Education Board, Auckland.

Department of Technical Education and Manual Training.

Science
Art
Commerce
Technology

Auckland Technical College

PROSPECTUS

of the

EVENING CLASSES.

FOR THE SESSION 1908.

Classes commence Monday, March 2nd, 1908.

PRICE 6d.

WILSON AND HORTON, AUCKLAND.

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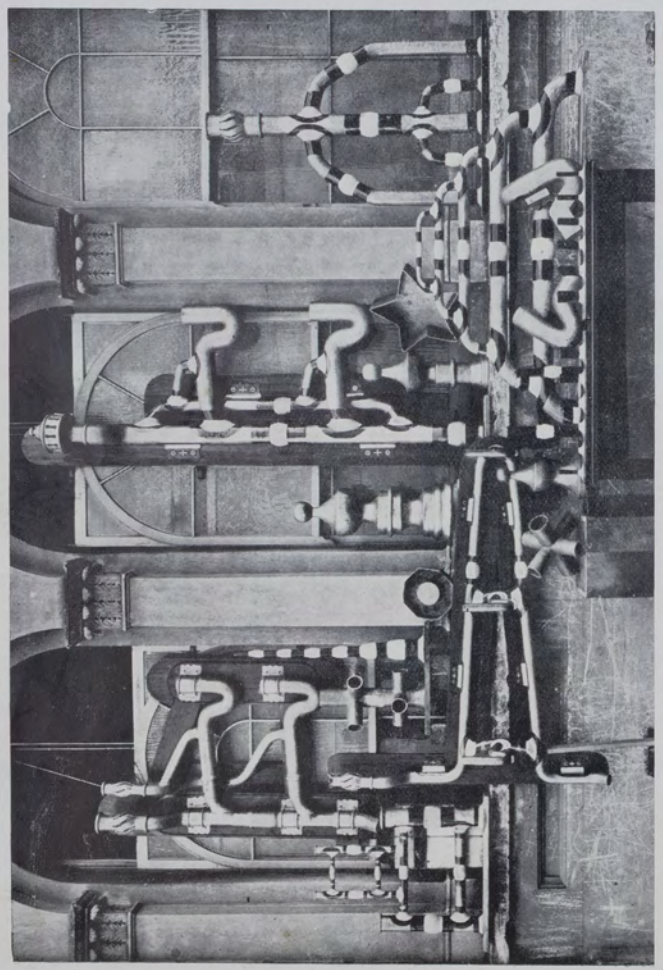

PLUMBING DONE BY TECHNICAL COLLEGE STUDENTS, WHICH OBTAINED FOUR GOLD, FIVE SILVER, AND ONE BRONZE MEDAL, AS WELL AS SPECIAL DISTINCTION CERTIFICATE AT THE CHRISTCHURCH INTERNATIONAL EXHIBITION, 1906-7.

Education Board, Auckland.

DEPARTMENT OF TECHNICAL EDUCATION
AND MANUAL TRAINING.

Auckland Technical College.

PROSPECTUS

OF THE

EVENING CLASSES

FOR THE SESSION COMMENCING

MONDAY, MARCH 2nd, 1908.

AUCKLAND:
Wilson & Horton, General Printers and Bookbinders.

1908.

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LIST OF ILLUSTRATIONS.

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STAFF.

Director of Technical Education and Manual Training:

GEORGE GEORGE, F.I.C., F.C.S.

(Late Headmaster of the Sutherland Technical Institute, Longton, Staffordshire, and of the Longton High School; Associate of, and late Colston Exhibitioner and Assistant Master at, the Merchant Venturers' Technical College, Bristol.)

Assistant Director of Technical Education and Manual Training:

GEORGE P. DARNELL-SMITH, B.Sc. (Lond.), F.I.C., F.C.S.

(Associate of, and late Assistant Professor of Chemistry at, the Merchant Venturers' Technical College, Bristol.)

COMMERCIAL DEPARTMENT.

Chief Instructor—JOHN PAYNE, formerly of Smart's Commercial College, Manchester.

Instructors in Commercial Arithmetic and English Composition—

WILLIAM KAY, First Assistant, Beresford Street Public School.
NORMAN H. S. LAW, First Assistant, Bayfield Public School.
ALFRED J. C. HALL, First Assistant, Nelson Street Public School.
NELSON T. LAMBOURNE, Headmaster, Mangere Bridge Public School.
CHAS. WILSON, First Assistant, Epsom Public School.

Instructors in Commercial Geography, Commercial Correspondence, and Précis Writing—

ROBERT H. PATERSON, First Assistant, Normal School, Wellesley Street.
FRANCIS H. BROWN, First Assistant, Newton East Public School.

Instructors in Typewriting, Shorthand, Book-keeping, and Handwriting—

JOHN PAYNE, formerly of Smart's Commercial College, Manchester.
MISS MARY HAMILTON COOK, late Secretary and Commercial Instructor of the Hamilton Academy and Technical School, Hamilton, Scotland.

Lecturer in French—

H. BRUCE WALLACE, M.A. (Vict.), late of Leeds University.

DOMESTIC DEPARTMENT.

Chief Instructor—MISS EMILY LAWSON, Diplomée in Cookery, Dressmaking, Housewifery, and Laundrywork; late of the National Training School of Cookery, London.

Instructor in Hygiene and Human Physiology—

GEORGE P. DARNELL-SMITH, B.Sc., F.I.C., F.C.S.

Instructor in Household Cookery and Laundrywork—

MISS EMILY LAWSON, Diplomée in Cookery, Dressmaking, Housewifery, and Laundrywork; Instructor in Cookery at the Newton Manual Training School.

Instructor in Dress Cutting and Making—

MISS ATALINA CAMPBELL.

Instructor in Millinery—

MADAME MARION WESTGARTH, late of Madame Valerie's, New Burlington Street, London.

PLUMBING DEPARTMENT.

Lecturer on Principles of Plumbing and Sanitary Law—

CHARLES T. HAYNES, Honours City and Guilds of London Institute; Certificate in Practical Sanitary Science, Sanitary Institute, London; Sanitary Inspector to the Auckland City Council.

Workshop Instructor in Practical Plumbing—

JOHN AULD, R.P.C., First-class Honours, City and Guilds of London Institute.

Instructors in Drawing for Plumbers—

FRANCIS C. J. COCKBURN, late Art Master, Halifax Higher Grade School.
WALTER FOSSEY, Instructor in Woodwork at the Manual Training School, Newmarket.

Instructors in Practical Mathematics—

HOWARD HOULSTON MORGAN, B.Sc. (Lond.), A.R.C.S. (Lond.), late Science Master at the Kidderminster School of Science.
NELSON T. LAMBOURNE, Headmaster, Mangere Bridge Public School.

Instructor in Science for Plumbers—

HOWARD HOULSTON MORGAN, B.Sc. (Lond.), A.R.C.S. (Lond.)

BUILDING TRADES DEPARTMENT.

Chief Instructor—ARTHUR DALE TRENDALL, A.B.I.C.C., Honours in Carpentry and Joinery, City and Guilds of London Institute.

Lecturers on Building Construction and Architectural Drawing—

HENRY S. MORRAN, A.R.I.B.A., London.
ARTHUR D. TRENDALL, A.B.I.C.C., London.

Lecturer and Workshop Instructor in Carpentry and Joinery—

ARTHUR D. TRENDALL, A.B.I.C.C., London.

Instructors in Practical Geometry—

ARTHUR D. TRENDALL, A.B.I.C.C., London.
GEORGE I. ALLEN, Instructor in Woodwork at the Newton Manual Training School.

Instructors in Practical Mathematics—

LEONARD CULLIS, B.A. (Cantab.), 26th Wrangler; late Scholar and Exhibitioner of St. John's College, Cambridge.
FREDERICK J. OHLSON, Headmaster, Newmarket Public School.

Instructor in Drawing for Carpenters—

FRANCIS C. J. COCKBURN, late Art Master, Halifax Higher Grade School.

Instructor in Woodwork—

GEORGE I. ALLEN, Instructor in Woodwork at the Newton Manual Training School.

ART DEPARTMENT.

Chief Instructor—HARRY WALLACE, late Organising Instructor in Art and Handwork to the Burslem School Board, and Art Master at the Wedgewood Institute, Burslem.

Instructors in Freehand and Model Drawing, Light and Shade, Perspective, Drawing and Painting from Nature, etc.—

HARRY WALLACE, late Organising Instructor in Art and Handwork to the Burslem School Board, and Art Master at the Wedgewood Institute, Burslem.
FRANCIS C. J. COCKBURN, late Art Master, Halifax Higher Grade School.

CABINETMAKING DEPARTMENT.

Chief Instructor—BENJAMIN P. RANDLE, Honours in Cabinetmaking, City and Guilds of London Institute: late Cabinetmaker at Messrs. Gillows & Co., Oxford Street, London.

Lecturer and Workshop Instructor in Cabinetmaking—BENJAMIN P. RANDLE.

Instructors in Practical Mathematics—

LEONARD CULLIS, B.A.
FREDERICK J. OHLSON.

Instructor in Drawing for Cabinetmakers—FRANCIS C. J. COCKBURN.

Instructor in Perspective and Design—HARRY WALLACE.

Instructor in Woodwork—GEORGE I. ALLEN.

MECHANICAL AND ELECTRICAL ENGINEERING DEPARTMENTS.

Chief Instructor in Mechanical Engineering—

CHARLES CARROL ALLEN, Wh. Ex., late Chief Lecturer in Mechanical Engineering, Municipal Technical Institute, Coventry; Honours in Mechanical Engineering and in Motor Car Engineering, City and Guilds of London Institute.

Chief Instructor in Electrical Engineering—

SAMUEL IRWIN CROOKES, A.M.I.E.E., F.C.S., late Chief Assistant Lecturer in Physics and Electrical Engineering, Battersea Polytechnic, London.

Lecturer on Applied Mechanics, Machine Construction and Drawing, and Motor Car Engineering—

CHAS. C. ALLEN, Wh. Ex.

Lecturer on Magnetism and Electricity and Electric Lighting and Power Distribution—

SAMUEL I. CROOKES, A.M.I.E.E., F.C.S.

Lecturers on Practical Mathematics—

LEONARD CULLIS, B.A. (Cantab.), 26th Wrangler; late Scholar and Exhibitioner of St. John's College, Cambridge.
HOWARD HOULSTON MORGAN, B.Sc. (Lond.), A.R.C.S. (Lond.).
NELSON T. LAMBOURNE, Headmaster, Mangere Bridge Public School.

Instructor in Steam, Marine Oil Engines, and Mechanical Workshop, and Coach for Government Engineering Examinations—

JOSEPH E. DANGERFIELD, First-class Honours in Mechanical Engineering, City and Guilds of London Institute; late Instructor at the Northampton Institute, London.

Instructor in Electric Wiring—

JAMES PEARCE, Foreman Wireman to Messrs. Turnbull & Jones, Ltd., Auckland; late of the Eastern Telegraph Company.

TAILORING AND CUTTING DEPARTMENT.

Instructor in Tailors' Cutting—

FREDERICK COLLEGE, formerly Instructor at the Tailors' and Cutters' Academy, London.

Chief Clerk and Registrar	JOHN J. ROACH.
Assistant-Registrar	WALTER H. RUSHBROOK.
Senior Typiste	IDA PITCHER.
Junior Typistes	FLORENCE J. RANKIN and MURIEL E. ALISON.
Junior Clerk	HARRY ABERCROMBIE.

Auckland Technical College

HISTORICAL RETROSPECT.

