

*Upper Shotover.*

The New Sandhills Gold-dredging Company have 70 acres on the Upper Shotover, and employ nine men. Power for the dredging plant, pumping, and lighting is supplied by two electric generators, driven by water-power, two motors being placed on the dredge.

*Sandhills Dredge.*—The following description of the Sandhills Dredging Company's plant and operations is taken from the *Lake Wakatipu Mail* :—

"The Sandhills dredge was built six years ago, the total cost of it being £7,000, of which some £800 was paid for freight and cartage. The dredge was built on the company's first claim, which extended from the Sandhills to Rapid Creek. Although it was well known that a greater portion of the claim had been formerly worked, the company was led to expect substantial returns from the rich patches left untouched. The actual returns, however, proved disappointing, and after five years' work with indifferent results the property changed hands, and the work is now carried on by a small Dunedin company.

"With regard to the electric power by which the dredging is carried on, it will be of interest to give some account. The generator-station is situated about seven miles from Skipper's Point, and three miles from where the dredge is at present working. This part of the plant consists of two Brush Victoria generators driven by an ordinary 4 ft. Pelton wheel. The machines are capable of giving a total output of 52 kilowatts or 70-horse power. The water for driving purposes is brought in by a race from a creek about two miles distant. A pressure-tank is placed 525 ft. (vertical) above the generator-station, from which a line of pipes delivers the water at a pressure of 232 lb. to the square inch.

"The plant is equipped with a very complete set of measuring and controlling apparatus, and the station is connected with the dredge by telephone. A Buss Sombast tachometer—an ingenious piece of mechanism—is mounted on one of the generators and driven direct from the armature shaft. This instrument continuously records the speed of the machines without the usual reference to a timepiece and consequent arithmetical calculation. A Soames Nalder ammeter registers the amount of current, and a Carden volt-meter, designed to read up to 4,000 volts, indicates the electrometer force. Two electro-magnetic cut-outs are included in the main circuit, to prevent damage to generators and motors in the event of a short circuit or total disconnection. In the event of either of these happening the 'cut-outs' automatically switch the power into a set of resistance coils capable of carrying the maximum working current. This arrangement works admirably, and I was told that it had frequently prevented serious damage to the more delicate parts of the machinery.

"A Brush lightning-arrester is connected with each conductor immediately inside the building, which effectually prevents damage from that source. The generator-station and all machinery therein are kept scrupulously clean, and appear to be carefully attended to.

"The conductors which convey the power to the dredge are carried on patent fluid insulators supported (2 ft. apart) on iron rails, the telephone-wire occupying a central position immediately above. I am told that, notwithstanding the heavy current present in the power conductors, no inconvenience is caused by induced currents in the telephone-line. This trouble was anticipated, and the fear of a similar drawback led to much opposition to the proposal to drive the Dunedin city trams by electricity. The telephone instrument in use is of the ordinary kind, and, although working under great disadvantages, the transmission is excellent. To prevent damage to the telephone from accidental contact with the power line an exceedingly fine safety-fuse is included in the telephone circuit.

"Leaving the generator-station, a three miles' walk for the most part on the river-beach takes us to where the dredge is now working, under Muddy Creek Terrace—and, by the way, I may mention that the track is nothing to brag about. This three miles of bad road, or no road at all, is a great drawback to the working of the dredge. From the Skipper's dray-road there is already a trolley track made (but not kept) to the generator-house; from there the heavy machinery for the dredge has to be conveyed the remaining three miles as best one can.

"Midway between the generator-house and the dredge you come to two falls in the river—one 10 ft. and the other 12 ft. About ten months ago it fell to the manager's lot to get his dredge over there, and any one seeing the place can estimate the difficulty. The fact of the dredge getting over, after being lightened of all her gear, without any injury whatever, in spite of the unavoidable rough handling, speaks volumes for the care both of the manager, Mr. White, and Mr. R. Hay, Dunedin, the designer of the dredge.

"Reaching the dredge you get aboard by means of a boat attached to one of the quarter lines. Fortunately, at the time of my visit the river was in excellent condition for dredging, and the dredge was working well in solid ground (*i.e.*, ground never previously worked), and is in every way splendidly adapted for dredging. The power is conveyed from the land-lines by means of flexible cables suspended at a convenient height above water. After passing through guide-blocks they are led to revolving drums (part of the recent alterations, and a great improvement on the old method) by means of a revolving connector attached to each drum. There is no interruption in the connections while paying out or taking in the cable.

"The two motors are duplicates of the generators, the electrical plant having been constructed specially for the work. The several parts of all the machines are interchangeable, and a spare armature and field magnet are provided in case of an accident. A 16 in. centrifugal pump is worked by one motor, and the other drives the buckets, winches, and other gear in connection with dredging. All the necessary switches, shunt coils, &c., for controlling the machinery, &c., are placed in convenient positions on deck. The small space occupied by the whole plant, and the ease with which it is handled, makes electricity a very convenient power for any class of work, and the necessary gear will compare favourably in point of weight, dimensions, and multiplicity of parts with any