

As each working dredge is, on the average, responsible for the direct employment of about a dozen men (including coal-miners and carters), it will be seen that the present state of the industry gives occupation to over two thousand persons, without taking into consideration those who are employed in the manufacture of machinery both in and beyond the colony, as well as in the building of pontoons, erection of machinery, repairs, removal and rebuilding of dredges, cartage of material, and in the various incidental requirements of this branch of the mining industry.

The safety of workmen employed on dredges continues to occupy the attention of the Inspectors of Mines, and it is found that both dredgemasters and workmen are becoming more observant of the regulations issued in this respect, and the dredges are, as a rule, kept well equipped with the required safety appliances. The great majority of fatal accidents in connection with dredge-mining are by drowning, and it is to be feared that carelessness, if not recklessness, on the part of employees (especially in the handling of boats in swift-running rivers) is often the cause of such accidents.

In regard to the construction of dredges for work in the West Coast district, experience has demonstrated the necessity of increased powers and strengths of machinery (as compared with the usual practice found suitable to the characteristics of the Southern district) to successfully deal with the tight wash, large boulders, and buried timber which are met with in many of the claims. This is a feature which will doubtless be dealt with by engineers in designing future dredges.

The most novel and striking improvement which appears to have been introduced during the year is that of the centrifugal tailings-elevator patented by Messrs. Payne and Peck, of Dunedin, of which a drawing is given. A photograph showing the machine at work on board the Ngapara dredge, Alexandra South, is also reproduced. This elevator is, I understand, working very satisfactorily, and at my last visit to Dunedin I saw a larger machine (intended to replace a ladder elevator) in course of construction for the Sandy Point dredge working near Alexandra South. As this dredge ranks as one of the largest at work, and has a deep bank-face to excavate, in addition to what is lifted from below water-line, its stack of tailings is necessarily high. The adoption of the new elevator on this dredge is being watched with much interest; the test may be considered a fairly severe one, and if successful here its future may be reasonably considered to be assured.

The following paragraph from the *Otago Daily Times* of Monday, the 27th May, 1901, describes the trial at Dunedin of what may be termed an 'experimental machine,' improvements having been effected in those of later design:—

"*Trial of a New Dredge Elevator.*—A practical test of an invention which, if what is claimed for it is borne out in its actual use, will very largely decrease the cost of dredge-construction took place on the reclaimed ground on Saturday afternoon in the presence of a large number of gentlemen interested in mining. The machine is the invention of Mr. W. Peck, with whom Mr. F. W. Payne, consulting engineer, is associated in the patent rights. The invention is intended to do away with the elevator at present in use on dredges, and it simply throws the stuff away with great force. In the first test on Saturday about 5 tons of stone, some of which consisted of rubble about 1 ft. in diameter, was put through the machine, and it disposed of this readily, throwing the most of it to a distance of about 100 ft., while some of the larger stones were cast as far as 300 ft. In the second test the stone was bagged, and emptied down the shoot in a continuous stream, and the result was even more satisfactory, the material being hurled away to a distance without any trouble. The trial with the stone used was perfectly successful, and, given the same results with the varied material that is taken up in the elevator-buckets on a dredge, the invention is a most important one to the mining industry. The machine consists of a wheel or drum with beaters or vanes somewhat similar to a water-wheel. The general dimensions of the machine under trial on Saturday were 5 ft. diameter by 3 ft. wide, with four beaters or impact plates. The machine was driven at a speed of 240 revolutions per minute. The tailings are delivered on to the periphery of the drum, and, being struck by the revolving beaters, are projected in the required direction. The advantages of the machine are obvious. In the first place, the cost of this machine as compared with an ordinary bucket elevator is trifling, and the cost of maintenance is also immensely reduced, as there are only four wearing surfaces and two bearings, in place of tumblers, rollers, links, bushes, pins, &c. The impact plates used on the machine at the trial were only soft metal, the manganese plates not yet being to hand. The inventors have given much time and study in determining, by calculation and experiment, the best form of wheel, and have also given the various practical points that will no doubt suggest themselves to dredging-men due consideration, and now state they are prepared to place these wheels at work on any dredge. One difficulty that will no doubt suggest itself is the disposal of the large stones. This difficulty, it is claimed, has been entirely overcome, and the inventors state that any stone that can come up in the buckets may be put into the machine with impunity. In regard to the deposit of silt, the present machine has been constructed to elevate material such as is now being delivered to existing elevators, and if it is required to elevate silt the inventors suggest a slightly modified form of vane. A 120 ft. elevator is now lying in Messrs. McGregor and Co.'s yard, near the new machine, this huge structure being a strange contrast to the simple, unpretentious-looking wheel at work on Saturday. In the carrying of bucket elevators the pontoons have to be made deeper and wider than would otherwise be necessary; while poppet-heads have to be erected for the attachment of hanging ties, &c. All this additional work can now be dispensed with, and it is estimated that a saving of £6,000 to £6,500 could have been effected in one at least of the mammoth dredges now being built if the machine had been invented in time to save the expense of a long elevator and its attendant large pontoons, &c. One of the drawbacks of a bucket elevator is that it deposits the material in one spot, causing a series of heaps, and to attain a better distribution revolving shoots have been in some cases resorted to, and shoots delivering sideways. This difficulty, it is claimed, is entirely overcome by the new machine, which gives good distribution of the material, thus insuring an even stack. In cases where this distribution is not permissible,