The Auckland Technical School came into existence in 1896 as the outcome of enthusiasm shown by a number of prominent citizens, who realised that Technical Education was an economic necessity, and that the youth of Auckland were, at that time, lacking educational facilities which were enjoyed by the youth in many other parts of the world. A temporary building was rented and fitted up in Rutland Street, and opened for work in 1896, under the name of the "Auckland Technical School." The classes continued to be held, under the management of the "Auckland Technical School Association," until 1902, when they were taken over by the Board of Education, the number of students in attendance at that time being about thirty (30). At the end of that year (1902), the classes were reorganised, and have shown steady progress ever since, the number of **individuals** in attendance last session being over eleven hundred (1,100).

BUILDINGS AND EQUIPMENT.

Even at the present time the City of Auckland possesses no permanent building of the nature of a Technical College, but thanks to the generosity of the City Council, who has given a site of nearly an acre near the centre of the city, and of the Auckland Savings Bank, who donated a sum of £10,000, as well as that of the general public, a site and a sum of about £30,000 are now available, and it is hoped that considerable progress will soon be made with the building of the new College, which is to be erected in Wellesley Street East as a memorial to the late Premier of the Dominion, the Right Hon. R. J. Seddon, and is to be known as the "Seddon Technical College, Auckland."

During the present session the various Evening Classes of the College will be conducted in the following buildings:—

(a). **RUTLAND STREET BUILDING.**—On the **ground floor** are the following:—Director's and General Offices, Photographic Dark Room, Storeroom, Electrical Engineering Laboratory, and Ladies' Lavatory

and Cloakroom. The rooms on the **first floor** are: The Typewriting Room, the Commercial Class Room, and Gentlemen's Lavatory. On the **top floor** are: Science Lecture Room, Chemical Laboratory, Mathematical Class Room, and Gentlemen's Lavatory.

(b). NORMAL SCHOOL, WELLESLEY STREET EAST.—Two rooms at this School have been specially fitted up for the use of the Technical College students, one for the teaching of Mechanical Drawing, and the other for classes in Applied Art. Five other class rooms at this School are also used for Art and Commercial Classes.

(c). MACHINE SHOP AND PLUMBERS' SHOP, WELLESLEY STREET EAST.—An iron building has been erected at the end of the Normal School playground, Wellesley Street East. It consists of two large rooms, fitted up as Machine Shop, and Plumbers' Shop, respectively.

(d). CARPENTERS' AND CABINETMAKERS' SHOP, CHANCERY STREET.—A large building in Chancery Street, opposite the Public Health Department's Office, has been fitted up for Carpentry and Cabinetmaking Classes.

(e). MECHANICAL ENGINEERING LABORATORY, LORNE STREET.—This building adjoins the premises of Messrs. Tonson Garlick and Co., Ltd., Lorne Street. It comprises three floors, and provision is being made in it for an Engineering Lecture Room and also for a Mechanical Laboratory and Testing Room.

(f). NEWTON MANUAL TRAINING SCHOOL, UPPER QUEEN STREET.—This School, which is one of the best equipped in Australasia, consists of a Cookery and Laundrywork Room, Woodwork Room, Teachers' Rooms, and Lavatories.

(g). DRESSMAKING ROOM, STRAND ARCADE.—Room No. 12 on the second floor of the Strand Arcade has been specially fitted up for the teaching of Dressmaking and Needlework.

THE OBJECT OF THE COLLEGE EVENING CLASSES.

It is the earnest desire of the Board that the instruction given at the College may be of **practical value to all sections of the community.** Classes have therefore been provided which it is hoped will prove of service to a number of the local trades, and these will be added to, as funds are provided for buildings and equipment. It must be clearly understood that a trade cannot be taught in a classroom. Manual skill is obtained only after long practice in factories, and commercial experience must be the outcome of business life, and not of the school classroom. In a Technical College the object of the workshop instruction is to give a student the opportunity of handling tools and learning trade processes which he may have no opportunity of doing in his daily work, owing to the division of labour required by modern systems of manufacture. In addition to "the know how," he will be able to acquire in the school classes a knowledge of "the know why," or in other words, a knowledge of the scientific principles on which each particular trade is based, and thus be prepared to take that intelligent interest in his daily work which is so essential if the tradesmen of New Zealand are not to be hopelessly outclassed by those of other countries, e.g., Germany, America, and Switzerland.

ADMISSION OF STUDENTS.

PAYING STUDENTS.

Paying students must possess one of the following qualifications before they can be admitted to Classes at the Technical College:—

(1) Have passed Standard VI., or an equivalent, and be at least 13 years of age;

or (2) Be at least 21 years of age;

or (3) Have been already on the Technical College Roll during the years 1903, 1904, 1905, 1906, or 1907.

Applications for admission should, as a rule, be made in person. In the case of students under 21 years of age, the Standard VI. or equivalent Certificate must be produced.

FREE STUDENTS.

(a) **JUNIOR FREE PLACES.**—Instruction at the Technical College is **Free** to any boy or girl over thirteen years of age who has obtained:—

either (1) A Standard VI. Certificate in any Public School in New Zealand previous to 1905;

or (2) A Standard VI. Certificate of Proficiency at a Public School in New Zealand during 1905, 1906, or 1907;

or (3) Has qualified for a Free Place in an Examination for Junior National Scholarships;

or (4) Has qualified in any Special Examination for Junior Free Places held by the Education Department;

or (5) Has qualified for an Education Board Scholarship.

Under this scheme students will be granted **Free** technical education for **Two** years, provided that their conduct is satisfactory; that they receive a **definite** course of instruction which bears upon their life's industry or occupation; that they provide the necessary books, etc.; that they make 80 per cent. of the possible number of attendances at the classes; and that they pass the necessary examinations at the end of each year.

The minimum period for which any student can be enrolled is **one year,** and parents will be required to enter into a bond with the Board, that in the event of their son or daughter not making 80 per cent. of the possible number of attendances from any cause except illness, they will pay to the Board a sum of money equivalent to the fee that is charged to paying students for the same course of instruction.

During their **First Year's** attendance at the College, holders of a Junior Free Place must take up one or other of the following courses of instruction:—

(1) Preliminary Art Course.

(2) Preliminary Commerical Course.

(3) Preliminary Domestic Course.

(4) Preliminary Plumbing and Engineering Course.

(5) Preliminary Cabinetmaking and Carpentry Course.

(6) Preliminary Tailoring and Cutting Course.

Each of these courses entails **three** evenings' attendance per week at the College, and homework, which, as a rule, will occupy a **fourth** evening.

Preliminary Art Course—

The objects of this course are to provide a preliminary training in the principles and practice of Art, for those who intend to engage in a trade or profession in which Art plays an important part. It is a suitable first year course for boys and girls who propose to become Artists, Carvers, Designers, Engravers, Letterers, Lithographers, Painters, Sculptors, Typographers, Tailors and Cutters, etc. The course embraces English, including Composition, Literature, and Commercial Handwriting; Practical Mathematics; and Drawing. This latter subject will be varied to suit individual requirements (see page 85).

Preliminary Commercial Course—

This course is open to boys and girls who intend to enter upon, or are already engaged in commercial work, and embraces Commercial Arithmetic, English, including Composition, Literature, and Commercial Handwriting; Commercial Correspondence; and Commercial Geography; with either Shorthand or Typewriting as an additional subject (see pp. 15 and 85).

Preliminary Domestic Course—

This course is intended to provide instruction for girls which will be of value to them, either in their own homes or in occupations in which a knowledge of Cookery, Dressmaking or Millinery is essential. The subjects taken in this course are:—English, including Composition, Literature, and Commercial Handwriting; Practical Mathematics; and any two of the following:—Cookery, Laundrywork, Dressmaking, and Millinery (see page 85).

Preliminary Plumbing and Engineering Course—

This is the first year's course for those who are engaged in the Plumbing and Engineering Trades. The subjects embrace English, including Composition, Literature, and Commercial Handwriting; Practical Mathematics; Trade Drawing; and Experimental Science (see pp. 69 and 85).

Preliminary Cabinetmaking and Carpentry Course—

The subjects taken in this course are:—English, including Composition, Literature, and Commercial Handwriting; Practical Mathematics; Trade Drawing; and Woodwork. The course is intended as a first year's course for those engaged, or about to be engaged, in the Cabinetmaking or Carpentry Trades (see pp. 53 and 85).

Preliminary Tailoring and Cutting Course—

This course, which is intended for first year students in Tailoring and Cutting, is the same as the Preliminary Art Course above. It is essential that those engaged as Cutters should be able to draft the Figure, and for this reason, special instruction will be given in Free-arm Drawing (see page 85).

It will be noticed in the above, that (1) English and (2) Commercial Arithmetic or Practical Mathematics are compulsory subjects in all the courses.

Free Place Students who completed a first year course of instruction last year (1907), will take up a second year course of studies this session, in the same department.

Students who are specially qualified will be allowed to modify the above courses.

(b) **SENIOR FREE PLACES.**—At the end of two years, Junior Free Place Students who have passed the examinations of the

College will be admitted as Senior Free Place Students, and provided they make satisfactory progress are eligible for a further term of **three** years' **free** tuition at the College. A student shall also be qualified to hold a Senior Free Place at the College if he (or she) has passed the Matriculation Examination, or the Civil Service Junior Examination, or the Special Examination for Senior Free Places held by the Education Department, or has qualified for an Education Board Senior Scholarship.

Every holder of a Senior Free Place must take up a **definite** course of technical instruction, which course shall be determined by the Director, due regard being given to the calling or profession which the student is following, or has in view.

FREE RAILWAY TICKETS.

Holders of Senior or Junior Free Places are granted Free Railway Tickets where necessary. Paying Students can obtain Railway Tickets at reduced rates (see page 131, New Zealand Railway Time Table).

CONTINUATION CLASSES.

For those students who are deficient in general education, and have not yet passed Standard VI. (or an equivalent examination), and who wish to obtain a Standard VI. Certificate of Proficiency, so as to eventually attend the Technical College free, Evening Continuation Classes will be held at the Normal School, Wellesley Street (see page 90).

FEES.

All Fees are payable in advance to the Director of Technical Education, at Rutland Street. Full particulars regarding the fees charged for the various subjects will be found under each subject, and on pages 86 to 89. **No Fees will be returned.**

COMPOSITION FEES.

A considerable reduction in fees is made to students taking **complete courses.** In the Art, Building Trades, Cabinetmaking, Commercial, Domestic, Electrical Engineering, Turning and Fitting, Painting and Decorating, Plumbing, and Tailoring Departments, the Composition Fees are:—Preliminary Course, £2; Elementary Course, £2 10s; Intermediate Course, £2 10s; Advanced Course, £3; Honours Course, £3 10s.

EXAMINATIONS AND CERTIFICATES.

Examinations in each subject are held at the end of the Session (November), and Certificates awarded to Successful Students.

Examinations are also held by the City and Guilds of London Institute in May, and by the Board of Education, London, in June, and students who are qualified are required to sit for these Examinations.

DISCIPLINE.

Students are requested to co-operate with the Teachers in maintaining perfect discipline in the various workshops, classrooms, cloakrooms, etc.

DIPLOMA OF THE COLLEGE.

The Diploma of the College will be granted, in either of the following Departments, to those students who attend at least three years at the College, and pass the prescribed examinations:—

Cabinetmaking,
Carpentry and Joinery,
Commerce,
Electrical Engineering,
Mechanical Engineering,
Plumbing,
Tailoring and Cutting.

