Then, $\frac{1{\cdot}98 \times 250}{5{\cdot}07 \times 30} = 3{\cdot}25$, which is the ratio of power required to do the work effectively. And the top elevator: The discharge from a 2½in. jet under a hydrostatic head of, say, 400ft. would be 5·12, and this added to the former is 10·19 cubic feet of water per second that has to be lifted 45ft. by 1·98 cubic feet of water under a head of 400ft. Therefore, $\frac{5{\cdot}12 \times 400}{10{\cdot}19 \times 45} = 4{\cdot}46$, the ratio of power used in the top elevator.

From experiments made with the working of the top elevator Mr. Ewing finds that a throat of 6in. in diameter produces the best result. More material can be lifted with a throat of this dimensions than one of 5in. in diameter, or with one larger than 6in. Hitherto there has been no definite formula by which the lifting-power of hydraulic elevators can be calculated. The difficulties which stand in the way are that the conditions under which each elevator is placed seems different; as, for instance, if there are no large stones amongst the washdrift the throat may be made to the corresponding ratio with the quantity and velocity of the water used from the jet; but when there are large quantities of stones in the ground, such as are found at the Hercules Nos. 1 and 2, near Roxburgh, the throat requires to be larger, in order to take stones of a medium size. There are so many elements to take into consideration that the co-efficient of ratio of power required would alter in almost every case.

Mr. Ewing gave me a note of the work he was doing with an elevator some years ago when he was only lifting the material 13ft., with a jet 2in. in diameter under a hydrostatic head of 200ft., and he was using six sluice-heads for sluicing. The result would therefore be as follows:—

Jet 2in. in diameter under 200ft. head discharges	2·3	cubic feet per second
Sluicing-nozzle	6·0	" "
Total quantity of water lifted 13ft. ...	8·3	" "

Therefore $\frac{2{\cdot}3 \times 200}{8{\cdot}3 \times 13} = 4{\cdot}26$, the ratio of power that was employed. Also at Vinegar Hill the elevator used there is lifting the material 25ft. The quantity of water used on the jet under a hydrostatic head of 246ft. is 3 cubic feet per second, and 5 cubic feet is discharged through the sluicing-nozzle, therefore $\frac{3 \times 246}{8 \times 25} = 3{\cdot}69$, the ratio of power used in this instance. It will therefore be seen that the ratio of power, or a co-efficient that would have to be used even in the calculation of elevators used by Mr. Ewing, working the same description of ground, varies from 3·25 to 4·46. In regard to the character of the auriferous deposit found in St. Bathan's basin, Mr. Ewing's claim seems to be on the richest portion of it that has yet been tested, and there seems to be no diminution of the gold in the drift as it goes down, but if anything it may be said to increase. The season before last he got 1,500oz. of gold, and he had only on an average five men employed; and for the last season 800oz. of gold was obtained. He expects to be able to elevate to a height of 100ft. with his two elevators.

Eagle and Gray's Claim.—This claim adjoins Mr. Ewing's, with apparently the same run of quartz drift; but they have only a poor supply of water. They have a water-race from Wheeler's Gully, which is one of the tributaries of the Dunstan Creek; but, except in wet weather, they have not sufficient water to work their ground advantageously. They are merely sluicing off the upper portion of the ground to such a depth as the tail-race will admit.

M. & E. Company's Claim.—This claim is next to Eagle and Gray's, and they are working it in a similar manner—only working it down to such a depth as the tailings can be carried away by the tail-race. They have a water-race from Dunstan Creek, and have had a very fair supply of water for the last season; but, the piping they use for conveying the water to the sluicing-nozzle being only about 7in. in diameter, they lose a large percentage of the available head of water by friction. There are five men employed in this claim, and they got 200oz. of gold for last season's work.

P. Tiernan's Claim.—This is the adjoining claim to the M. & E. Company's ground, being similar in character, and also worked in a similar manner. It is stated that this ground pays the owner very well for working. He has had a very good supply of water for the last season from the same race that the M. & E. Company uses, he being one of the proprietors along with the company referred to.

St. Bathan's Sludge-channel Company.—This company was formed amongst those holding claims in St. Bathan's basin, each shareholder in these claims paying in proportion to the interest he held. The channel was carried up to the place where it crosses the road from St. Bathan's to Clyde, and then the company commenced to work the surrounding ground. They have now been employed in working this ground for the last four years, and have obtained a considerable quantity of gold. The previous year they got 450oz., and the return for this season is expected to be about 500oz. The character of the ground they were working last season is quite different from that in the claims in St. Bathan's basin, and to a great extent resembles the consolidated clay found in Mr. Ewing's claim at Vinegar Hill. Overlying this clay there is from 6ft. to 8ft. of loamy material, which has a little gold in it; but the principal washdrift that they get the best of the gold in is lying directly on the top of the clay referred to. This clay is full of the vertebræ of small fishes and shell fossils similar to that found at Vinegar Hill. This material seems to abut on to the old quartz-drift wash, which is seen higher up on the face of the terrace, and gives one the impression that there is a deep run of this drift between the place where they are working and the terrace; and very likely a great portion of the ground that has been stripped by this company will be worked again to a greater depth when the tail-race or channel is constructed to the proper level. There have been five men employed on an average by this company during the last year. This company has a wide spread of tables, having a distributing-box set at right angles to the main sluice and directly under the grizzly or perforated plate. The mining manager informed me that the proportion of the gold obtained on these tables was about 80oz. out of 450oz., which is over a sixth portion of the total yield. Previous