

THAMES SCHOOL OF MINES.

The Director, Mr. O. Gore Adams, A.O.S.M., F.C.S., reports as follows :—

Despite the general depression existing on the Lower Thames Goldfield, the attendance at the Thames School of Mines has been kept up to a satisfactory average.

During the year a special grant from the Mines Department, as mentioned in my last annual report, enabled the Council to purchase an optical lantern with electric arc lamp, half-plate camera, lantern-slide maker, and all accessories. A number of lantern-slides have been made illustrating metallurgical, mining, geological, electrical, and other subjects, and these slides are now used to illustrate the lectures given to the students. This is a great advantage, saving time and giving a correct representation of many objects that it would be impossible to draw properly on the black-board.

The various subjects taught and the scope of the work are indicated by the following summary of classes.

SUBJECTS OF INSTRUCTION.

Mining and Applied Mechanics.

Mining.—Characteristics, mode of occurrence, and distribution of the usual minerals; classes of ore-deposits; faults; recovery of lost lodes; shaft-sinking and driving levels; dry and wet ground; timbering shafts, levels, and inclines; underground workings.

Mine-drainage.—Surface-water; dams; force-pumps; lift-pumps; steam-pumps; pumping-engines; capacity of pumps; thickness of pipes; calculation of water-power.

Explosives.—Composition and strength; mode of charging boreholes and firing; products of combustion; calculation of quantities.

Ventilation.—The atmosphere; natural ventilation; artificial ventilation; furnaces, fans, &c.; division of air-currents; composition and detection of noxious gases.

Hauling and Winding.—Strength of ropes; aerial haulage; underground haulage; roads, rails, and guides; safety appliances; man-engine; turbine; Pelton-wheel; steam-engine; winding-engine, and signalling.

Land and Mine Surveying.

Land-surveying.—Chains and tapes; ranging lines; adjustments of theodolite, dial, and level; chaining; offsets; reduction of slope-measurements; inaccessible points and obstacles to alignment; triangulation; measuring base-line; shape of triangles; tie-lines.

Mine-surveying.—Connecting the underground with the surface meridian; magnetic variation; correcting the magnetic survey; holing.

Levelling.—Recording levels; grading roads, tramways, and water-races; Abney level; calculation of earthworks.

Office-work.—Computation of co-ordinates, areas, and triangles; use of logarithmic tables; scales; methods of plotting survey; construction of survey-plans; principle and use of slide rule; principle of calculating-machines.

Metallurgy of Gold and Silver.

Ore crushing and pulverising machinery; rock-breakers; stamps; rolls; Huntingdon mill; arrangement of battery; sampling; drying and roasting furnaces; dry and wet crushing; classifiers; concentration; amalgamation on copper plates and in pans; chlorination; cyanide treatment and other leaching processes; treatment of slimes; agitation; filter-presses; smelting; fluxes and slags; cupellation; refining bullion; retorting and smelting of bullion; calculation of results obtained in the battery; metallurgical problems.

Practical Assaying (Dry).

Dry Assaying.—The furnaces and assay appliances; the fuels and fluxes; methods of sampling; preparation of the ore-sample; fusion and cupellation; parting; weighing and valuation of the bullion; sources of error in fire assaying; assay of litharge and red-lead; assay of gold and silver ores; assay of bullion; refining of base bullion; assay of lead-ores; assay of tin-ore; retorting and melting of bullion; volatility of gold and silver; preparation of pure silver and gold; calculation of results obtained in batteries from treatment of ore; keeping note-books and forms of assay reports; the valuation of specimens.

Practical Assaying (Wet).

Wet Assaying.—Preparation and use of reagents; tests for purity; use of apparatus and balances; assay of iron-ores, of copper, lead, zinc, antimony, bismuth, mercury, manganese, nickel, cobalt, arsenic, chrome-iron, and silver ores; assay of slags; assay of sulphur in fuels; assay of ash and coke in fuels; assay of lime in limestone; assay of cyanide-solutions.

Practical Chemistry.

Junior Class.—Preparation and use of reagents. Tests for purity. Use of apparatus and balances. Separation of the metals into groups. Qualitative tests for the different metals. Separation of silver, lead, mercury; separation of copper, bismuth, arsenic, and antimony; separation of iron and alumina, iron and zinc, iron and manganese, iron and chromium; separation of calcium and magnesium; separation of barium, strontium, and calcium; separation of potassium and sodium. Qualitative tests for the acid-radicals (inorganic)—(a) H_2S , HCl , HBr , HI ; (b) HNO_3 , HClO_4 ; (c) H_3BO_3 , H_2CO_3 , H_2CrO_4 , HF , H_3PO_4 , H_4SiO_4 , H_2SO_4 , H_3AsO_4 .