Successful students will receive the title of **"Diplomé of the Auckland Technical College."** Full particulars regarding the examinations will be found under the several Departments.

INFECTIOUS AND CONTAGIOUS DISEASES.

No student coming from a house in which there is any infectious disease will be permitted to attend the College, nor will any student be allowed to return to College on recovery from illness of a dangerous character without a medical certificate.

Table showing periods of isolation and of quarantine required in the case of the following diseases:—

DISEASE.	Period of isolation required after suffering from the disease.	Quarantine after accidental exposure to infection, if disinfection be carried out at the commencement of Quarantine.
Chicken Pox ...	Until every scab has fallen off ...	For 19 clear days
Diphtheria ...	For at least 4 weeks	For 14 days
German Measles	For at least 10 days	For 22 clear days
Measles ...	For at least 3 weeks after rash has gone	For 19 clear days
Mumps ...	1 week after the subsidence of all swelling	For 25 clear days
Scarlet Fever ...	For at least 6 weeks	For 7 clear days
Small Pox ...	Until every scab has fallen off ...	For 20 clear days
Whooping Cough	For at least 5 weeks	For 14 clear days

THE SESSION.

The Session **commences on Monday, March 2nd, 1908,** and continues until November 27th, 1908, with the following exceptions:—A week's holiday at Midwinter and at Michaelmas, a few days at Easter, and the usual public holidays.

ADVICE TO INTENDING STUDENTS.

The Director will be at the College each day from 9.30 a.m. to 12 noon, and from 1.30 p.m. to 3 p.m., and on Wednesday, Thursday, and Friday, February 25th, 26th, and 27th, in the evenings from 7 p.m. to 9 p.m., to advise students as to the best courses to take up to suit their various requirements.

RULES FOR STUDENTS.

1. Before joining any class, you are required to consult the Director as to the most suitable course for you to take up.

2. See that you have your Admission Ticket before you attend any class, as the Instructor will not admit you without this.

3. You must provide yourself with all the necessary text books, note books, mathematical instruments, etc., which must be shown to the Instructor at the first meeting of the class. Students not so provided will be suspended from attendance at the classes.

4. You should be regular and punctual in your attendance; any student who is absent from a class more than **ten** minutes during any one lesson is, in accordance with the regulations of the Education Department, marked "**absent.**" Students who are compelled to leave a class early, in order to catch a boat or train, must obtain a Ticket from the Office in Rutland Street, **before 7 p.m.** Instructors will not allow students to leave without the production of such tickets.

5. Students must on no account leave the classroom or workshop without first obtaining permission from the Instructor of the Class.

6. When students under 19 years of age are absent from a class, they are required to bring to the **Instructor** at the **next** meeting of the class a written note from a parent or guardian stating the reason of the absence. Students failing to bring such excuses will not be re-admitted.

7. Smoking on any of the College Premises is strictly prohibited.

8. Students must work the Homework Exercises set at the various classes, and use the special Homework blocks prescribed by the Director.

9. The Examinations of the College are held yearly at the end of each session, and those of the City and Guilds of London Institute and of the London Board of Education, in June and July. Students who refuse to enter and sit for any of these Examinations, if requested to do so by their Instructors, will be suspended from attendance at the classes.

10. The work done by students during the session will count equally with that done at the Examinations at the end of the year. Thus, the marks awarded will be as follows:—

Possible percentage of marks obtainable during session, 100.

Possible percentage of marks obtainable at Examination, 100.

The whole of the practical work done during the session in such subjects as Plumbing, Cabinetmaking, Carpentry and Joinery, Turning and Fitting, etc., must be **produced** at the **end** of the session.

11. Any student who is reported to the Director for disorderly conduct or insubordination will be suspended from attendance at **all** classes until he has apologised for his misconduct to the Instructor before the class from which he was suspended. Any student reported a second time during the session will be expelled.

12. Any damage done to any of the College property, such as tools, machinery, etc., must be immediately reported to the Instructor of the class. When the cost of the repair of the damage has been ascertained, the student will be duly notified and required to pay the same.

13. Unpunctuality, irregularity of attendance, neglect of College or home work, or non-provision of text books, etc., will be considered by the Director sufficient reason for the suspension of students from the College.

Domestic Science Department.

Chief Instructor.—Miss Emily Lawson, Diplomée in Cookery, Laundrywork, Dressmaking, and Housewifery; late of the National Training School of Cookery, London.

The Domestic Science Course aims at giving students a sound foundation in the different branches of household work, such as Cookery, Dressmaking, Laundrywork, and Millinery, and at awakening their interest in the important questions of sound bodies, wholesome dwellings, and real homes.

The Cookery Kitchen, which is situate at the Newton Manual Training School, Upper Queen Street, has been fitted up on up-to-date lines, and is probably the finest in Australasia. One end of the room is provided with a gallery for demonstration purposes, and the other end with tables for practical work. The Practising Tables are fitted with every convenience, including gas burners for simmering, boiling, etc. A Fletcher's Gas Stove and an "Orb" Range for wood or coal fire also form part of the equipment.

A thoroughly up-to-date Laundrywork equipment has been provided in the Cookery Kitchen.

Room No. 12 at the Strand Arcade has been specially fitted up for the teaching of Dressmaking and Millinery. It is well provided with drafting tables, sewing machines, etc.

HOUSEHOLD COOKERY.

Class meets—From 7 p.m. to 9.30 p.m. on Mondays or on Thursdays, in the Cookery Kitchen, at the Newton Manual Training School, Upper Queen Street.

Instructor ... ... Miss Emily Lawson.

The object of this course is to impart a thoroughly sound knowledge of the principles and practice of household cookery. At each class the Instructor prepares and cooks the various dishes during the first hour of the lesson, and she will also lecture on the principles involved; during the last hour and a-half the students cook the same dishes, using the notes and recipes they obtained from the previous demonstration.

SYLLABUS.

The course will include: The effect of heat on water. Use of the Thermometer. The effect of heat on air. Management of coal and gas stoves. Choice and care of utensils. Marketing and care of larder. Selection of good meat, fish, and vegetables. Economy in cooking. Adaptation of food to varying circumstances. Making of stocks and vegetable soups. Baking, roasting, boiling, stewing, frying, broiling, and grilling. Preparation of various puddings—baked, boiled, and steamed. Pastry, bread, and cake making. Cooking of vegetables. Vegetarian dishes. Re-cooking of cold meat. Various ways of preparing fish. Invalid cookery. Jellies and sauces. Jam making. Marmalade. Bottling of fruits. Pickles. Salting of meat.

Note.—At the Practice Classes each student pays for cost of raw material used, and is at liberty to take away all dishes cooked by her.

Fees.—For either Class (Monday or Thursday), for the Session, £1 5s.

Text Book.—The Polytechnic Cookery Book, by Mitchell, 2s.

PRINCIPLES AND PRACTICE OF DRESSMAKING.

ELEMENTARY OR FIRST YEAR'S COURSE.

Morning Class meets—From 10 a.m. to 12 noon on Wednesdays, in Room No. 12, Strand Arcade.

Afternoon Class meets—From 2.30 p.m. to 4.30 p.m. on Tuesdays, in Room No. 12, Strand Arcade.

Evening Classes meet—From 7 p.m. to 9 p.m. on Tuesdays or Fridays, in Room No. 12, Strand Arcade.

Instructor ... ... Miss A. Campbell.

SYLLABUS.

The course of instruction will include:—

(1.) The different parts of a dress bodice, including the sleeve and collar; how put together and finished off.
(2.) The linings most suitable for such materials as Velvet, Serge, and Silk, and the points to be noted in tacking linings to these materials.
(3.) The calculation of the quantity of material of various widths required for a dress, and the cost of the dress, including material, lining, making, and finishing.
(4.) The methods of fastening a dress, the use of whalebone in dress bodices, and substitutes therefor.
(5.) The various stitches used in dressmaking, and their application to the material.
(6.) The drafting of the diagram of a plain gored skirt, and the method of making, mounting, facing, and braiding the same.
(7.) The drafting of the diagram of a dress bodice and sleeves, showing how the various parts of the same should be cut from material of given width.
(8.) The fixing of the parts of a bodice ready for sewing, and mode of fitting a bodice to a given figure.
(9.) The simple methods of trimming and preparation of the same.

Specimen Work.—Each student will be required, during the Session, to make up a tight-fitting dress (bodice and skirt), and to complete the same in all particulars, and also to work a sampler showing the various stitches used in dressmaking, fastenings, buttonholes, etc.

Fees.—For either Class (Tuesday, Wednesday, or Friday), £1 5s 0d for the Session.

Text Books.—(1.) Dresscutting, Drafting, and French Pattern Modelling, by Miss Prince-Browne, 2s 6d.
(2.) The Practical Work of Dressmaking and Tailoring, by Miss Prince-Browne, 2s 6d.

ADVANCED OR SECOND YEAR'S COURSE.

Class meets—From 7 p.m. to 9 p.m. on Wednesday evenings, in Room No. 12, Strand Arcade.

Instructor ... ... Miss A. Campbell.

SYLLABUS.

The course of instruction will comprise advanced cutting and fitting, and the drafting, cutting out, and making up of garments other than the standard close-fitting dress (as blouses, coatees, dressing gowns, princess robes, cycling skirts, etc.), with the differences in making up and finishing required by the differences of style.

The course also aims to give students increased facility in copying fashion plates, and in following new designs. It will also cover cutting out by measurement, and making up by high-class tailor methods of coat-and-skirt costumes for ladies and girls, with special attention to the fine finish which distinguishes tailor work.

As a rule, students will be expected to have passed the examination of the Elementary Course before joining this course, but any others whom the teacher considers sufficiently qualified to profit by the instruction given will be admitted.

Specimen Work.—Each student will be required to make, during the Session, a complete tailor-made costume, and also to work a sampler showing the various stitches used in tailoring, fastenings, buttonholes, etc.

Fee.—£1 5s 0d for the Session.

Text Books.—(1.) Dresscutting, Drafting, and French Pattern Modelling, by Miss Prince-Browne, 2s 6d.
(2.) The Practical Work of Dressmaking and Tailoring, by Miss Prince-Browne, 2s 6d.

LAUNDRYWORK.

ELEMENTARY OR FIRST YEAR'S COURSE.

Class meets—From 7 p.m. to 9 p.m. on Tuesdays, in the Cookery Kitchen at the Newton Manual Training School, Upper Queen Street.

Instructor ... ... Miss Emily Lawson.

SYLLABUS.

The Theoretical portions dealt with will include:—Materials used, such as soap, starch, soda, borax, and water. Choice, care, and price of utensils. Washing, ironing, and "getting up" of linen, cotton, and flannel garments. The Practical Work will embrace:—Washing of flannels (white and coloured), woollen stockings. Washing and ironing pocket handkerchiefs (plain and fancy). Washing of prints. Making hot starch. Setting and reviving colours. Ironing a blouse. Washing and ironing of body linen. Washing and ironing table linen. Removing stains—e.g., tea, coffee, wine, fruit, etc. Making cold starch. Ironing and polishing collars and cuffs. Washing of silks, laces, and muslins.

Note.—Students will require to bring soiled linen, flannel, cotton, and other garments for their own practice at the Class.

Fee.—£1 0s 0d for the Session.

Text Book.—The Art and Practice of Laundrywork, by Miss M. C. Rankin, 2s 6d.

MILLINERY.

Afternoon Class meets—From 2.30 p.m. to 4.30 p.m. on Mondays, in Room No. 12, Strand Arcade.

Evening Class meets—From 7 p.m. to 9 p.m. on Mondays, in Room No. 12, Strand Arcade.

