

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; various apparatus with various kinds of cutting and clearing instruments; the diamond drill.

*Mining* (Professor Ulrich).—First Course: Four hours per week. Fee, £3 3s. (1.) The breaking-down of rocks and useful minerals; tools employed in hard and soft ground, in metal and coal-mines; various methods of blasting, tools and explosives 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 minerals and rocks along the underground roads, and hoisting or winding them up the shafts; machinery, appliances, safety-cages or parachutes, &c.

Second Course: Four hours per week. Fee, £3 3s. (6.) Modes of gaining access to underground workings. (7.) Ventilation of mines, its principles and modes of achievement; natural ventilation, artificial ventilation, various approved ventilators, distribution of air through the workings. (8.) Lighting of underground workings; description of the most approved safety-lamps; extinguishing of fires in mines. (9.) Drainage of mines of water; adits, pumps, pumping-engines, water-pressure engines. (10.) Mechanical extraction of gold from drifts and lode-stone, common and hydraulic sluicing, dredging, puddling, milling, and amalgamation, machines and appliances. Text-books: Gordon's *Miners' Guide*, Eissler's *Metallurgy of Gold*, Eissler's *Metallurgy of Silver*, Smyth's *Coal Mining*.

*Mineralogy* (Professor Ulrich).—General Course: Three hours per week. Fee, £3 3s. (1.) Crystallography; systems of crystallization; laws determining the modification of crystals; compound crystals; pseudomorphous crystals; description and use of goniometers. (2.) Physical properties of minerals discussed as far as essential to recognition and practical distinction of the various mineral species. (3.) Chemical composition of minerals. (4.) Classification and description of the more important species and varieties of minerals; their modes of occurrence, association, and geographical distribution, with special consideration of those that are of economic value, or that are of interest from a geological or physical point of view. These lectures will be illustrated by specimens intended for close inspection.

Advanced Course: One hour per week. Fee, £1 1s. Extended course in crystallography and the physical (especially optical) properties of minerals. Text-books: E. S. Dana's *Text-book of Mineralogy*, James E. Dana's *System of Mineralogy*.

*Scientific Use of the Blowpipe and Determinative Mineralogy* (David Wilkinson).—Fee, £1 11s. 6d. Instruction in the use of the blowpipe; reactions of elements, oxides, and acids; determination of artificial inorganic compounds, to be succeeded by that of important metallic and earthy minerals, by the aid of their crystalline form and physical properties. Experienced students, on providing themselves with the necessary apparatus, will also receive instruction in executing assays for gold, silver, lead, copper, nickel, cobalt, &c., by means of the blowpipe. Text-books: Fuch's *Guide to the Determination of Minerals by means of the Blowpipe* (trans. T. W. Danby), Brush's *Manual of Determinative Mineralogy*, Platner's *Manual of Qualitative and Quantitative Analysis with the Blowpipe* (trans. H. B. Cornwall).

*Petrography* (Professor Ulrich).—General Course: Three hours per week. Fee, £3 3s. Description of the character of the rock composing the earth's crust. Discussion of the different systems of classification proposed for the igneous, aqueous, and metamorphic rocks. Various methods for the determination of the chemical and mineralogical constitution and minute structure of rocks, with special consideration and illustration of the use of the microscope in the examination of thin sections. Preparation and mounting of thin sections. These lectures are illustrated by specimens intended for close inspection. Text-book: *The Study of Rocks*, by F. Rutley.

Advanced Course: Two hours per week. Fee, £1 11s. 6d. Special description of the "rock-forming minerals," particularly as to their optical properties; their determination in thin sections by the microscope and polariscope. Text-book: *Rock-forming Minerals*, by F. Rutley.

*General Geology* (vacant).—Introductory: History and development of geology as a science. Structure of the earth and evidences of internal heat. Degradation of the rocks, chemical and mechanical, including the action of glaciers, rivers, and seas. Distribution of material and formation of strata. Elevations and depressions of land. Volcanoes and earthquakes. General principles of stratigraphy, with metamorphism, contortion and slaty cleavage. Preservation of fossils, and succession of life in time. Stratigraphical geology: (a) palæozoic, (b) mesozoic, (c) kainozoic. Economic geology. Field geology. Summary of course. The lectures will be illustrated, according to circumstances and opportunities, by field excursions. Text-books: Geikie's *Class-book of Geology*, Elementary Lessons in Physical Geography, Outlines of Field Geology.

*Applied Mechanics*.—Fee, £1 11s. 6d. Steam-engine and boilers; pumping and winding machinery; air-compressors; rock and diamond drills; tramways.

*Land and Mine Surveying*.—Three hours per week. Fee, £3 3s.

*Drawing* (David C. Hutton, S. and A.M.).—The following is a condensed summary of the instruction given in drawing: Freehand drawing—Sketching simple designs and objects from the "flat;" sketching from models and from objects from the "round." Practical geometry—Use of drawing instruments, and the construction of scales; practical plane geometry; practical solid geometry, including isometric and perspective projection and the theory of shadows. Mechanical drawing—Machine drawing to scale, and working drawing in accordance with the best modern practice. Tinting drawings, correct figuring and lettering. Exemption from attendance may be granted to any student who has passed the science and art examinations in the above subjects.