

above the bed of the Shotover River, on the opposite side of Deep Creek, and at this elevation the ancient bed of the river can clearly be seen; but the scarcity of water precludes the ground being worked profitably; nevertheless, men are content to wait for a heavy day's rain to allow them to carry on sluicing operations. This alone shows that some of these terraces must contain very rich auriferous drifts.

DREDGING.

Dredging for gold in the river-beds of the Molyneux has been successfully carried on for many years past, but it is only within the last four years that any large attention has been devoted to this branch of the mining industry. The impetus given to dredging of late years is due in some measure to representations made by Messrs. Brooke-Smith, Gibson, and Welman that suction dredges could work the beds of rivers and the ocean-beaches at comparatively small cost, but none of them have been successful in their efforts to get the suction dredges largely introduced. Mr. Brooke-Smith introduced a small Ball dredger, and commenced operations on the ocean-beach at the Five-mile, below Okarito, and, although this is one of the richest beaches on the West Coast, he could not make the ground pay for working. The dredge he erected was not suitable for the purpose for which it was intended. Mr. Welman has constructed several of these suction dredges, two of which were placed on the ocean-beaches on the West Coast, one at the Saltwater Lagoon and another at the Three-mile Beach below Okarito. Neither of these dredges could make the ground pay for working on the principle on which they were constructed. Mr. S. Brown, of Wellington, also erected a suction dredge known as the Cataract pump, but this also was a failure. These suction dredges, so far, have proved that they are capable of lifting sand and fine shingle, but that they are not suitable for dredging where large stones and coarse gravel exist.

Every year will bring about improvements in dredging appliances. What now is looked on as the most suitable machine for lifting gravel and stones from the beds of rivers, or for working alluvial flats where there is water to contend with, is what is known as the centre-bucket dredger, and, as far as lifting the material is concerned, these dredges act admirably; but more attention has been devoted to the lifting appliances than to the washing apparatus and the saving of the gold. Many of the dredges now at work on the rivers are lifting large quantities of material, but the greater portion of the fine gold amongst the wash-drift is again discharged over the stern of the dredge. It is admitted by all those who have been accustomed to working the ocean-beaches and black-sand leads that a large quantity of sand cannot be rushed over narrow tables and save the gold. The width of tables and corresponding quantity of water must be in proportion to the quantity of material required to pass over them. This principle does not seem to be carried out in working the dredges on the rivers. So long as the sand does not actually bank up on the tables, so as to make the water flow over the sides, everything is regarded as working satisfactorily.

The question of erecting good gold-saving appliances on the hull of a dredge is beset with many difficulties, as there are so many elements to consider and provide for, to be able to recover a fair percentage of the gold from the material lifted. There is a great deal of fine scaly gold in the beds of the rivers, and it is this class of gold that is most difficult to recover. Very little of it is saved in the ordinary sluice-box, and it is on wide tables where most of this class of gold is to be recovered; but, before the material can be allowed to run over the tables, the stones and fine gravel have to be separated from the finer sands. This operation does not seem to be successfully performed in any of the dredges working at the time of my visit to the Wakatipu district. There is a difficulty in getting sufficient surface of tables erected on the hull of a dredge to treat the whole of the material that is lifted, and also in erecting sufficient separating appliances to classify the material so as to have fall for the tables without having the tumbler-shaft too high, which would make the dredge top-heavy.

Before the dredges will be successful machines for working the beds of rivers so as to recover a fair percentage of the gold which the gravel contains, the material from the buckets must pass through a machine, or some appliance to separate the stones from the fine shingle, afterwards to be separated from the fine sand before it is allowed to pass over any table which is covered with either coconut matting, baize, blanketing, or plush. The fine sand also requires to be so regulated that it is carried down over the tables with a thin film of water, having always the surface of the matting, &c., perfectly clear. As soon as sand appears on the surface of the tables it is certain that little or any of the fine scaly gold is being saved. Sufficient attention has not been given to this part of the process of gold-saving on any of the dredges working on the Shotover up to the time of my visit.

Sand-hills Dredging Company.—This company has constructed a dredge on the upper side of the sand-hills on the Shotover River, and it had been working for nearly six weeks previous to my visit in April last. As this dredge is worked by electro-motive force, a description of it may be interesting. It is a centre-bucket dredge, with revolving cylinder for separating the stone and gravel from the fine material. The latter passes over tables covered with matting set transversely with the hull, having a chute at the bottom end of the tables which conveys the waste material over the stern, while the large stones pass over a grating, and are discharged by another chute over the stern, and the rest of the material passes into a sluice-box about 2ft. wide and 40ft. long, filled with ripples and false bottoms. The hull of the dredge is 80ft. long, with 18ft. 3in. of beam, and 4ft. 6in. deep, the height of the tumbler shaft above deck being 16ft., and the buckets dredge to a depth of 20ft. below the water-level. The revolving cylinder is about 3ft. in diameter and 10ft. long, perforated with very small holes, as it is only intended to allow the fine sand to get through. The revolving motion of this cylinder causes a greater discharge at one side than the other, and, although the tables were working fairly well on one side of the screen, on the other side they were covered with sand to such a depth that it was impossible to save any gold. After observing the motion of this screen, and the irregularity in the discharge, it would seem that either a long cradle having a perforated hopper-plate, or a transverse shaking-table set on such an inclination that the stones