Instructor ... Madame "Marion," late of Madame Valerie's, New Burlington Street, London.

SYLLABUS.

(1.) (a) Materials suitable for various kinds of shapes. (b) Materials suitable for covering different shapes.
(2.) Methods of taking (a) measurements and (b) patterns of hat and bonnet shapes.
(3.) Methods of (a) cutting out and (b) making up net, buckram, or sparterie shapes.
(4.) Methods of making (a) wire shapes, (b) drawn shapes, (c) covering buckram shapes.
(5.) Terms peculiar to millinery, and the various stitches involved in the manipulation of lace, velvet, wire, crepe, etc.; also the renovation of various millinery materials.
(6.) (a) Approximate statement of quantities and cost of hats and bonnets of given style and construction. (b) Suggestions for making and trimming a given hat or bonnet.
(7.) Methods of (a) lining and binding hats according to current fashions; (b) cutting materials on cross, corner, straight, or to shape; (c) making up bows, rosettes, and other general forms of trimming. The making up of children's hats and bonnets in velvet, silk, or cloth.

Note.—Students will be required to provide their own material, and all work done by them will become their own property.

Fee.—For either Class (afternoon or evening), £1 5s 0d for the Session.

Text Book.—Millinery, Theoretical and Practical, by C. Hill (Methuen), 2s 6d.

ENGLISH.

PRELIMINARY GRADE FOR JUNIOR FREE PUPILS.

Class meets—From 8.15 p.m. to 9.30 p.m. on Wednesdays, at the Normal School, Wellesley Street.

Instructor ... .. ALFRED J. C. HALL.

SYLLABUS.—(See page 18.)

PRACTICAL MATHEMATICS.

PRELIMINARY GRADE FOR JUNIOR FREE PUPILS.

Class meets—From 7 p.m. to 8.15 p.m. on Wednesdays, at the Normal School, Wellesley Street.

Instructor ... ... ALFRED J. C. HALL.

SYLLABUS.—(See page 36.)

HYGIENE.

Class meets—From 6.45 p.m. to 7.45 p.m. on Mondays, at the Technical College, Rutland Street.

Instructor ... GEORGE P. DARNELL-SMITH, B.Sc, F.I.C., F.C.S.

SYLLABUS.—(See page 83.)

Fee.—For Hygiene and Physiology combined (see below) £1 5s 0d for the Session.

HUMAN PHYSIOLOGY.

Class meets—From 7.30 p.m. to 8.50 p.m. on Mondays, at the Technical College, Rutland Street.

Instructor ... GEORGE P. DARNELL-SMITH, B.Sc, F.I.C., F.C.S.

SYLLABUS.—(See page 83.)

Fee.—For Physiology and Hygiene combined (see above), £1 5s 0d for the Session.

COMPOSITION FEES.

For any **two** of the above subjects (Cookery, Dressmaking, Laundrywork, Millinery, and Hygiene with Physiology), £2; for any **three**, £3.

TIME TABLE OF DOMESTIC COURSE FOR JUNIOR FREE PUPILS.

Subject.		When Held.	Where Held.
English		Wednesday, 8.15—9.30	Normal School, Wellesley Street
Practical Mathematics		Wednesday, 7—8.15	
Household Cookery	Any two	Monday or Thursday, 7—9.30	Cookery Room, Newton
Laundrywork		Tuesday, 7—9	Manual Training School
Dressmaking		Tuesday or Friday, 7—9, or Tuesday, 2.30—4.30, or Wednesday, 10—12	Room No. 19, Strand Arcade
Millinery		Monday, 2.30—4.30, or Monday, 7—9	

Department of Commerce.

Chief Instructor ... JOHN PAYNE, formerly of Smart's Commercial College, Manchester.

In order to provide a practical commercial training for persons of either sex who have left school, and who are either preparing to enter, or who have already entered upon a business career, a course of study, extending over a period of at least five years, and embracing the most important commercial subjects, has been arranged.

A full year's course entails attendance for three evenings per week during the Session (about 36 weeks). It is not absolutely essential that a student should take all the subjects embraced in a full year's course in the same Session; the number taken up will, of course, depend upon the amount of time at his (or her) disposal. In some cases it will be necessary for a student to extend the one year course over a period of two Sessions.

The subjects taken up in each year are shown in the following table:—

Preliminary or First Year.	Elementary or Second Year.	Intermediate or Third Year.	Advanced or Fourth Year.	Final or Fifth Year.
Commercial Arithmetic	Commercial Arithmetic	Book-keeping	Book-keeping	Accountancy
Commercial Geography	Commercial Geography	Business Methods and Office Routine	Business Methods and Office Routine	Economics
English, including Composition and Handwriting	English, including Composition and Handwriting	French or German	French or German	Mercantile Law
Commercial Correspondence and Précis Writing	Commercial Correspondence and Précis Writing	Shorthand or Typewriting	Banking	Actuarial Mathematics
Shorthand or Typewriting	Shorthand or Typewriting or Book-keeping			Commercial Products

Examinations are held at the end of each year's work (December), and Certificates are granted to successful students. It is intended that the standard required for passing the various examinations shall be a high one, and that each Certificate shall be a record, not merely stating that the holder has passed an examination, but also of the degree of proficiency attained, so that the Certificates issued under the above scheme shall be recognised by the community as having a very high value.

DIPLOMA IN COMMERCE.—The Diploma of the College, in Commerce, will be granted to students who obtain Certificates for each of the five-year courses. The Auckland Chamber of Commerce has agreed to recognise these Certificates and Diplomas, and in making appointments in their respective offices, other things being equal, its members will give preference to applicants holding the College Certificates.

MEDALS.—The Chamber has also agreed to award two gold medals annually to the male and to the female student respectively who obtains the highest marks at the final examinations.

COMMERCIAL ARITHMETIC.

PRELIMINARY OR FIRST YEAR'S COURSE.

Class meets—From 7 p.m. to 8.15 p.m. on Wednesdays, at the Normal School, Wellesley Street.

Instructors ... WILLIAM KAY AND NORMAN H. S. LAW.

SYLLABUS.

Students will be taught to work examples in:—Practice, Proportion, Interest, and in the finding of Areas and Volumes; the use of short methods of multiplication and division, and approximations will be taught; also the more common use of the Metric System in commerce. Conversion of the more common Weights and Measures. Speed and Accuracy tests of long additions and cross additions will also be given. Special attention will be given to mental calculations.

Fee.—15s for the Session.

Text Book.—Oliver and Boyd's Commercial Arithmetic, 1s.

ELEMENTARY OR SECOND YEAR'S COURSE.

Class meets—From 7 p.m. to 8.15 p.m. on Mondays, at the Normal School, Wellesley Street.

Instructor ... ... WILLIAM KAY.

SYLLABUS.

Fundamental rules, vulgar and decimal fractions, approximations, proportion, percentages (including interest, profit and loss), stocks, square root, cube root of numbers reducible to prime factors not greater than eleven, metric system, areas of plane rectilinear figures and of circles, mensuration of the prism, pyramid, sphere, circular cylinder, and circular cone.

The use of algebraical symbols and processes and of graphical methods.

Note.—This course will fit students for the Junior Civil Service Examination in Arithmetic.

Fee.—15s for the Session.

Text Book.—Oliver and Boyd's Commercial Arithmetic, 1s, or Grant and Hill's Commercial Arithmetic, 3s 6d.

COMMERCIAL GEOGRAPHY.

PRELIMINARY OR FIRST YEAR'S COURSE.

Class meets—From 7 p.m. to 8.15 p.m. on Tuesdays, at the Normal School, Wellesley Street.

Instructors ... ROBERT H. PATERSON AND FRANCIS H. BROWN.

SYLLABUS.

This course, which will be illustrated by Lantern Slides, Maps, Charts, etc., will embrace the following:—Maps and map projection. Climate. The waters and the winds. Mankind, language and religion. Forms of society. Conditions of labour and trade. Means of communication by road, river, railway, post, telegraph, telephone, etc. Distribution of food products, raw materials, manufactured goods, etc., over the surface of the globe. Conditions under which goods are produced, localities of production, quantities available for export, etc. Colonisation. Capacities of English Colonies. e.g., South Africa. Study of New Zealand and Australian commerce. Trade routes, harbours, ports, coaling stations, etc.

Note.—This course covers the work prescribed for the Junior Civil Service Examination in Geography.

Fee.—15s for the Session.

Text Book.—Pitman's Commercial Geography of the World, 2s 6d.

ELEMENTARY OR SECOND YEAR'S COURSE.

Class meets—From 8.15 p.m. to 9.30 p.m. on Thursdays, at the Normal School, Wellesley Street.

Instructor ... ... ROBERT H. PATERSON.

SYLLABUS.

The chief industries of the United Kingdom and their local centres, with the geographical reasons for such location. The leading foreign and colonial sources of our raw material, together with geographical reasons for the production of each article in its locality. The chief markets for our exports, with the reasons for this commercial intercourse. The producing and distributing of commercial commodities, especially food and foodstuffs, raw and manufactured products, and minerals; the various facilities for trade and hindrances to trade. The course will have special reference to Great Britain, to New Zealand, to Australia and the Pacific Islands, and to America, dealing with the chief geographical and local conditions under which commodities are produced and distributed, with the chief trade routes and means of transit, with currencies, with social and political conditions affecting or likely to affect trade with New Zealand, with ports or harbours, coaling stations, the chief post and telegraph routes, the distribution of population, of minerals, of forests, and of vegetable products; the necessary conditions of development in manufactures, agriculture, and commerce; the distribution of industries, the distribution of forests and of the main timber trees, the distribution of density of population, railway routes and trade lines, routes

by sea to countries with which most trade is done. Students will receive instruction as to what special inducements are offered by the Government of New Zealand to different trades, and what exports and imports are carried on under special Government supervision or regulation.

Note.—This course will cover the Senior Civil Service and Teachers' "C" Examinations in Commercial Geography.

Fee.—15s for the Session.

Text Book.—Pitman's Commercial Geography of the World, 2s 6d.

ENGLISH.

PRELIMINARY OR FIRST YEAR'S COURSE.

Class meets—From 8.15 p.m. to 9.30 p.m. on Wednesdays, at the Normal School, Wellesley Street.

Instructors ... WILLIAM KAY AND NORMAN H. S. LAW.

SYLLABUS.

Commercial handwriting. Spelling. Paraphrasing. Punctuation. Parsing and analysing. The elements of English grammar, particularly in relation to composition. Writing of essays and simple commercial letters. English literature.

Fee.—15s for the Session.

Text Books.—Nesfield's Manual of English Grammar and Composition, 2s 6d.
Logie Robertson's English Prose, Part II., 2s 6d.
Goldsmith's Deserted Village and Traveller, 2d.
Pitman's Business Handwriting, 1s.

ELEMENTARY OR SECOND YEAR'S COURSE.

Class meets—From 8.15 p.m. to 9.30 p.m. on Mondays, at the Normal School, Wellesley Street.

Instructor ... ... WILLIAM KAY.

SYLLABUS.

As in the Preliminary Course, but of a more advanced nature. Special attention will be given to handwriting and composition.

Note.—This course is suitable for candidates for Junior Civil Service and Matriculation Examinations.

Fee.—15s for the Session.

Text Books.—Nesfield's Manual of English Grammar and Composition, 2s 6d.
Washington Irving's Sketch Book (Bell), 1s 6d.
Goldsmith's Deserted Village and Traveller, 2d.
Pitman's Business Handwriting, 1s.

