Senior Class.—Estimation of chlorine; estimation of sulphuric acid and sulphur; estimation of phosphoric acid. Analysis of limestones and calcareous freestone; analysis of coals, coke, charcoal, and shales; analysis of barytes; analysis of fluor-spar; analysis of scheelite and wolfram; analysis of rocks (including estimation of K_2O and Na_2O); analysis of fireclays; analysis of soils; analysis of complex sulphide ores; analysis of milk; analysis of waters; analysis of bone-dust and bone-ash, with estimation of nitrogen; analysis of guanos and apatite; analysis of super-phosphates. Estimation of alcohol—(*a*) by weight; (*b*) by volume. Volumetric analysis: the estimation of—alkaline hydrates; alkaline carbonates; acids, HCl, H_2SO_4, HNO_3, $HC_2H_3O_2$, $H_2C_4H_4O_6$; haloid salts, HCN, KCN, I, As_2O_3, SO_2 ($Na_2S_2O_3 + 5H_2O$).

Theoretical Chemistry.

Mechanical mixtures and chemical compounds. Melting and boiling points. Elementary and compound substances. Laws of chemical combination. Equivalent weights. Multiple proportions. The atomic theory. Atoms and atomic weights. Molecules and molecular weights. Volume and density. Chemical symbols, formulæ, and equations. Specific heat. Diffusion of gases. Electrolysis.

The history, occurrence, preparation, properties, and uses of the elements, and their compounds—viz., hydrogen, oxygen, nitrogen, chlorine, bromine, iodine, fluorine, sulphur, phosphorus, arsenic, antimony, carbon, boron, silicon, sodium, potassium. Calculation of problems.

General and Mining Geology.

Physical Geology.—The earth as a planet, its form and motions; geological climate; the atmosphere; ocean; solid crust; the interior of the earth.

Dynamical Geology.—Metamorphism; agencies modifying the crust of the earth—atmospheric, aqueous, chemical; weathering; sedimentation; classification of deposits—mechanical, aqueous, organic, and chemical; denudation and erosion; volcanic action; earthquakes.

Structural Geology.—Stratification; jointage; contortion; faults; conformity; unconformity; dip and strike; cleavage; metamorphic rocks; intrusive sheets, bosses, dykes, fissures; formation of quartz veins, lodes, and metallic deposits; dynamics of lodes; recovery of lost lodes.

Geological Surveying.—The practice of running natural sections; noting dip, strike, and inclination of strata and lodes; mapping geological formations; collection of mineral and rock specimens.

Stratigraphical Geology.—Classification of plants and animals; fossils; blending of species; geological record; the study of characteristic life, and distribution of formations from archæan to recent times, with special reference to the geology of New Zealand.

Mineralogy and Blowpipe Determination.

Crystallography.—The six systems, their axes, typical and modified forms; holohedral and hemihedral forms; twin crystals; use of goniometer.

Systematic Mineralogy.—Physical properties—hardness, specific gravity, cleavage; optical properties—reflection, refraction, polarisation, phosphorescence, lustre; chemical properties and composition; isomorphism and pseudomorphism; distribution and paragenesis of minerals; classification.

Descriptive Mineralogy.—Description of the chief varieties; mode of occurrence; distribution in New Zealand; value.

Blowpipe Determination.—Use of the blowpipe; oxidizing and reducing flames; examination of mineral samples.

Mathematics.

Arithmetic.—The simple rules; weights and measures; vulgar fractions; decimals; proportion; problems; logarithms; mensuration.

Algebra.—The signs and symbols; simple rules; factors; symmetry; problems; quadratic equations; simultaneous equations; binomial theorem: transposition of formulæ used in mining.

Trigonometry.—Definition of an angle; trigonometrical ratios; easy problems; solution of triangles.

Euclid.—The first four books of Euclid, with definitions, axioms, and problems.

Drawing.

Geometrical Drawing.—Use of scales and instruments; plane geometrical figures; projection; isometric drawing.

Mechanical Drawing.—Machine drawing to scale from copies and from the machines, showing plan, elevation, and sections; tinting; shading; inking-in; figuring and lettering; enlarging and reducing; preparation of working-drawings, and tracings on paper and cloth.

Architectural Drawing.—Preparation of working-plans and finished drawings.

Practical Astronomy.

The ecliptic; equinoxes; meridians; longitude; latitude; altitude; declination; right ascension; azimuth; use of Nautical Almanac; polar distance; zenith distance; hour-angle; sidereal time; mean time; solar time; parallax; refraction; retardation; acceleration; convergency of meridian; determination of meridian by star and sun observations, by single altitudes and greatest elongation of circumpolar stars; use of star-charts; calculation of hour-angle, azimuth, and altitude of celestial bodies for any time and place; determination of latitude by meridian altitudes; determination of time by star-transits and sun-observations.