

KARANGAHAKE SCHOOL OF MINES.

The Director, Mr. R. B. McDuff, reports as follows:—

I have the honour of submitting the following report on the Karangahake School for the year ending the 31st March, 1906.

ATTENDANCE.

During the year a marked increase took place in the number of students, the average number being thirty-eight registered students. But in the last term, 1905, forty-eight students were on the roll. This attendance is being maintained.

EXAMINATIONS.

At the annual examinations held in December last sixteen first-class, fourteen second-class, and three third-class certificates were obtained by students of this school. In all, thirty-four papers were handed in, and the average marks per paper were 67.76 per cent., or only 2.25 per cent. below first-class. This average is the highest on record.

LABORATORY.

A fair amount of public assays and analyses were carried out during the year, they being chiefly for gold and silver; but some were for iron, phosphorus, and zinc. Some coal and oil-shale were also analysed.

EXTENSION CLASSES.

In July last year I commenced giving a lecture on metallurgy and on mathematics once a week at Waikino. These classes were so well patronised that the Council asked the Hon. the Minister of Mines to grant a subsidy for the erection of a school at Waikino. The Hon. the Minister, ever ready to assist an educational movement, at once granted the request, and I am pleased to state that the school will be ready to commence operations at the beginning of our third term—9th September, 1906.

It is intended to depart from the ordinary course at Waikino and offer a two-years' course in mathematics, assaying, chemistry, mechanical drawing, metallurgy of gold, silver, copper, lead and zinc (including electro-metallurgy), and electricity. It is believed that such a course, assisted by the excellent environment, will enable the school to turn out students capable of upholding the good record of New Zealand metallurgists and the fame of the renowned Waihi Gold-mining Company, whose reduction-works are situated at Waikino.

SYLLABUS.

The syllabus has been somewhat extended to meet the needs of advanced students, and comprises instruction in mining, mathematics, surveying, assaying, chemistry, mechanical drawing, survey map-drawing, geology, mineralogy, metallurgy, metallurgical chemistry, and electricity. A synopsis of the courses is given below.

Mining.—Minerals of common occurrence, with New Zealand localities; kinds of rock in which different minerals are found; dynamics of lodes; faults in lodes and coal-seams; recovery of lost lodes and seams; Zimmermann's law; location of shafts, slopes, and adits, and calculations pertaining thereto; exploitation, driving, sinking, rising; working ore by overhand and underhand stopes; precautions for safety of men; timbering drives, rises, stopes, shafts, slopes; special methods of sinking, driving, and timbering in running and watery strata; tubbing; coffering.

Poetah's method, Triger's method, Goebert system, Kind Chaudron system, Bullock system.

Drainage of mines by pumps, pulsometers, buckets, siphons, drifts, &c.

Pumping-engines, with necessary calculations. Fixing pumps, and pitwork generally. Plunger pumps, draw-lift pumps, steam and compressed-air pumps. Calculation of power required to drive pumps.

Steam and the steam-engine, condensing and non-condensing engines. Expansion of steam. Calculations of required size for given work. Horse-power of engines.

Haulage, engine plane, gravity plane, tail-rope system, endless-rope and chain haulage.

Hoisting is treated in detail, so as to bring out the important practical points so commonly overlooked by writers of text-books.

Ventilation of mines by blasts, jets, fans, and furnaces. Gases met with in mines—CO₂, CO, H₂S, CH₄, C₂H₄—their properties and effect on human beings. Calculations pertaining to practical mine-ventilation.

Text-books: Pameley, Lupton, and Foster.

Mathematics.—This includes:—Arithmetic: The whole subject; text-book, Workman's School Arithmetic. Geometry: The substance of Euclid's books I, II, and III; text-book, Hall and Stevens's Geometry. Algebra: To binomial theorem; text-book, Hall and Knight. Trigonometry: To solution of triangles; text-book, Loney's Plane Trigonometry.

Surveying.—Pacing practice, ranging-lines, offsets, chain surveying, surveying with prismatic compass and miners' dial, adjustments of prismatic compass, miner's dial, and Abney level.

Adjustment of and surveying with theodolite and transit theodolite. Levelling. Computations. Mine-surveying, taking meridian underground, holing.

Text-books: Baker and Dixon, J. B. Johnson.

Assaying.—This subject is divided into (a) dry assaying, (b) wet assaying.

(a.) Fluxes, oxidizers, and reducers. Chemistry of the smelt. Assay for gold, silver, mercury, lead, antimony, and tin. Cupellation of lead buttons for gold and silver; chemistry of cupellation. Parting gold and silver. Parting gold, silver, and platinum. Calculations of values. A thorough practical course of sampling ores and bullion is given before the assay is carried out.