COMMERCIAL CORRESPONDENCE AND PRECIS WRITING.

PRELIMINARY OR FIRST YEAR'S COURSE.

Class meets—From 8.15 p.m. to 9.30 p.m. on Tuesdays, at the Normal School, Wellesley Street.

Instructors ... ROBERT H. PATERSON AND FRANCIS H. BROWN.

SYLLABUS.

Elements of composition. Essays on commercial subjects. The setting out of a letter. Commencing and ending letters. Addressing envelopes. First steps in commercial correspondence. Composing short letters on different subjects. The making out of simple business forms, such as order notes, invoices, statements, receipts. Common abbreviations used in correspondence. The fair copying of invoices, market reports, list of prices, etc. Drafting of advertisements, circulars, prospectuses, etc. Postal and telegraph regulations, etc. Methods of copying and filing correspondence, etc. Simple précis writing, etc.

Fee.—15s for the Session.

Text Book.—Pitman's Commercial Correspondence and English, 2s 6d.

ELEMENTARY OR SECOND YEAR'S COURSE.

Class meets—From 7 p.m. to 8.15 p.m. on Thursdays, at the Normal School, Wellesley Street.

Instructor ... ... ROBERT H. PATERSON.

SYLLABUS.

Commercial Correspondence.—

(1.) Plenty of practice will be given in letter writing, both from notes and without. Special attention will be paid to setting-out and to correct punctuation.

(2.) Candidates will be made thoroughly familiar with the more important Postal and Telegraph Regulations, and with methods of copying and filing correspondence.

Précis Writing.—

(1.) At the examination, candidates will be furnished with a printed copy of correspondence (usually on some subject of general public interest), and will be required—
  (a) To make a short Abstract, Schedule, or Docket of the several letters or other papers;
  (b) To draw up a Memorandum or Précis, i.e., a brief and clear statement of what passed, not letter by letter, but in the form of a narrative.

(2.) The object of the Abstract, Schedule, or Docket is to serve as an Index. It should contain the date of each letter, the names of the persons by whom and to whom it was written, and, in as few words as possible, the subject of it. The merits of such an Abstract are: (a) To give the really important point or points of each letter, omitting everything else; (b) to do this briefly; (c) distinctly; and (d) in such a form as to readily catch the eye.

(3.) The object of the Memorandum or Précis is to convey to the reader a complete history in a narrative form of the circumstances and events to which the correspondence relates in such a manner as to put him readily in possession of all the essential facts.

(4.) Clear and neat handwriting, and clearness and conciseness of expression are essential to success.

Note.—This course covers the work prescribed for the Senior Civil Service Examination in Commercial Correspondence and Précis Writing.

Fee.—15s for the Session.

Text Books.—Pitman's Commercial Correspondence and English, 2s 6d.
Précis Writing, by Jackson and Briggs, 2s 6d.

TYPEWRITING.

PRELIMINARY OR FIRST YEAR'S COURSE.

Class meets—From 7 p.m. to 9.30 p.m. on Thursdays, at the Technical College, Rutland Street.

Instructor ... ... Miss M. H. Cook.

The Typewriting Department has been equipped with forty (40) of the most successful "Visible" Typewriters, including twenty-seven (27) "Monarchs," each machine being fitted to a special American pattern typewriting desk (see opposite page). The department is also equipped with four Commercial Graphophones, which are used for speed practice, and also to familiarise the students with the use of these machines in commerce.

Instruction will be given in the mechanism and the correct fingering of the typewriter. The students, having learned to use **all the fingers of both hands,** will be introduced to the "touch" method. That is to say, they will be taught to manipulate the keys of the typewriter **without looking at the fingers.** By this method a considerable speed is soon gained by the operator, as he (or she) is able to read the manuscript or shorthand copy at the same time that the process of typewriting is going on.

SYLLABUS.

1. Theory Paper.—To include simple questions, covering: The manipulation of the keyboard; uses of characters, signs, etc.; care of the machine; punctuation, etc.

2. Practical Test.—To compose and type a commercial letter from notes given; from particulars given, to type in business form an invoice statement or debit note; to type for fifteen minutes from printed matter consisting of about 375 words (25 words per minute).

Fee.—£2 for the Session.

Text Book.—Mosher's Touch Method of Typewriting, 5s.

TYPEWRITING ROOM.

ELEMENTARY OR SECOND YEAR'S COURSE.

Class meets—From 7 p.m. to 9.30 p.m. on Fridays, at the Technical College, Rutland Street.

Instructor ... ... JOHN PAYNE.

SYLLABUS.

1. Theory Paper.—To include simple questions, covering: The manipulation of the keyboard, i.e., fingering, touch, even-timed depressions, etc., uses of characters, combination signs, and spacing for punctuation marks; care of the machine; the capitalising, punctuating, and paragraphing of a short printed passage; centring of headlines; easy commercial terms and abbreviations; press-copying, including indexing and cross-referencing of the letter-book.

2. Practical Test.—To type a commercial letter in correct style from an easy manuscript containing mis-spellings, etc.; to copy an invoice, estimate, or account sales from printed or manuscript copy; and to type for fifteen minutes from printed matter consisting of about 600 words (40 words per minute).

Fee.—£2 for the Session.

Text Book.—Mosher's Touch Method of Typewriting, 5s.

SHORTHAND.

PRELIMINARY OR FIRST YEAR'S COURSE.

Class meets—From 7 p.m. to 9.30 p.m. on Mondays, at the Technical College, Rutland Street.

Instructor ... ... MISS M. H. COOK.

SYLLABUS.

This course is designed for beginners in the subject, the work to be covered being that dealt with in Pitman's Teacher.

Fee.—£1 10s 0d for the Session.

Text Books.—Pitman's Teacher, 6d; Pitman's Shorthand Budget, 6s.

ELEMENTARY OR SECOND YEAR'S COURSE.

Class meets—From 7 p.m. to 9.30 p.m. on Tuesdays, at the Technical College, Rutland Street.

Instructor ... ... JOHN PAYNE.

SYLLABUS.

This course is intended for students who have obtained a thorough knowledge of Pitman's Teacher. The work to be covered is that dealt with in Pitman's Instructor.

Fee.—£1 10s 0d for the Session.

Text Books.—Pitman's Instructor, 3s 6d; Pitman's Shorthand Budget, 6s.

INTERMEDIATE OR THIRD YEAR'S COURSE.

Class meets—From 7 p.m. to 9.30 p.m. on Tuesdays, at the Technical College, Rutland Street.

Instructor ... ... JOHN PAYNE.

SYLLABUS.

Speed.—Students who have a sound knowledge of Pitman's Instructor will receive speed practice on carefully-selected matter, which will be dictated by the Instructor, and also by the Commercial Graphophones, which have been installed in the College.

Fee.—£1 10s 0d for the Session.

Text Book.—Pitman's Instructor, 3s 6d.

BOOKKEEPING.

ELEMENTARY OR FIRST YEAR'S COURSE.

Class meets—From 7 p.m. to 9 p.m. on Wednesdays, at the Technical College, Rutland Street.

Instructor ... ... JOHN PAYNE.

The matter dealt with in the Book-keeping Classes is of a thoroughly practical nature, and the detail handled is exactly that of which the student requires a sound knowledge in commercial practice. The Instructor has written Book-keeping Papers suitable for the requirements of the various grades, and these papers, based upon the practical experience of an Accountant and Auditor of some years' standing, form the subject matter of the classes.

SYLLABUS.

The beginner is taught the purpose of the various books used in a simple set. The object and value of book-keeping. Journalising in the old style. Old style journalising the true basis of a knowledge of Double-entry book-keeping. Single and Double-entry compared. Double-entry may be used in any business, no matter how small. Entering the Day Book or Sales Journal. Invoicing. Checking Invoices and entering the totals in the Invoice Book or Purchases Journal. Entering and balancing simple Cash Books and Cash Books ruled in columns. Journalising the items for which no other book is provided. Opening a small set of books on the Double-entry system. Assets and Liabilities. Difference of Assets and Liabilities. Capital at date of opening. Journalising the Opening Balance Sheet. The difference between "entering" and "posting." Posting the Ledger. Ruling up the Ledger. Taking out the Monthly or Trial Balance. The object of "calling over" the postings. "Calling over" part of the daily routine. The elements of a merchant's Trading Account. The difference between a manufacturer's Trading Account and a merchant's Trading Account. Gross Profit. The Profit and Loss Account. Net Profits. Making out the Balance Sheet. How to ascertain the profit of a business (or the loss) without keeping books at all.

Note.—This course covers the syllabus for the Junior Civil Service Examination in Book-keeping.

Fee.—£1 10s 0d for the Session.

INTERMEDIATE OR SECOND YEAR'S COURSE.

Class meets—From 7 p.m. to 9 p.m. on Thursdays, at the Technical College, Rutland Street.

Instructor ... ... JOHN PAYNE.

This course is intended for students who have passed through the Elementary Book-keeping Course of the College, or who already have some elementary knowledge of the science of book-keeping.

SYLLABUS.

Opening a set of books on Double-entry principles, with a Cash Book showing accounts and sundry items paid away by cash as well as by cheque. An Invoice Book ruled in columns. The object of the Invoice Book ruled in columns. A simple Day Book. Bills Receivable and Bills Payable. Bills Discounted. Bills Dishonoured. Balancing the Ledger each month. Taking out an Interim Statement of Accounts and Balance Sheet. The Annual Balance Sheet. Trading and Profit and Loss Accounts made up. Making up the Accounts of a manufacturing business. Partnership Accounts. Opening a set of Books on Double-entry principles for a partnership. An advanced form of Cash Book used, in which all cash received is banked, and all cash paid is paid by cheque. A Petty Cash Book not kept on the "Imprest" system. The "Imprest" system compared with a system used by the principal business houses. Department columns in Day Books and Invoice Books. Writing off bad debts. Contingent Assets and Liabilities at date of making up the Balance Sheet. Adjusting the Partnership Accounts. Papers on Partnership Adjustments. Papers on making up Statements of Accounts and Balance Sheets.

Fee.—£1 10s 0d for the Session.

ACCOUNTANCY.

This course has been instituted for students who are studying for the various Accountancy Examinations held in the Dominion. Students should be at least 18 years of age, and have received a preliminary training in Book-keeping.

Class meets—From 7 p.m. to 9 p.m. on Mondays, at the Technical College, Rutland Street.

Instructor ... ... JOHN PAYNE.

SYLLABUS.

A short paper on the Accounts of a merchant using a Single Ledger. Making up the Trading Account and Profit and Loss Account. Providing for Contingent Assets and Contingent Liabilities. Writing off Bad Debts. Settling Accounts by Promissory Notes and Bills involving the journalising of Discounts and Interest. Joint Venture Accounts. An independently-balancing Ledger scheme of Double-entry, involving the use of the following books:—5 Ledgers, 3 Cash Books, 3 Day Books, 1 Invoice Book, 2 Journals, 2 Returns Books, 1 Reconciliation Book, 1 Bank Pass Book. In opening the books on this independently balancing scheme, the student converts the particulars of the amalgamation of two firms into Limited Company form. The opening accounts of a Limited Company are thus illustrated. The Company Secretary's duties and his requirements as to the practical application

of the Companies Act (1903). Penalties on non-compliance with the Act. Writing up the Share Register. Making out and issuing the Share Certificates. The Act reviewed. Provisions for the protection of Creditors. The Rights and Duties of Auditors. Writing up the Minute Book. An Interim Dividend with Statement of Accounts and Balance Sheet. Dealing with Bills. Discounting. Bills dishonoured. Bills met. Entering Bill items from the Bank Pass Book into the Cash Books. Suspense Accounts. Consignment Accounts and a common-sense method of dealing with them. Costing. Special Books for Special Purposes. Papers on Partnership Adjustments. Trustee Accounts. Percentages. Amalgamating two Companies. How the Act applies. Formation of a Private Company. Provisions of the Act relating to Private Companies. Dealing with Dividends. Office Routine. Checks on accuracy. Practical hints on Ledger-keeping. The Loose-leaf Ledger. The Card Ledger. The simplest style of Ledger ruling possible. A Ledger ruled up at the end of the month in one-third of the time taken by the old method.

