

When boring in rock the practice is generally to bore about 5ft. before drawing the rods—that is, before it is necessary to clean out the hole with the sand-pump. When the rods have to be drawn a strain is taken on the rope from the winding-barrel, the clamp which attaches the rope to the screw is loosened, the belt passed on to the pulley, and the rods lifted above the surface of the ground and held a little to one side of the hole by a guy-rope. The sand-pump is then let down by a separate winding-barrel, and the hole is thoroughly cleaned out.

The sand-pump is a tube about 4in. in diameter and 5ft. long, having a valve at the lower end and open at the top. This has a rope attached to it, and when it comes to the surface the tube is emptied and sent down time after time until all the material is out of the hole. The sand-pump is then detached from the rope, and another tube put on for filling the hole with water. When boring operations were first commenced here the water was simply poured in at the top of the pipe, but it was found that the action of the water falling down the sides of the borehole, especially on strata highly inclined, was the means of the holes caving to a great extent, and this led to the adoption of a tube, having a spear-valve at the bottom to charge the hole with water. This tube is 3in. in diameter and 15ft. long, having a spear projecting below the bottom, which opens the valve as soon as it touches the bottom of the hole. The tube conveying the water used for boring is by this means landed at the bottom of the hole, and the water has not then the same tendency to soften the rock as that it has when falling down the sides. The drill is then lowered down to the bottom of the hole by a brake, the rope held fast by clamps to the screw attached to the walking-beam, and boring again resumed.

The screw-nut is made in two halves on the end of the shears, and held together with a clamp and steel-set pin. This arrangement allows the screw to be lifted up through the nut by simply slacking the set-pin, and when in its place the set-pin is again tightened to hold the two halves of the screw-nut together.

There is a swivel on the lower end of the screw to allow the rope and rods to be twisted round as the boring progresses. The whole arrangement is very ingenious, and can be fully understood by referring to the diagram showing tools, marked B.

Rate of Boring.

The rate of boring depends not so much on the hardness of the rock as on its inclination to cave, when everything goes on well, or when very little caving takes place. About from 30ft. to 35ft. on an average is bored in twenty-four hours; but, taking the time occupied in driving and putting in the tubes, it is reckoned that boring can be carried on under ordinary circumstances at the rate of 20ft. a day, and that the cost of same without tubing is on an average about £1 per foot. The cost of tubing depends on the sizes of the pipes used.

It will be seen from the section of the borehole that an 8in. pipe is down to a depth of 108ft., after which a 6in. pipe is used to a depth of 1,104ft., below this a 4½in. pipe is down to 1,260ft., and below this depth there is no tubing.

As soon as the derrick and other machinery are erected, a 2in. pipe, having a ball-valve fixed at the lower end, will be put down inside the 4½in. pipe, and held in position by an indiarubber socket or barrel—that is, there is a piece of indiarubber 4½in. in diameter, with a hole through the centre of it sufficiently large to allow the 2in. pipe to pass through. When the 2in. pipe is down to the required depth, the indiarubber is screwed together, on the same principle as S. Humble's blasting-plugs, and this holds the pipe in position, and prevents the escape of gas.

On this 2in. pipe being put down, the surface that the gas can escape by is reduced from 15·9 square inches to 3·14 square inches, or to about one-fifth; this will cause the pressure to accumulate, and by this means the company consider their well will be self-delivering for some time before pumping will have to be resorted to.

The present borehole, where the oil has been found, is situated on the side of the Waingaromia Creek about four miles up from its junction with the Waiporou River, and about two miles and a quarter distant in a due easterly direction from the place where oil was first discovered. The site of the present bore is not on the company's original lease, but on a special lease of five acres adjoining the original one, at an elevation of about 370ft. above sea-level.

It may appear strange that there is a large supply of oil at the surface at the old workings, which is 1,450ft. above sea-level, and at the present borehole, where the oil has been found, which is only 370ft. above sea-level, while their distance from each other is only two miles and a quarter; but this, I think, can be satisfactorily explained.

Above the oil-formation is a certain thickness of a dark-grey calcareous marl known locally as papa rock. The thickness of this rock varies considerably in places, according to the anticlinal arches or synclinal troughs of the oil-formation. The old oil-workings I take to be near the top of an anticlinal arch where the newer strata are not so thick, while the present borehole is more towards a synclinal trough, or it might be that the old working is near the vicinity of a slide; but, be that as it may, it is clear that the rock is more loose and disjointed at the old workings than near the vicinity of the present borehole; and, if the old workings are directly above an anticlinal arch, the gas would naturally rise to the highest point in the oil-formation, and, if the superincumbent strata were not so great, it would be more likely to find its way to the surface.

Future Prospects of the Company.

The South Pacific Company has now arrived at this stage: It has found that a supply of oil is to be had in the locality, but what that supply is cannot yet be determined. The manager, Mr. Weaver, who has large experience of the oil-springs in Pennsylvania, is under the conviction that the daily supply will not be less than 4,000 gallons, still this must be looked on as merely an estimate until it is proved, and this cannot be done until a large supply of storage-tanks is on the ground. When the supply is determined the oil-industry may be said to have entered the second