able to test the value of the various metalliferous lodes would be the means of opening up and profitably working minerals other than gold, and possibly do more towards developing our mineral resources with a less expenditure than any other means.

In New South Wales the only institution corresponding to a school of mines is the Technical College in Sydney, where Mr. S. H. Cox, F.C.S., F.G.S., who was formerly connected with the Mines Department here, is one of the lecturers. Mr. Cox travels about, visiting the different mining centres, and delivers lectures on geology, mineralogy, and metallurgy; but he does not hold any classes in up-country districts, his classes being entirely confined to the college in Sydney.

This is a subject which will repay a hundredfold any expenditure which may be incurred in establishing branch schools in the principal mining centres in New Zealand.

## Summary.

In the foregoing remarks I have described the workings and different descriptions of mining and reducing plants that are employed in the various localities I visited, and I have also generally endeavoured to point out what may be of benefit to the mining community of New Zealand, namely,—

(1.) That the great depth of the quartz-workings in Victoria, and the different lodes that have been passed through in sinking, with the same indications still continuing, to a depth of 2,040ft. below the level of the surface (Lansell's 180 mine), encourages the hope that our quartz-mines are only yet in their infancy, requiring further prospecting to develop them.

(2.) The superiority of the processes adopted in Victoria for saving gold in concentrating and amalgamating, and likewise in the winding-machinery and safety appliances.

(3.) That the successful treatment of pyrites, and profits to be derived from its manipulation, showing that the whole of this product is allowed to run to waste in this colony, although some of the pyrites gives on assay over 11oz. of gold per ton.

(4.) The method adopted in Victoria for working alluvial leads of gold, and the system of going through drift-sand.

(5.) The price charged the miners for water, in Victoria, for sluicing purposes, being from £5 12s. 6d. to £6 per week, for a quantity equal to our sluice-head in the Beechworth District, and £2 5s. to £9 per week for a quantity equal to our sluice-head in the Castlemaine and Sandhurst Districts. The price charged in New Zealand is from £2 to £3 per head per week.

(6.) Tin-mining, and machinery employed in reducing the ore and extracting the tin, in the Vegetable Creek District, New South Wales.

(7.) Silver-mining, showing the various descriptions of ore as it is found, the formations where the lodes occur, the similarity of the formation to that of this colony, and the smelting and reduction plants for treating metalliferous ores containing silver and gold.

(8.) Copper-mining and reduction plants, showing how the ore is treated.

(9.) Coal-mining, showing method of haulage and ventilation of mines.

(10.) Hydraulic cranes, Newcastle, for loading vessels with coal; showing likewise that railway wagons for conveying coal from the mines to the port are superior to those used in New Zealand.

(11.) That air-compressors and rock-drills are everywhere advantageously used, both with regard to lessening the cost of working mines and assisting in ventilation.

(12. That diamond drills for prospecting in metamorphic schist for quartz-lodes have not been worked with great success, but that in boring for coal or through basaltic rock they have been worked very advantageously. Taking into consideration the nature and character of New Zealand, I do not think, unless in prospecting for coal, that their use would be of any great service.

(13.) The systems on which mining surveys are conducted in Victoria and New South Wales are not equal in efficiency to the New Zealand system.

(14.) The organization of the Mines Departments of Victoria and New South Wales.

(15.) The necessity of having schools of mines established in mining centres, but not on so extensive a scale as that on which they are conducted in Victoria, the instruction required being only of such a nature as will enable the miners to analyze the metalliferous ores that they find, so as to be able to test their value, and to have a knowledge of the various forms in which the different metals are found.

I have gone considerably into details of the different machinery and reduction plants that I have seen, plans of some of which are annexed, in order that any one interested in the subject may understand the principal details and have a general idea of their construction.

## Conclusion.

From what I have seen in the Australian Colonies, especially in New South Wales, I am convinced that we have in New Zealand a country extremely rich in minerals other than gold; but, as our metalliferous lodes are generally in mountainous districts, which are very precipitous, having deep ravines between them, thus making it extremely difficult to prospect before roads are made, which from the nature of the country are very costly to construct and maintain, the development of our mines to any great extent cannot be proceeded with until the country becomes opened up.

Our mining community likewise has not a sufficient knowledge of metalliferous ores, and the various forms in which they occur; so, that taking the whole of these facts into consideration, it is apparent that the development of our mineral resources is bristling with difficulties, and conse-