Fee.—£1 10s 0d for the Session.

FRENCH.

Class meets—From 7 p.m. to 9 p.m. on Wednesdays, at the Technical College, Rutland Street.

Instructor ... H. Bruce Wallace, M.A.

SYLLABUS.

The class will be conducted on the most up-to-date method—the "Natural" or "Direct" method. With this method, students soon begin to think in the foreign language, and every effort is made to induce them to join in conversation, the mother tongue being abolished as much as possible. Special attention is paid to pronunciation and correct composition.

Fee.—£1 5s 0d for the Session.

Text Books.—Dent's First French Book, 2s; Kron's French Daily Life (for Advanced pupils), 2s 6d.

COMPOSITION FEES.

For Preliminary or First Year's Course, £2.

For Elementary or Second Year's Course (English, Commercial Arithmetic, Commercial Geography, and Commercial Correspondence), £2 10s 0d; with Book-keeping, Typewriting, or Shorthand in addition, £3.

TIME TABLE OF COMMERCIAL COURSE FOR JUNIOR FREE PUPILS.

Subject.	When Held.	Where Held.
English	Wednesday, 8.15—9.30	Normal School, Wellesley Street
Commercial Arithmetic	,, 7—8.15	
,, Geography	Tuesday, 7—8.15	
,, Correspondence	,, 8.15—9.30	
Shorthand	Monday, 7—9.30	Technical Coll., Rutland St.
or Typewriting	Thursday or Friday, 7—9.30	

Civil Service Department.

Junior Examinations.

The Junior Examination is held in December of each year. Candidates must be not less than 15, nor more than 21 years of age, on the 1st of December nearest the examination. The subjects of examination are:—English and Arithmetic, with **one** or more of the following:—Geography, Elementary Mechanics, Heat and Light, Magnetism and Electricity, Elementary Chemistry, Elementary Geology, Elementary Botany, Elementary Zoology, Elementary Physiology, Elementary Physical Measurements, Elementary Practical Agriculture, Elementary Mathematics, Greek, Latin, French, German, Italian, Spanish, Maori, English History, Shorthand, Book-keeping and Commercial Correspondence, and Drawing

Students who intend to sit for this examination will be admitted to as many of the College classes as the time-table will admit, for a **Composition Fee of £3.**

ENGLISH.

(See English, Elementary Course, p. 18.)

ARITHMETIC.

(See Commercial Arithmetic, Elementary Course, p. 16.)

GEOGRAPHY.

(See Commercial Geography, Preliminary Course, page 17.)

ELEMENTARY MATHEMATICS.

(See Practical Mathematics, Second Grade, page 36.)

MAGNETISM AND ELECTRICITY.

(See page 31.)

ELEMENTARY PHYSIOLOGY.

(See Human Physiology, page 83.)

ELEMENTARY PHYSICAL MEASUREMENTS.

(See Science, page 39.)

FRENCH.

(See page 24.)

SHORTHAND.

(See Intermediate Course, page 22.)

BOOK-KEEPING.

(See Elementary Course, page 22.)

DRAWING.—FREEHAND, MODEL, BLACKBOARD, AND BRUSH.

(See Art Department, page 81.)

DRAWING—GEOMETRICAL.

(See Practical Geometry, First Grade, page 55.)

TIME TABLE FOR JUNIOR CIVIL SERVICE CLASSES.

Monday.	Tuesday.	Wednesday.	Thursday.	Friday.
Commercial Arithmetic, 7—8.15 Commercial English, 8.15—9.30 Physiology, 7.50—8.50	Commercial Geography, 7—8.15 Shorthand, 7—9.30 Elementary Mathematics, 7—9.30	French, 7—9 Book-keeping, 7—9 Geometry, 7—9.30	Magnetism and Electricity, 7—10 Physical Measurements, 8.15—9.45 Elementary Mathematics, 7—9.30	Drawing, 6.45—9.15

Senior Examinations.

The Senior Examination takes place in January of each year. Précis Writing and Correspondence, and English Language and Literature are compulsory subects, whilst candidates must take not **less** than **four,** not **more** than **five,** of the following subjects:—Greek, Latin, French, German, Italian, Spanish, Maori, Arithmetic and Algebra, Geometry and Trigonometry, Mechanics and Hydrostatics, Heat and Light, Magnetism and Electricity, Chemistry, Physiography, Geology, Zoology, Botany, Physiology and the Structure of the Body, Hygiene, General Agriculture, Agricultural Chemistry, Agricultural Zoology, Agricultural Botany, General History, English Constitutional History, Economics, Economic History, Commercial Geography, Jurisprudence, Contracts, Real and Personal Property, Criminal Law and Torts, Industrial Law, Life and Accident Insurance Law, Principles of Life Insurance, Life and Accident Insurance Book-keeping, Elementary Actuarial Mathematics, Statistical Method, Applied Mechanics, Machine Construction and Drawing, Building Construction, Mining, Dairy Work, Accounting, Shorthand.

A number of the subjects required for the examination are taught at the College. An **inclusive fee of £3** for the Session will be charged for as many subjects as the student selects.

PRÉCIS WRITING AND COMMERCIAL CORRESPONDENCE.

(See Commercial Correspondence, Elementary Course, page 19.)

ENGLISH LANGUAGE AND LITERATURE.

(See English, Elementary Course, p. 18.)

FRENCH.

(See page 24.)

ARITHMETIC AND ALGEBRA.

(See Practical Mathematics, Third Grade, page 36.)

GEOMETRY AND TRIGONOMETRY.

(See Practical Mathematics, Third Grade, page 36.)

MAGNETISM AND ELECTRICITY.

(See page 31.)

PHYSIOLOGY.

(See Human Physiology, page 83.)

HYGIENE.

(See page 83.)

COMMERCIAL GEOGRAPHY.

(See Commercial Geography, Elementary Course, page 17.)

APPLIED MECHANICS.

(See Applied Mechanics, Second Grade, page 43.)

MACHINE CONSTRUCTION AND DRAWING.

(See Machine Construction and Drawing, Second Grade, page 46.)

BUILDING CONSTRUCTION AND DRAWING.

(See Building Construction and Drawing, Second Grade, page 63.)

ACCOUNTING.

(See Accountancy, page 23.)

SHORTHAND.

(See Shorthand, Speed, page 22.)

TIME TABLE FOR SENIOR CIVIL SERVICE CLASSES.

Monday.	Tuesday.	Wednesday.	Thursday.	Friday.
Hygiene, 6.45—7.45 Physiology, 7.50 - 8.50 Accountancy, 7—9 Commercial English, 8.15—9.30	Shorthand, 7—9.30 Arithmetic and Algebra, 8 - 10 Geometry and Trigonometry, 8—10	French, 7 - 9 Applied Mechanics, 7—9.30 Building Construction and Drawing, 7—9.30	Précis Writing and Commercial Correspondence 7—8.15 Commercial Geography, 8.15—9.30 Magnetism and Electricity, 7—10	Machine Construction and Drawing, —9.30

The New Zealand University

Matriculation Examination.

The Matriculation Examination of the New Zealand University is held annually in December. The subjects of the examination are as follows:—English, Arithmetic, Algebra, Geometry, Latin, Greek, French, German, History, Geography, Elementary Mechanics, Sound, Light and Heat, Electricity and Magnetism, Chemistry, Zoology, Botany, Music, and Drawing. Of these, every candidate is required to pass in at least seven subjects, except those who take Latin or Greek, who are required to pass in six subjects only. Every candidate must pass in English, Arithmetic, and at least one of the following languages:—Latin, Greek, French, German. No candidate may offer more than nine subjects. (See Matriculation Regulations.) Students of the College may attend as many classes dealing with Matriculation work as the Time Table will admit, at an **inclusive fee of £3.**

ENGLISH.

(See English, Elementary Course, p. 18.)

ARITHMETIC.

(See Practical Mathematics, Elementary Course, page 36.)

ALGEBRA.

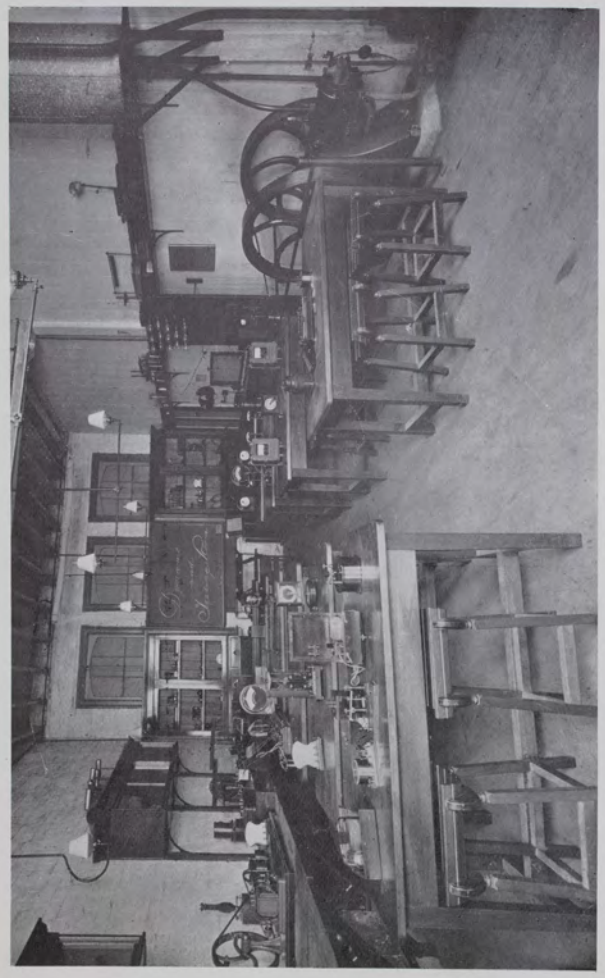
(See Practical Mathematics, Elementary Course, page 36.)

GEOMETRY.

(See Practical Mathematics, Elementary Course, page 36.)

FRENCH.

(See page 24.)



DYNAMO AND TESTING ROOM.

GEOGRAPHY.

(See Commercial Geography, Preliminary Course, page 17.)

MAGNETISM AND ELECTRICITY.

(See page 31.)

DRAWING—PRACTICAL PLANE AND SOLID GEOMETRY.

(See Practical Geometry. First Grade, page 55.)

DRAWING—FREEHAND AND MODEL.

(See Art Department, page 81.)

TIME TABLE FOR MATRICULATION CLASSES.

Monday.	Tuesday.	Wednesday.	Thursday.	Friday.
English, 8.15—9.30	Commercial Geography, 7—8.15 Commercial Arithmetic, 7—9.30 Algebra, 7—9.30 Geometry, 7—9.30	French, 7—9 Geometry, 7—9.30	Magnetism and Electricity, 7—10 Commercial Arithmetic, 7—9.30 Algebra, 7—9.30 Geometry, 7—9.30	Drawing—Freehand and Model, 7—9.30

Electrical Engineering Department.

