

2½in. in diameter under a hydrostatic head of 530ft. is about 6·65 cubic feet of water per second, and from a nozzle 2in. in diameter under same head is 3·87 cubic feet per second. Therefore, the quantity discharged in both jets is about 10·52 cubic feet per second; but in addition to this quantity of water to be lifted there is about half a sluice-head comes from drainage in the ground; therefore, 6·65 sluice-heads has to actually lift eleven sluice-heads along with the drift gravel to a height of 67ft. The ratio of power employed to do the work, irrespective of the quantity of ground lifted, is  $\frac{6.65 \times 530}{11 \times 67} = 4.78$ . The ratio of power employed, however, depends to some extent on the condition of the throat-piece. If this is greatly worn, the elevator is not so effective as when it is in exact proportion to the quantity of water used and the diameter of the elevating-pipe.

There is an ingenious appliance used by this company, designed by Mr. Adams, the former working manager. This is a slide which is worked by means of a lever, and goes over above the top of the jet. This sends the water out at the intake of the elevator, and clears away any rubbish or material that may have collected to stop the regular inflow of the water and gravel; but it is of no service in clearing the throat, and that is the place where the greatest danger is of stones getting in and jamming in the throat-piece. The following description of this is taken from the *Tuapeka Times*:—

“Mr. W. Adams, manager of the Island Block Extended Gold-mining Company, has applied for a patent for use in hydraulic sluicing, where stones or other large substances may frequently choke an elevator. This causes great trouble in many places, and serious delays arise, and many queer means are resorted to by ingenious persons to free a choked elevator. The patent consists of a solid bar so arranged in the side of an elevator seat that by a lever, or other suitable means, it can be projected over the jet, not so as to stop the flow, but rather to turn it downwards, when the weight of the water and the material above at once relieves the elevator, and on withdrawing the bar the elevating is continued without even losing the material and water in the elevator, as on many occasions during the trials only a foot or two was lost when the work was re-started, the stoppage being but a few seconds in all. Several of these have been made, and tested in the presence of persons interested; and the work done has been so satisfactory that elevator seats on this principle have been ordered by several of those who were present at the experiments, which were recently conducted at the Island Block.”

This company have the best hydraulic-pipes there are in use in the colony, being lap-welded steel, all manufactured in England. All the joints are faced in the lathe, a collar being shrunk on each end of the pipe, having a loose flange slipped on previous to the rings being shrunk on both ends. These joints act very well where the pipes are laid in a straight line, but where there are bends in the line they are not so good. The cost of these pipes in England were as follows:—Pipes 15in. diameter, ¾in. thick, 8s. per lineal foot; pipes 15in. diameter, ⅝in. thick, 6s. 10d. per lineal foot; pipes 11in. diameter, ⅜in. thick, 4s. 9d. per lineal foot. Their plant is in every respect a good one; and there is a prospect, when they have got on to the run of auriferous drift in the valley where the river formerly flowed, that it will continue payable for working for a considerable distance before another break takes place.

*Island Block Extended Company.*—This company has carried on operations successfully last year, and though they have not yet been able to declare dividends, they have reduced their liabilities considerably, the net profit on the working last year being £1,387 14s. 11d. About two years ago this company was on the verge of liquidation; but the shareholders had confidence that by holding on the venture could be brought to a successful issue, and the operations last year justified the opinion thus formed. They have a good hydraulic plant, and they have the water at the highest elevation above their ground of any company in the Clutha Valley. The supply of water last year was very limited; but the company intend, as soon as their liabilities are paid off, to increase the supply, so as to insure the carrying on of hydraulic operations continuously. Their present supply is taken from the Menzion Burn, but the quantity of water in this stream in dry weather is very small; and, although in some parts of the colony there was an unusual amount of wet weather, it has been a very dry season in Otago, the miners in every goldfield complaining of the scarcity of water. The quantity of gold obtained by this company last year was 1,155oz. 4dwt. 9gr., which would represent a value of about £4,620.

*Hercules No. 1 Company.*—This company is working back into the flat, but the ground is not so good as it was close to the edge of the river. It is a question whether they will find another channel between their workings and the terrace; judging from the appearance of the bottom, there seems a probability that another channel will be found. As far as they have worked back the whole of the material is river-wash; but there are a very large percentage of boulders among the drift, which make the ground more expensive to work than the claims lower down the valley. They were, at the time of my visit, elevating the material about 46ft., having a jet of 3¼in. in diameter, under a head of 450ft., the water being supplied from a main 19in. in diameter, and about 4,000ft. in length. The sluicing jet varies from 2in. to 2½in. in diameter. If the sluicing nozzle be taken at 2½in., then the quantity of water discharged by the two nozzles—that is, the jet and sluicing nozzles—would be about 13·83 sluice-heads—that is, 8·71 discharged by the jet, and 5·12 by the sluicing nozzle. This would produce a velocity in the main pipe of 6·9ft. per second, which is equal to 40ft. loss of head; but as there is a small quantity used for pumping, the loss would be a little more, or, say, the hydrostatic head would be somewhere about 400ft.; then  $\frac{8.71 \times 400}{13.83 \times 46} = 4.69$  as

the ratio of power used to work the elevator.

The bottom they were working on at the time of my visit was very uneven, being full of holes, so that one could hardly tell in what direction the bottom was dipping. The manager stated that the ground was paying expenses for working it, but he was rather reticent as to its value. However, he stated that they got 37oz. of gold for fourteen days' work; but it appeared to me doubtful at