods.

The plan marked A will show the whole arrangement of the plant required for boring. The derrick and the foundations, with intermediate framing, are the principal things requiring close attention in the construction of the plant.

As soon as the plant is erected boring operations can be commenced. In the case of the South Pacific Company the diameter of the borehole on the top was started at 9½in., going through shingle and boulders for the first 85ft. This diameter was maintained for some distance into the papa rock; but the first length of tubing could only be driven for 108ft., after which the diameter had to be decreased to 8in., and finally, at 1,104ft., it had to be decreased again to 6in. This is considered the smallest diameter for a borehole it is advisable to use in sinking an oil-well.

General System of Boring.

The rods used for boring wells are made of the best Low Moor iron, 3in. in diameter, and, including the bit, are 57ft. in length, weighing one ton and a half. The bit proper is 3ft. in length, having 1ft. of solid steel on the lower end, and on the upper end there are a screw and collar, which are turned and chased in a lathe, the bit being screwed into a socket on the lower end of the rods. On the top end of the rods there is a socket, into which is fixed a cable-laid Manilla rope, 6in. in circumference, with which the drill is worked.

The rope which is attached to the rods is brought over the pully fixed on the top of the derrick, and brought down to the winding-drum, which is about 18in. in diameter and 12ft. in length. This drum has a pully on each end 8ft. in diameter, one of which is for the brake to work on, and the other for the belt, the latter being only used when the rods require to be hauled up to the surface.

The derrick is about 70ft. in height, made entirely of planks, and bolted together. The reason the derrick is so high is to allow the length of rods to be hauled up above the surface each time the hole requires to be cleaned out.

In starting a borehole the rods are lowered down by a brake until the drill rests on the solid or bottom of the hole. The rope is then attached to a screw, which is fixed on one end of the walking-beam, as shown in the diagram of tools marked B. It will be seen that there are two half-round clips which are placed on the rope, and held together by a screw-clamp. This takes the weight off the rods, and the screw is for the purpose of lowering the rods as the boring progresses. On the other end of the walking-beam there is a connecting-rod attached to a crank, which is fixed on an intermediate shaft driven by the engine. This crank has a throw of about 15in., which is equal to 2ft. 6in. stroke, and is worked at the rate of about forty strokes a minute, the boring being done by the weight of the rods falling each time.

Before commencing a borehole a shaft is generally sunk for some distance through the surface-soil and boulders in order to get room between the end of the walking-beam and the mouth of bore, and also to lessen the difficulty of getting through the loose ground on the top.

Where the ground is of loose material on the top stone pipes made of 14 B.W.G., 13½in. in diameter, are used. These are pressed down as the boring progresses, and when they cannot be pressed down any further a drill-bit the same size as the inside diameter of the pipe is then used. The hole is carried down without piping as far as possible, or until it is found that the hole will not stand without tubing any further. The tubes then used are made on the same principle as gas-pipes, having screw couplings outside. These tubes are driven down by a monkey weighing about two tons to such a depth as it is possible to force them. I was informed that in driving the 6in. and 8in. pipes a drop of 15ft. is used to force them down.

The reason for boring the hole as far as possible without pipes is obvious. The hole can be drilled to the full size at once, but if pipes have to be inserted a smaller bit has to be used, and the hole afterwards rimed out before the pipes can be driven down. This increases the cost of boring considerably.