Chief Instructor ... SAMUEL IRWIN CROOKES, A.M.I.E.E., F.C.S., late Chief Assistant Lecturer in Physics and Electrical Engineering, Battersea Polytechnic, London.

Owing to the great utilisation of Electricity for power and lighting purposes in all parts of the world, to the developments now taking place in Auckland, and to similar developments in other parts of New Zealand, a systematic course, extending over five years, has been arranged in Electrical Engineering. Those taking the complete course will not only acquire a sound practical knowledge of Electrical Engineering, but also of such portions of Mechanical Engineering as will fit them for positions of responsibility.

In all kinds of industrial work, the advantages accruing from the use of Electrical machinery and appliances are becoming more and more recognised. In fact, this is so much so, that in the British Isles, Europe, and the United States of America, it is a difficult matter to find any profession, trade, or manufacture in which Electrical appliances are not used. All the best Engineering shops all over the world now use Electric Driving. All Mining, Marine, Civil, and Mechanical Engineers must nowadays possess some knowledge of Electrical Engineering, or fall behind the times.

In no branch of Engineering does theory and practice more closely agree than in Electrical Engineering, and it is this that makes it so essential that all students desirous of becoming thorough engineers should have a sound knowledge of subjects nearly related to Electricity, such as Mathematics, Mechanics, etc. On this account, students of Electrical Engineering are urged to take up the courses arranged for them, as the subjects there set out are those which experience has shown to be necessary.

The Five Years' course is as follows :—

Preliminary or First Year's Course.	Elementary or Second Year's Course.	Intermediate or Third Year's Course.	Advanced or Fourth Year's Course.	Final or Fifth Year's Course.
Practical Mathematics Trade Drawing Elementary Science English (see p. 85)	Magnetism and Electricity Applied Mechanics Practical Mathematics English	Electrical Engineering (Elementary Grade) Applied Mechanics Practical Mathematics Machine Construction and Drawing Heat Engines Engineering Workshop Practice	Electrical Engineering (Ordinary Grade) Practical Mathematics Applied Mechanics Heat Engines Electric Wiring Engineering Workshop Practice	Electrical Engineering (Honours Grade) Electrical Design Heat Engines Practical Mathematics

Students need not necessarily take up all the subjects set forth for any particular year, in the one Session, but will make a selection according to the time at their disposal.

Students possessing the necessary knowledge and qualifications will be admitted to the Second Year or more advanced courses.

DIPLOMA IN ELECTRICAL ENGINEERING.—The Diploma of the College in Electrical Engineering will be conferred on students who have attended the College for at least **three** Sessions, and have passed the following Examinations :—

CITY AND GUILDS OF LONDON INSTITUTE.—Electrical Engineering, Honours Grade, and Electric Wireman's Work, Final Grade.

ENGLISH BOARD OF EDUCATION.—Practical Mathematics, Second Stage ; Applied Mechanics, Second Stage ; Machine Construction and Drawing, First Stage ; and Steam, Second Stage.

AUCKLAND TECHNICAL COLLEGE.—Workshop Practice, Second Grade.

EQUIPMENT.—The Testing Equipment includes, in addition to Electrical Apparatus, a number of the latest types of Standard Apparatus, so that tests of the greatest accuracy can be carried out, as many of these Standards are vouched for by Certificates from the British National Physical Laboratory. The equipment also includes many of the various types of Ammeters, Voltmeters, and other measuring instruments used in present-day practice, as well as a first-class battery of thirty large accumulators.

Electrical Machinery.—At present this consists of a Gas Engine and belt-driven 110-volt Shunt-Dynamo ; a 110-volt Motor-generator set, each unit of which can be used separately ; a 3-H.P. Series Motor and Switchboard, as well as a variety of small alternating machines. All accessory apparatus for reproducing practical working conditions is available for testing purposes. Students thus have every opportunity of acquiring a sound practical and theoretical knowledge of Electrical machinery and apparatus.

Additions.—New machinery and apparatus are added as found necessary, and it is expected that by the end of the first year's working in the New College, the Dynamo and Motor Room will be equipped with one or more specimens of every type of Alternating and Continuous Current Machinery now used in Industrial Work.

Mechanical Engineering Workshop.—A full description of the equipment of this shop appears on page 48.

MAGNETISM AND ELECTRICITY.

FIRST GRADE.

Lecture Class meets—From 7 p.m. to 8.15 p.m. on Thursdays, at the Technical College, Rutland Street.

Laboratory Class meets—From 8.15 p.m. to 9.45 p.m. on Thursdays, at the Technical College, Rutland Street.

Instructor ... ... S. IRWIN CROOKES.

SYLLABUS.

Magnetism.—Magnets and magnetic substances. Action of magnets on one another. North and South Poles and magnetic axis of a magnet. Magnetic meridian. Magnetic field. Lines of force ; their delineation by iron filings or a small compass. Magnetic induction. Magnetic qualities of hard steel and soft iron. Effects of the introduction of soft iron into a magnetic field. Methods of magnetisation by permanent magnets. Distribution of magnetism in magnets. Consequent poles. Effects of breaking or subdividing a magnet. Effect of the keeper of a magnet on the distribution of the lines of force. Terrestrial magnetism. Mariner's compass ; Declination ; Dip ; Magnetic Poles and Equator. General explanation of the behaviour of compass and dip needle on the assumption that the earth is a magnet. Effect of the earth's magnetic field on masses of iron. Direction of the earth's magnetic force at a place. Horizontal and vertical components of the force.

Frictional Electricity.—Electrification by friction. Positive and negative electrification. Simultaneous development of positive and negative electricity in equal quantities. Attraction and repulsion. Electric charge or quantity. The gold leaf electroscope. Conductors. Non-conductors. Distribution of electricity on conductors. Hollow conductors. Points. Difference of potential. Analogies with temperature, level, and pressure. Work done by or against electric forces. Electrostatic induction. Ice pail experiments. Leyden jar and plate condenser. Condensing electroscope. Electrophorus. Frictional electric machine. Electric discharge.

Voltaic Electricity.—Simple voltaic cells. Local action and polarisation. Constant cells. General description of the chemical action taking place in the most common forms of cells. Electromotive force (potential difference). Electric circuit, current, resistance. Connection of cells in series. Magnetic field due to a current in a straight wire and in a circular coil. Oersted's experiment. Galvanometer. Forces acting on the needle of a galvanometer. Advantages of an astatic pair of needles. Ohm's law and its application to simple circuits. The heating effect of a current in a conductor proportional to the resistance of the conductor and to the square of the current. Electro magnet. Magnetising coil. Decomposition by an electric current of acidulated water, copper sulphate, etc.

Fee.—£1 10s 0d for Lectures and Laboratory Practice for the Session.

Text Book.—Hadley's Magnetism and Electricity, 2s 6d.

ELECTRIC LIGHTING AND POWER DISTRIBUTION.

(ELECTRICAL ENGINEERING.)

FIRST GRADE.

Class meets—From 7 p.m. to 9.30 p.m. on Wednesdays, at the Technical College, Rutland Street.

Instructor ... ... S. Irwin Crookes.

SYLLABUS.

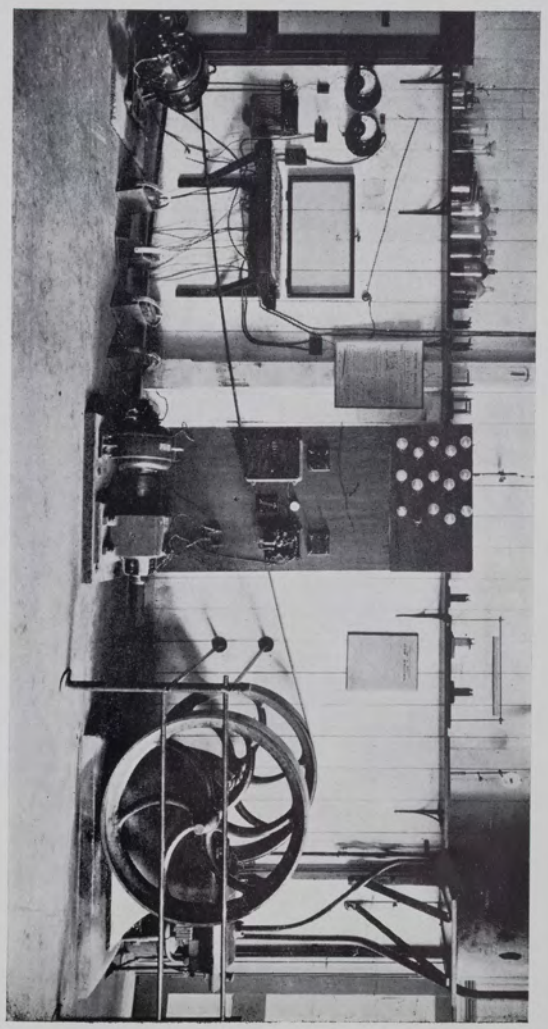
Electrical Measurements.—Applications of Ohm's law. Simple methods of measuring resistance, E.M.F. and current. Chief types of ammeters, voltmeters, wattmeters, and supply meters.

Electrical Properties of Materials.—Conductors and insulators. The effect of commonly occurring conditions, such as moisture, heat, etc. Conditions which hasten deterioration.

Magnetic Properties of Materials.—The magnetisation of iron by electric currents; permeability; the law of ampere turns; electro-magnets and simple applications of the principle of the magnetic circuit.

Secondary Batteries.—The various types; their installation and practical treatment. Precautions in charging and discharging. Testing state of cell by hydrometer and voltmeter.

Electric Lighting.—Carbon and metal filament lamps. Nernst lamps. Arc lamps. Current and voltages required by the more commonly used glow lamps. Methods of testing. Photometry and illumination.



A PORTION OF THE DYNAMO AND TESTING ROOM.

Electrical Machinery.—C.C. and A.C. motors; general principles of action; the practical importance of the back E.M.F. and conditions of producing it; field windings and their connections with the armature and the supply circuit; the more commonly occurring causes of breakdowns and their remedies; care of commutators. Starting switches; no voltage and overhead release devices; principles involved. Field breaking switches.

C.C. and A.C. Dynamos, their installation and running; regulation by resistance in field circuit; principles involved. Testing of motors and dynamos for insulation; temperature tests under load; testing for faults.

The Practical work in the Laboratory and Testing Room will include:—Resistance testing. Measurement of current and voltage. Calibration of ammeter and voltmeters. Fuse testings. Lamp testing. Potentiometry. Dynamo and motor testing. Running of gas-engine dynamo set. Accumulator charging.

Fee.—£1 10s 0d for the Session.

Text Book.—Rosenberg's Electrical Engineering, 6s.

SECOND GRADE.

Class meets—From 7 p.m. to 10 p.m. on Fridays, at the Technical College, Rutland Street.

Instructor .. ... S. Irwin Crookes.

SYLLABUS.

Continuous Current.—Scientific and commercial units and measurements. Measuring instruments and testing. The electric and mechanical properties of materials; conductors, insulators. The magnetic properties of materials; laws of the magnetic circuit and calculations thereon. C.C. Generators and Motors; principles of and essential parts; elements of design and simple calculations connected therewith; calculations of and tests for losses and efficiencies. Secondary batteries; principles of; usual forms; testing, setting up and maintenance. Electric lamps and lighting; glow, arc, mercury vapour, and other lamps; principles involved, use and testing. Power transmission and distribution by continuous currents. Electric traction by continuous currents.

