

Physical Measurements.

First Year.—1. The metric system: The measurements of length and area; relation between the two. 2. The balance and its uses: Care in handling; the measurements of mass. 3. The measurements of the volume of a liquid: Use of (a) pipette, (b) burette, (c) measurement-glass. 4. The measurement of temperature: Difference between heat and temperature; expansion of liquids, solids, gases; experiments to show the same; the thermometer, conversion of thermometric scales. 5. The relative density of liquids: (a) Ordinary method; (b) specific-gravity bottle. 6. Relative density of solids: (a) Regular solids; (b) irregular solids; (c) specific-gravity bottle; (d) principle of Archimedes. 7. Pressure: The pressure of the air; method of measuring it. The barometer—its construction; standard atmospheric pressure. 8. Evaporation and condensation: A natural process; cloud-formation, rain, &c. Water—purification of water; boiling-point of liquids; effect of pressure on the boiling-point. 8. Change of state: Liquefaction and solidification; effect of heat on certain solids—(a) ice, (b) paraffin, (c) sulphur; melting-point of solids.

Second Year.—1. Solutions: Water and sugar; experiment to see if a liquid increases when a substance is dissolved in it; substances soluble in water; solids in natural water; distillation; hard and soft waters; soap test; solubility of solids in water; influence of temperature on solubility; solvent action of other liquids. 2. Freezing-mixtures: Salt solution; ammonium-nitrate solution. 3. Latent heat: Meaning of the term; latent heat of liquefaction; latent heat of vaporization; the wet- and dry-bulb thermometers. 4. The measurement of heat; the effect of mixing two quantities of water at different temperatures; specific heat; specific heat of metals, &c. 5. Simple machines: The lever, the pulley, the balance; application to farm-work. 6. Gravitation: Newton's law; the centre of gravity; equilibrium. 7. Mechanical properties of water and other liquids: Flotation (hydrometers), &c.; elasticity, diffusion, surface tension, &c. 8. Graphic representation: Temperatures—wet and dry bulb, maximum and minimum thermometer; rainfall; soil-temperature; crop-yield; germination-tests, &c.

Agricultural Chemistry.

Section I, Inorganic Chemistry.—1. Composition of matter: Physical and chemical changes; mechanical mixtures and chemical compounds; chemical action. 2. Chemical manipulation and apparatus: Names and use of apparatus; glass cutting and bending; cork-boring; fitting up wash-bottle; weighing; measuring liquids; filtering. 3. Solutions; evaporation and precipitation. 4. Elements; symbols; chemical nomenclature; combination of elements. 5. Occurrence, preparation, properties, and importance of the following elements: Oxygen, hydrogen, nitrogen, carbon, oxides, marsh-gas, chlorine. 6. Water: Natural waters; impurities; hard and soft waters; physical properties; chemical composition; water of crystallization. 7. Air: Its composition; properties; importance to plants and animals. 8. Acids; bases; salts; neutralization; classification of salts; soil salts, how formed; classification of elements—acid-forming, base-forming; chief acids, their composition, preparation, and properties; laws of chemical action; indestructibility of matter. 9. Atomic and molecular theory; valence. 10. Soil-elements and their compounds essential for plant-life—nitrogen; ammonia; nitric acid and nitrogen compounds; phosphorus and its compounds; potassium and sodium and their compounds. 11. Calcium and its compounds. 12. Sulphur and its compounds.

Section II.—1. Mechanical analysis of soils. 2. Action of lime on sand and clay; slaking lime; action of air and acids on lime; tests for lime and humus matter in soils. 3. Silica; sand and clay; mechanical properties of soil. 4. Soil-acidity and remedies. 5. Tests for nitrates, phosphates, sulphates, &c.; experiments with manures—lime manures, potash manures, nitrogenous manures, compound manures, phosphatic manures, mixing manures. 6. Elementary analysis; qualitative experiments with soils and manures. 7. Tables for analysis (qualitative).

Statement of Receipts and Expenditure for the Year ending 31st December, 1911, in respect of Special Classes conducted at Gisborne, Napier, Hastings, Waipawa, Dannevirke, and Woodville.

| <i>Receipts.</i> | | | <i>Expenditure.</i> | | |
|--|---------------|--------------|---|---------------|--------------|
| | £ | s. d. | | £ | s. d. |
| Balance at beginning of year | 281 | 18 4 | Salaries of instructors | 293 | 0 0 |
| Capitation on special classes | 91 | 14 9 | Office expenses (including salaries, stationery, &c.) | 20 | 10 6 |
| Capitation on account of free places | 580 | 0 0 | Advertising and printing | 3 | 8 6 |
| Furniture, fittings, and apparatus | 53 | 4 5 | Lighting, heating, and cleaning | 6 | 16 8 |
| Material | 10 | 19 4 | Material for class use | 8 | 16 0 |
| Subsidies on voluntary contributions | 180 | 0 0 | Teachers' travelling-expenses | 32 | 18 6 |
| Training of teachers | 175 | 0 0 | Contracts (new buildings, additions, &c.) | 525 | 4 0 |
| Fees | 11 | 15 0 | Architect, &c. | 30 | 5 0 |
| Voluntary contributions | 180 | 0 0 | Furniture, fittings, and apparatus | 49 | 0 5 |
| | | | Expenses acquiring site | 55 | 0 0 |
| | | | Balance at end of year | 539 | 12 3 |
| | <u>£1,564</u> | <u>11 10</u> | | <u>£1,564</u> | <u>11 10</u> |

G. CRAWSHAW, Secretary.

EXTRACT FROM THE REPORT OF THE DIRECTOR OF THE NAPIER TECHNICAL COLLEGE.

The work of the year has again been very successful in all departments, particularly so in the evening classes, not only in point of numbers, attendance, conduct, but also in the increased number of students who have taken up related courses of work. This has been rendered more possible by the increased capitation granted by the Department for pupils taking related courses of study.

The work was carried on under similar branches as last year—viz., (a) An organized day technical school of 83 pupils; (b) eight primary-school classes in woodwork, cookery, and dressmaking; (c) two