

PHYSICAL GEOLOGY.—Professor Hutton.

The composition and formation of rocks; the structure of rock masses; metamorphism; form and internal condition of the earth; movements of the surface; earthquakes; volcanoes; denudation; physiography; results of palæontology; chronological classification of rocks; former changes of climate.

PALÆONTOLOGY.—Professor Hutton.

Processes of fossilization; zoological, and botanical characters of the more important extinct animals and plants; historical palæontology; principles of the distribution of animals.

NATURAL HISTORY.—Professor Hutton.

The morphology of the classes and orders of the animal kingdom; the principles of taxonomy. This course includes practical work in comparative anatomy and histology.

THEORETICAL AND TECHNOLOGICAL CHEMISTRY.—Professor Black.

- (a.) The general principles of chemical notation, combination, and nomenclature.
- (b.) The classification of the elements, and the principles of the leading chemical theories.
- (c.) The description of the more important elements, and organic and inorganic compounds.
- (d.) The general chemistry of animal and vegetable organisms.
- (e.) Chemical physics, including the chemical relations of light, heat, and electricity.

Text-book: Fownes' Manual.

QUALITATIVE ANALYSIS.—Professor Black.

This course is conducted in the Chemical Laboratory. Practical instruction is given to the students in classes. It is devoted to the qualitative analysis of simple, compound, and complex salts, soils, water, metallic ores, and other minerals.

Text-book: Fresenius' Qualitative Analysis.

QUANTITATIVE ANALYSIS.—Professor Black.

This course is conducted in the Chemical Laboratory. Practical instruction is given to the student in the methods of determining the percentage compositions of soils, rocks, water, the ash of plants, salts; also of metallic ores, limestones, coal, and other minerals.

Text-book: Fresenius' Quantitative Analysis.

METALLURGY.—Professor Black.

The lectures will treat of—

- (a.) Fuel, furnaces, crucibles, retorts, fluxes.
Coal—the different varieties.
Charcoal—its manufacture in kilns, heaps, ovens.
Coke—its manufacture in mounds, ovens, &c.

The description of the different kinds of furnaces: The blast furnace—hot blast, cold blast; reverberatory furnace, oxidizing and reducing furnaces, puddling furnace, refinery, calcining furnace, liquation furnace, assay furnace, Siemen's gas furnace; materials for furnaces and crucibles—*e.g.*, fire-stone, fire-clay, fire-bricks; the different kinds of crucibles and retorts; determination of the heating power of different kinds of fuel.

- (b.) Extraction of metals from their ores.
- (c.) Physical and chemical properties of the metals.
- (d.) Industrial applications of the metals.

ASSAYING.—Professor Black.

Instruction will be given to students in the Assay Laboratory or Furnace-room. It will be devoted to the most approved and useful methods of assaying—both by the dry and wet processes—metallic ores, such as gold, silver, platinum, bismuth, the compounds of copper, lead, tin, antimony, zinc, iron, nickel, cobalt, mercury, &c.; also the dry and wet assay of bullion.

MINING GEOLOGY.—Professor Ulrich.

1. Modes of occurrence of useful minerals; description of the various kinds of deposits of useful minerals; lodes or mineral veins; bedded deposits, seams or layers; irregular massive deposits; stacks and stack-works; impregnations, &c; theory of faults or heaves, and rules for searching for the faulted or lost portion of a deposit; review of certain theories and hypotheses regarding the mode of formation of mineral veins and other kinds of mineral deposits.

2. Prospecting for useful mineral deposits; shodding, trenching, costeaning; boring as practised with rods or rope, different apparatus and different cutting and clearing implements; the diamond drill.

MINING.—Professor Ulrich.

1. Breaking down rocks and useful minerals; tools employed in hard and soft ground, in metal and coal-mines; various methods of blasting; tools and explosions employed; boring and cutting machines; fire setting.

2. Opening of mineral deposits; shafts and adits.

3. Exploitation or the working away of mineral deposits.

4. Modes of securing excavations by timbering, masonry, and tubbing; construction of underground dams.

5. Transportation of mineral and rock along the underground roads, and hoisting or winding them up the shafts; machinery, appliances, safety-cages or parachutes, &c.