

with a stout candle, a piece of wood-charcoal, a small and inexpensive assortment of chemicals in the form of dry salts and other reagents, and a blowpipe. The supply of blowpipes, however, ran short, owing to the large number that joined the class; but the students very soon provided themselves with that requisite from various sources.

Furnished with these appliances Mr. Montgomery took his students through a preliminary course of blowing; practising them in the different kinds of flame—oxidizing flame, reducing flame, &c.—and here he was greatly aided by the efficiency of many of his students, who were adepts in the art. He then guided them through a long course of blowing beads in the loop of a platinum wire, from the powdered ores of different metals, showing them how to identify the metal from the colour of the bead with the various fluxes. Mr. Montgomery also instructed and exercised his class in the art of heating metallic compounds, with and without oxidizing and reducing agents, and fluxes in dry glass tubes and on charcoal, and showed them how to distinguish the substance under trial by the results obtained. The energy and success with which the students entered into these blowpipe experiments were quite in keeping with their enthusiasm and perseverance in the other classes.

II. Mr. Fenton, who joined the teaching staff as assayer in Auckland, opened his class for assaying metallic ores every morning at 9 o'clock, and conducted, with his students, assays every day from 9 a.m. to 5 p.m., on the ores of gold, silver, lead, and tin. Being in some difficulty about necessary furnaces, Mr. Dunlop, of the Golden Crown battery, built a melting- and assay-furnace in the battery, and gave the use of it, free of charge, to the class, supplying them, as well, with various other appliances required for carrying on the fire-assays.

The Board of Governors of the Thames High School also, with the hearty concurrence of Mr. Adams, the Rector, placed their laboratory at our disposal, supplying us with one of their gas-assaying furnaces, with the necessary connections, as well as with crucibles, muffles, cupels, &c. When I visited this school with the Chairman, Mr. Brodie, I was greatly surprised at the character of the work done by the more advanced boys in the subjects of chemistry and assaying. At the time of my visit—quite unannounced—some of the boys were busy assaying gold- and silver-bearing stone; and they were doing so with their simple and inexpensive, but well-selected, appliances in a manner that showed they had been trained in a sound practical knowledge of chemistry and the principles and practice of assaying. Indeed, I had not been aware, till I saw it here, that work of so advanced and practical a character in these subjects was attempted in any school in the colony outside of the university colleges. Boys have far more aptitude for such practical studies than they are credited with; and you yourself, Sir, saw, while passing through Ross, with what interest and success boys of from ten to fourteen years of age will take up such subjects.

I look on that kind of work in the schools in mining districts as deserving every encouragement and support at the hands of the Government and the community. It is amazing how utterly such kind of education, direct, practical, and scientific, has in the past been neglected in England and her colonies. It is to be hoped that we in New Zealand will, in our mining centres at least, modify the old courses of study so as to find room in the upper classes of our schools for practical instruction in the elements of chemistry, geology, mineralogy, and assaying, instead of causing our brightest boys to spend their best energies, at the most receptive period of their lives, in the old-world cram of Latin and Greek, to the utter neglect of the practical, everyday, and productive sciences of the present and the future.

In Mr. Fenton's classes, as in all the others, the men themselves took a practical part in the work. He had them engaged in grinding and sifting the ores, weighing them, weighing out the proper fluxes for the different kinds of ore, mixing the fluxes with the ground ore, charging the crucibles, heating them in the melting-furnace to the required temperature and for the proper time, pouring out the molten metal into the ingot-moulds, detaching the slag, hammering and cupelling the resultant buttons of metal, weighing the bullion, and finally separating the silver from the gold, washing, drying, and weighing the latter, and calculating the results.

In all these operations the men took a most intelligent interest, and worked at them with such success that a very large number of men on the Thames can now assay their own ores with quite sufficient accuracy for their own purposes.

The direct advantage to the miners of being able to do this will be seen when it is stated that the silver in the silver-bearing stone of Waihi and Karangahake does not exist in the stone in the state of metallic silver, but chiefly as the grayish-black sulphide and variously-coloured chloride, and in these states of combination is not visible at all as silver. Most of the gold also in the silver-bearing ore exists as a blackish sulphide of gold, probably in combination with the sulphide of silver, and thus escapes the notice of the miner who is prospecting on the old lines. It is only when the gold and silver are brought out either by the fire-assay process or by the wet chemical processes that the value of the stone is known. Much stone on the Waihi and Karangahake, containing gold and silver worth from £10 to £100 per ton of stone, has been overlooked for years for want of a little of this kind of knowledge. I have heard, since my visit to the Thames, of several instances of large quantities of stone, showing to the eye neither gold nor silver, being taken up by members of Mr. Fenton's assaying class, and turned rapidly to their own advantage. A practical acquaintance with the methods of testing stone puts the mining prospector in a position to profit directly by his own discoveries, instead of having to get sample after sample tested by the professional assayer for a fee which he can, in many cases, ill afford, besides subjecting himself to tedious delays, long journeys, loss of time, and the risk of having some one else, better informed, in the meantime jumping his claim.

I look on a practical knowledge of the process for assaying silver- and gold-bearing stone as an incalculable boon to the miners on the Coromandel Peninsula, and a boon that, in the interests of the colony, the Government would do well to provide.

III. My own testing classes were held in the morning from 9 to 12 o'clock, and again in the