While staying in this district I visited, with Messrs. Ferguson, Mackay, Cornes, Cameron, Fenton, and others, the principal mines in the neighbourhood, including the New Find, the New Era, the Galena, at Waiorongomai; and the Champion lode, at the head of the Tui Creek, and about 2,000 feet above sea-level, just then being opened by Messrs. Cornes and Banks, ssociated I believe, with Messrs. Saunders and Chambers, of Auckland. In the Champion Mine I saw stone carrying gold, silver, mercury, copper, lead, iron, and zinc, the gold chiefly in the free state, the other metals being all combined with sulphur, as sulphides, with part of the lead also as sulphate. The mercury sulphide was in this lode a little apart from the other metallic sulphides, and was of a light porous texture and mixed with a good deal of oxide of iron, and had the appearance of having been formed by the agency of water, probably at a high temperature, and carrying up sulphuretted hydrogen, which, acting on mercury in any form, would convert that metal into the cinnabar which we here saw.

Mr. Cornes and the other members of the party were of course intensely interested in the simple tests by which these metals can be distinguished side by side in such complex ores. It is the abundance of such complex minerals on the whole of the Coromandel Peninsula that makes the establishment of a thorough-going and properly-equipped school of mines so great a necessity on the Thames. Without some technical instruction in the methods of testing these minerals, and of extracting the useful metals from them, the miners and prospectors are working in the dark, as the metals cannot be seen by the naked eye and cannot be saved by the usual battery processes. Every variety and mixture of ore requires to be treated according to its composition, and a process that is well enough suited for extracting gold from clean-milling quartz, will not reach the gold or silver, bound up as we found them here and at Karangahake.

We also visited the plant which Messrs. Mackay and Ferguson were erecting for the extraction of the gold and silver of the metallic sulphides of the district. This plant is on an American principle for dealing with silver ores, similar to those to be operated on here. The stone is to be crushed by Fraser and Tinne's (of Auckland) patent rollers. The crushed materials are then admitted into Mackay's patent cast-iron pans, where, after undergoing various grinding, rubbing, separating, and concentrating operations with hot water, mercury, common salt, and other inexpensive chemicals, the silver and gold are found in the form of an amalgam with the mercury, which is retorted in the usual way. The process is a modification of one that, with several others, has been successfully at work for years in Nevada. It deserves every encouragement, and, being in the hands of enterprising men, one of whom has had large experience in similar operations, it will doubtless get a fair trial.

At Waiorongomai Mr. H. Adams took me through what is undoubtedly the best quartz-crushing battery and tailings plant I have seen in the colony. It is a splendidly-housed forty-head stamper battery furnished, in all its details, with the most approved appliances for quartz-crushing and gold-saving of the present day. It is a self-feeding battery. When the stone is low in the boxes the disc affixed to the stamper-rod, in its descent, gives a blow to the top of an upright, that in its turn communicates motion to the board that shuts off the stuff, and thus admits more material into the battery-boxes. The machinery is driven by a splendid supply of water, and the stampers are, by special mechanical contrivances, which I have not seen elsewhere, kept under easy and perfect control throughout their whole extent. There are about twenty berdans at work in the battery itself, besides thirty-two others at a lower level in the tailings plant, situated about five chains from the battery.

The tailings plant being conveniently situated at a level lower than that of the battery, there is no difficulty in conveying the tailings by water down an open sluice to the lower berdans.

The self-feeding contrivances, as seen in operation at the Waiorongomai battery, were such that one boy could manage the whole of this part of the work, which otherwise would require the constant attention of several men. The stone is broken up and passed through screens before being admitted into the feeders so as to reduce it to a suitable size.

This battery, like all of its kind, is admirably suited for extracting the gold from clean-milling quartz comparatively free from complex metallic sulphides. It is, however, in my opinion, not capable of extracting all the gold or much of the silver of the rich gold- and silver-bearing stone of some parts of the Waihi, Karangahake, and Te Aroha; and hence the necessity of importing into the colony processes for dealing with these minerals which have been found efficient in treating similar minerals in other countries—Nevada, Mexico, Spain, Saxony, New South Wales, &c.

It would be one of the chief functions of a colonial school of mines to investigate the character and composition of our gold- and silver-bearing stone and other valuable minerals; to procure and disseminate among those concerned the most recent information about their treatment elsewhere; and to guide the miner in the application of sound and scientific principles in their development and metallurgy. There will thus be saved to the colony the useless expenditure of much money and a great deal of energy in hopeless directions, and the country will be in a position to profit by whatever mineral wealth our mountains contain.

We all returned to the Thames on the 7th December, and continued the classes there for another week, Mr. Fenton having charge, as usual, of the assaying classes, Mr. Montgomery of the blowpipe class, and myself, with Messrs. McLymont and Goodlet, of the testing classes.

On Tuesday Warden Kenrick accompanied me to Tapu, where he had made arrangements for a lecture on gold-saving appliances. The miners all attended, some coming in from a long distance, and we had an audience of about 120, including in this case persons of all ages. The meeting was a very enthusiastic one, and, as in every other place visited, I had only to regret that I could not make a longer stay.

At the Thames Mr. Montgomery delivered during the week three of his lectures on gold-saving appliances; and I closed the classes there by two lectures on the treatment of silver ore and gold-bearing tailings on Thursday and Friday evenings before audiences larger, stronger, more enthusiastic, and more keenly interested in the subject of lecture than even they had been before.