

high-pressure cylinders to keep the dredging and pumps at their proper speed must not be less than 80lbs. to the square inch, the steam being in both engines cut off at half-stroke. Having this data, it enabled me to calculate the actual theoretical horse-power employed in this dredge, taking the low-pressure engines to develop the same power as the high-pressure ones, but in reality they would give a higher result. The terminal pressure of steam in the high-pressure cylinders being 40lbs. per square inch, the mean pressure would be 67.7lbs per square inch, which would make the high-pressure cylinder of the dredging-engine develop 22.2-horse power theoretically, and the one for working the centrifugal pump 31.5-horse power theoretically. This means that it requires 44 theoretical horse-power to work the dredge, and 63 theoretical horse-power to drive the centrifugal pump.

The washing appliances consist of one longitudinal sluice-box, 2ft. wide, fitted with Jones's patent cast-iron riffles. Near the end of the sluice there is a grizzly 5ft. long placed in the box, and all the coarse material passing over the grizzly falls over the stern of the dredge, and the firm material and water going through the grizzly passes on to return-tables, which are covered with cocoanut-matting. The whole of the machinery and appliances on the dredge are of good workmanship and substantially constructed. The only question appeared to me to be whether the engine and gearing for working the dredge was powerful enough to be able to break up the cemented wash-drift, and there will also be soon very large boulders amongst the auriferous drift, which will be a great obstacle in the way of carrying on dredging operations.

The whole of the machinery was completed and dredging operations commenced in November last, and from this up to the middle of April last about 282oz. of gold, representing a value of £1,106, was obtained. They have had many difficulties to contend with in dealing with large boulders in the river-wash, and also in the cemented character of the wash-drift, but the ground proves to have sufficient gold to pay for working.

OTAGO DISTRICT.

Waipori.

Waipori Dredging Company.—This company have two dredges working the Waipori Flat, and their operations have been attended with success. Last year 358,000 tons of material were treated, which yielded 965oz. of gold, representing a value of about £3,860. This shows the value of the material was about 2s. 6d. per ton.

Jutland Company.—This company are also carrying on dredging operations at Waipori. Last year they treated 170,000 tons of material for 503oz. of gold, valued at about £2,012, which gives the average value of the wash-drift operated on at about 2s. 8d. per ton. This shows that very poor ground can be made to pay for working by dredging.

Clutha Valley.

There are a number of dredges of various kinds employed in lifting and washing the auriferous ground from the bed of the Clutha River, and most of them have been successful in their operations last year. The old current-wheel dredges are all getting altered to be worked by steam, as these dredges can only be worked in a place where there is a rapid flow of water; they cannot be used in any place where there is still water, or in eddies. The Golden Rim Company have now erected a new steam dredge to work a claim in the Clutha River, at the upper end of the Island Block, where there is every prospect of their getting payable results. The Miller's Flat Company have just about managed to pay expenses last year; the great depth of tailings in the river for some time past has retarded them getting down on the good wash-drift. The Ettrick Company have been at work in the Clutha River, opposite Ettrick, since September last, but owing to the machinery not being suitable for the work, they have not been so far as successful as they might have been, their returns averaging about 12oz. of gold, or £48 per week.

Dunedin Company.—This has been one of the most successful dredging companies on the Clutha River last year. It is said that between the 1st August and 5th October last year, in fifty-three days the yield of gold was 1,035oz., representing a value of £4,140, out of which £3,600 was paid in dividends, being equal to 8s. per share. This company have recently purchased a small dredge, which had been working on some of the beaches on the river unsuccessfully, and have removed it opposite to Coal Creek, where it will be employed in prospecting the river-bed. During a portion of last year this company suspended operations for the purpose of having alterations made in their dredge, so that they could work the river-bed to a greater depth. These alterations have been made, and dredging operations resumed. The hull and pontoons have been altered, and the ladder lengthened, so that dredging can be carried down to a depth, it is said, of 39ft. under water-level.

A dredge has been working on Upper Clutha River, above the Lowburn Punt, for a considerable time, and giving fair returns to the shareholders. At the Cardrona a number of claims were also taken up to work with dredges; but no steps being taken to place machinery on the ground, all the claims have been cancelled.

Wakatipu.

Dredging-machines, applied to gold-working in this district as well as in other places, have not been so successful in their operations as many people anticipated; but at the same time it has been demonstrated by their use that large quantities of material can be lifted from below water-level at a small expenditure, if it can be afterwards treated successfully, so that a large percentage of the gold contained in the material is recovered. The latter has been the chief cause of failures in dredging ventures. The principle hitherto acted on has been, "Rush the material through, even if gold is lost; the quantity operated on will make up any differences of such loss." This might hold good if the character of the gold was coarse and heavy; but generally in rivers most of the particles of gold being ground up into fine dust and minute scales it requires a very careful system to be adopted to save a fair percentage of it. If the wash-drift is rushed through in large quantities,