there is an unfailing supply of water in the latter river, and that 100 sluice-heads of water can be obtained from this source in dry weather. They also state there is 70ft. of fall in one mile of this river, and that in measuring the quantity of water they found the average depth of a cross-section of the stream to be 40ft. wide by 10in. in depth, these measurements being taken during the dry season. Taking these measurements and fall as correct, the quantity of water in the stream would be equal to about 137 sluice-heads; but if an allowance be made of 1in. in depth of the water for inequalities in the bottom of the bed of the river, and taking the cross-section of the water as 40ft. wide and 9in. in depth, with a fall of 70ft. per mile there would be about 117 sluice-heads. The data supplied to Mr. Fletcher was that 100 sluice-heads of water could be obtained with a fall of 30ft., and the distance that the electricity would have to be transmitted would be fourteen miles. He was also asked to give an estimate of the cost of an electric plant, as well as his opinion as to whether such a plant could be utilised economically for supplying motive-power for the crushing-batteries. The following is an extract from the reply sent by Mr. Fletcher:—

"One hundred sluice-heads of water with fall of 30ft.—reckoning a sluice-head 60 cubic feet per minute—this would give 340 theoretical horse-power. A water-motor using this quantity of water and giving out 150-horse power would have an efficiency of only 46 per cent.—a very poor result. With a properly-constructed turbine you might assume an efficiency of 70 per cent., which would give about 238 effective horse-power. However, I will take your assumption of 150-horse power as the amount of power available to drive the electric generators.

"The losses in transmission are as follows: (1) Electric generators; (2) line, or conductors; (3) motors. The electric generators will give out 85 per cent. of the power required to drive them, so that we have 85 per cent. of 150, or 127·5-horse power, given out to the electric-generators for transmission to the motors. The loss in the line or conductors depends on three things—(*a*) their length, (*b*) their diameter, (*c*) the quantity of electricity sent through them.

"With high-pressure water a small quantity will do a certain amount of work, so that the higher the pressure we use the smaller the quantity of water required for a given amount of work; and, consequently, by working at a high pressure, pipes of smaller diameter can be used.

"I have allowed 10 per cent. loss on the line, so that the power the motors will receive would be 127·5-horse power, less 10 per cent., or 114·75-horse power. The motors will give out mechanical power of 85 per cent. of the electric energy put into them, so that the power available for driving the stampers would be 85 per cent. of 114·75; or 97·5-horse power. The total efficiency of the plant would be $\frac{97 \cdot 5}{150} = 65$ per cent.

"As to the cost of an electric plant, the following approximate figures are sufficiently accurate for the present. Material for power and telephone line, including copper conductors, telephone-line insulators, wooden arms for poles, bolts and nuts, for fourteen miles of line, say, £1,500. This sum does not include poles, or erection of same.

"The cost of electric generators and one motor of 100-horse power would be, say, £1,600. If four small motors are required, the cost would be £2,000. Unless there is any costly work necessary to obtain water-power, the whole scheme could be carried out at a cost of £3,500 or £4,000. The cost of maintenance is not a heavy item."

The electric plant would only be one item in the total cost of the scheme. If a hundred sluice-heads of water had to be taken out of a river, and conveyed in either an open conduit or flume until 30ft. of fall was acquired, and pipes from this point to a turbine, the cost would be considerable. Indeed, it would be better to have twenty sluice-heads of water with 150ft. of fall, which would give an equal horse-power to a hundred sluice-heads with a fall of 30ft. However, the scheme is only in embryo, and more information will be required to ascertain the actual amount of fall that can be obtained, and the cost of constructing the water-race and headworks to lift the water with tank and pipes. If twenty sluice-heads of water can be obtained at an elevation of 150ft., according to Mr. Fletcher's own showing it would give 65 per cent. of 238-horse power, or about in round numbers 150-horse power, which would be capable of driving a crushing-battery of forty heads of stamps, having a stone-breaker, with the requisite number of pans and settlers. The cost of crushing with such a plant would be minimised to such an extent that the low-grade ore that is now left intact in the lode, or used for filling the stopes, would be made to pay.

Try Fluke Company.—This company has been continually engaged in opening-out and working their mine since the field was first opened. They got a block of very rich stone near the surface, when the yield from several crushings went about 10oz. gold per ton. They erected the first crushing-battery on the field, and have been able to keep it fully employed on quartz from their mine since its erection. They have thoroughly tested their mine down to a depth of 300ft., and the lode continues to go down, carrying gold uniformly for about the last 250ft., averaging from 10dwt. to 15dwt. per ton; this yield is obtained from their crushing-plant, and it can be safely asserted that there is at least as much gold being washed into the creek. The only difference in their plant since my last visit is that they allow the tailings and water to go into a box about 20ft. long, 2ft. wide, and about 2ft. deep, having a number of bars to slip in on the outlet end of the box, as the tailings rise up, the slimes and muddy water being run into the creek. The actual tailings are stored, and are being treated in one of Fraser's pans in charges. The Watson-Denny, Price's, and Fraser pans, having continuous discharges, were all failures; they then tried these pans by working the ore in charges, and found that they got much better returns. There was only one of Fraser's pans being used at the time of my visit, and that was employed both for grinding and amalgamating, no settler being used. The loss of gold from this company's plant is perfectly appalling; what ought to be going into the pockets of the shareholders is being daily carried away by the water in the creek towards the ocean. On my representing to the manager of this company the great loss of gold in the muddy water, he had 20 gallons of the water boiled down to dryness, and sent me the residue, which was treated by a thorough amalgamation at the Colonial Laboratory, and gave gold at the rate of 9dwt. 16gr. per ton. Considering that the tailings are all being stacked for further treat-