Alternate Current.—Principles of alternate current working; elementary mathematical theory; units and simple measurements. Alternate current power, principles and details of measurement of. A.C. Generators and Motors; principles of and essential parts, elements of design and simple calculations connected therewith; various types of motors; circle diagrams; testing. Transformers and convertors; necessity for; various types; elements of design; simple calculations concerning; testing. Power transmission and distribution by alternate currents. Electric traction by alternate currents.

The Practical work in the Laboratory and Testing Room will include:—Running and testing single-phase generators. Determination of angle of lag, and impedance. Idle and energy current. Measurements of power. Wave form of an alternator. Effect of capacity and inductance. Testing of transformers. Synchronising. Power in a polyphase circuit. Characteristic and efficiency of rotary converters. Tests on induction motors.

Fee.—£1 10s 0d for the Session.

Text Books.—Smith's Practical Alternating Currents, 6s.
Rosenberg's Electrical Engineering, 6s.

THIRD GRADE.

Class meets—From 7 p.m. to 10 p.m. on Fridays, at the Technical College, Rutland Street.

Instructor ... ... S. IRWIN CROOKES.

SYLLABUS.

This course is designed to prepare students, who have already passed the Ordinary Grade, for the Honours Grade Examination in Electrical Engineering of the City and Guilds of London Institute. The Syllabus for this examination is as follows:—

Two papers will be set. The first paper will contain numerical and mathematical questions on the design, working and testing of electrical apparatus, and will include questions upon the winding of magnets and armature coils, properties of materials, losses in machinery, and the action of instruments.

The second paper will be set in four sections, of which no candidate will be allowed to answer questions from more than one section. The examination in each section will include more advanced questions on the relevant portions of the Ordinary (Second) Grade Syllabus in addition to the following subjects:—

Section 1. Electrical Machinery Design.—Properties of materials, design, manufacture and testing of C.C. and A.C. generators and motors, transformers, and regulators.

Section 2. Electrical Instruments and Apparatus.—Properties of materials, electrical measurements. The underlying principles, details of design, manufacture, and calibration of switchboard and laboratory instruments, testing sets, meters, standards and standardising instruments. Construction and testing of switches, protective devices and auxiliary apparatus. Switchboards, principles and details of construction and arrangement of various types.

Section 3. Generation and Traction.—Generating stations, factors influencing choice of site, plant, general arrangements, working and control, capital charges and running costs. Principles and details of systems of Electric Tramway and Railway Engineering ordinarily used—permanent way, lines and feeders, surface and conduit systems, collection and control of current, capital charges and running costs.

Section 4. Distribution.—High voltage transmission systems, details of erection, construction, testing, maintenance—safety devices, limitations of voltage. Sub-stations, choice of positions, plant, general arrangement, working and control. Use and maintenance of secondary batteries. Medium and low voltage distribution systems, details of construction, testing, maintenance. Consumers, circuits, and connections—meters, plant, lighting, public and private.

Fee.—£1 10s 0d for the Session.

ELECTRIC WIRING.

FIRST GRADE.

Class meets—From 7 p.m. to 9.30 p.m. on Thursdays, at the Technical College, Rutland Street.

Instructor ... ... JAMES PEARCE.

This course is adapted to the requirements of Journeymen in Electric Wiring. The Theoretical as well as the Practical side of the work will be taken up, and students will be prepared for the City and Guilds Examination in Electric Wiremen's work. Students who have not already done so, are strongly advised to attend the Electricity and Magnetism Course on page 31.

SYLLABUS.

LECTURE WORK.

Electricity.—The Elementary Principles of Electricity and Magnetism so far as necessary for understanding the matters referred to in the following paragraphs:—

Conductors.—The standard wire gauge; recognition at sight of the different sizes of stranded copper wire in common use.

Resistance Wires.—Properties of resistance materials in common use; methods of winding and connecting resistance spirals and the installation of resistances.

Fuse Wires.—Properties of materials in common use. Precautions in installing.

Jointing.—Construction and use of the blow lamp and soldering iron. Making of married and tee joints on conductors up to 19/16 size or its equivalent. Sweating of joints, thimbles, and connectors without burning the metal or leaving the joints rough.

Insulators.—Porcelain, pure and vulcanised rubber, paper, slate, marble, fibre, etc. Insulation of single and twin wires on rubber and paper cables up to ½ square inch size, or its equivalent.

Wiring Systems.—Cleats, insulators, wood casing, metal piping and conduits. Full details of handling material, fixing in position, running of wires. Mechanical and electrical coupling of metal pipes on both screw and slip joint systems.

Connections to distribution boards, cut-outs, ceiling roses, lamp holders, switches, including two-way switches, fuses. Wiring of electroliers, brackets and other fittings, connecting up and finishing off connections for incandescent lamps, Nernst lamps, arc lamps, and motors.

Testing.—Use of the test lamp and detector for sorting out circuits. Pole finding.

Bells.—The installation of electric bells. Indicators.

PRACTICAL WORK.

Methods of handling wire and cable. The soldering iron. Methods of tinning and heating fluxes. Solder making and testing, sweating and preparing thimbles and lugs, making the following joints:—Running, end to end, T and Y in 1/18, 3/22, 7/16, 19/16. Connecting to ceiling roses, switches, plugs, holders, and distribution boards. Methods of connecting flexibles. Wiring of three-light ball fittings and electroliers, insulating joints. The connecting up of simple bell and lighting circuits. Looping and strapping. Running of wires on cleats and insulators. Running of wood casing and capping; mitre cutting. Cutting, screwing, and bending metal pipes and conduits. Sorting out circuits by means of the test lamp and detector.

Fee.—£1 10s 0d for the Session.

Text Book.—Clinton's Electric Wiring, 2s.

PRACTICAL MATHEMATICS.

PRELIMINARY OR FIRST GRADE.

Class meets—From 7 p.m. to 8.15 p.m. on Fridays, at the Normal School, Wellesley Street.

Instructor ... ... NELSON T. LAMBOURNE.

SYLLABUS.

Arithmetic.—Vulgar and decimal fractions; contracted methods of multiplication and division; approximations; the metric system.

Algebra.—Symbols; four simple rules; simple equations.

Geometry and Mensuration.—Mensuration of surfaces and volumes; graphs.

Fee.—£1 for the Session.

Text Book.—Oliver and Boyd's Elementary Practical Mathematics, 1s 6d.

ELEMENTARY OR SECOND GRADE.

Class meets—From 7 p.m. to 9.30 p.m. on Tuesdays, at the Technical College, Rutland Street.

Instructor ... ... FREDERICK J. OHLSON.

SYLLABUS.

Approximate methods of arithmetic calculation; decimalisation of money; ratio; variation and proportion; simple equations and problems; indices; fractions; factors; mensuration of surfaces and volumes; Simpson's rule; use of squared paper; interpolation; meaning of sine, cosine, and tangent of an angle; logarithms and their use.

Fee.—£1 for the Session.

Text Book.—Oliver and Boyd's Elementary Practical Mathematics, 1s 6d.

THIRD AND FOURTH GRADES.

Class meets—From 8 p.m. to 10 p.m. on Tuesdays, at the Technical College, Rutland Street.

Instructor ... ... LEONARD CULLIS.

SYLLABUS.

More advanced indices and surds; quadratic equations with more than one unknown; simplification and transformation of algebraical expressions; slide rule; logarithms; use of calculating machines; mensuration, including areas, volumes, weights of castings, etc.; trigonometrical functions and their graphs; solution of triangles; use of tables of sines, etc.; heights and distances treated analytically and graphically; relations between the trigonometrical functions; trigonometrical equations. Use of squared paper for finding areas of irregular figures and volumes of solids of varying cross sections; Simpson's rule; results of experiments; interpolation; graphs of algebraic

functions; solution of equations by graphic methods. Equation of the straight line and circle; laws obtained from plotted results of experiments, when in the form $y = a + bx$, $y = ax^n$; graphs of exponential and logarithmic functions; notion of a limiting ratio and its representation by a differential co-efficient; slope of a curve; differentiation of $y = ax^n$; Maxima and minima problems; illustrations of differential co-efficients considered as rates of increase drawn from well-known phenomena.

Fee.—£1 for the Session.

Text Book.—Practical Mathematics by Knott and Mackay, 4s 6d.

APPLIED MECHANICS.

FIRST GRADE.

Class meets—From 7 p.m. to 9.30 p.m. on Mondays, at the Mechanical Laboratory, Lorne Street.

Instructor ... ... CHARLES C. ALLEN.

SYLLABUS.—(See page 43.)

SECOND AND THIRD GRADES.

Class meets—From 7 p.m. to 9.30 p.m. on Wednesdays, at the Mechanical Laboratory, Lorne Street.

Instructor ... ... CHARLES C. ALLEN.

SYLLABUS.—(See page 43.)

MACHINE CONSTRUCTION AND DRAWING.

FIRST GRADE.

Class meets—From 7 p.m. to 9.30 p.m. on Thursdays, at the Normal School, Wellesley Street.

Instructor ... ... CHARLES C. ALLEN.

SYLLABUS.—(See page 45.)

HEAT ENGINES.

FIRST GRADE.

Class meets—From 7 p.m. to 8 p.m. on Tuesdays, at the Technical College, Rutland Street.

Instructor ... ... S. IRWIN CROOKES.

SYLLABUS.—(See page 47.)

SECOND AND THIRD GRADES.

Class meets—From 7 p.m. to 8 p.m. on Tuesdays, at the Mechanical Laboratory, Lorne Street.

Instructor ... ... JOSEPH E. DANGERFIELD.

SYLLABUS.—(See page 47.)

MECHANICAL ENGINEERING WORKSHOP PRACTICE.

FIRST GRADE.

Class meets—From 7 p.m. to 10 p.m. on Thursdays, at the Machine Shop, Wellesley Street.

Instructor ... ... JOSEPH E. DANGERFIELD.

SYLLABUS.—(See page 49.)

SECOND GRADE.

Class meets—From 7 p.m. to 10 p.m. on Mondays, at the Machine Shop, Wellesley Street.

Instructor ... ... JOSEPH E. DANGERFIELD.

SYLLABUS.—(See page 50.)

TRADE DRAWING.

PRELIMINARY GRADE.

Class meets—From 7 p.m. to 9.30 p.m. on Wednesdays, at the Normal School, Wellesley Street.

Instructor ... FRANCIS C. J. COCKBURN.

SYLLABUS.

Drawing in outline from geometrical models and common objects. Free-hand drawing of simple ornamental forms and from leaves and flowers. Brush drawings of simple natural forms and from leaves; elementary design; flat tinting. Freearm drawing on paper and on the blackboard. Scale drawing. Geometrical and pattern drawing. Simple Isometric and Oblique projection. Lettering. Making solids in clay or card and drawing plan and elevation, then the same in perspective.

Fee.—£1 for the Session.

Note.—Students must provide themselves with the following:—Set of mathematical instruments (about 6s 6d); drawing folio, 1s; block of drawing paper, 6d; pair of 8in set squares (one 45°, one 60°); Auckland colour box, rubber, and lead pencils.

ENGLISH.

PRELIMINARY OR FIRST YEAR'S COURSE.

Class meets—From 8.15 p.m. to 9.30 p.m. on Fridays, at the Normal School, Wellesley Street.

Instructor ... ... NELSON T. LAMBOURNE.

SYLLABUS.—(See page 18.)

ELEMENTARY SCIENCE.

PRELIMINARY OR FIRST YEAR'S COURSE.

Class meets—From 7 p.m. to 9.30 p.m. on Tuesdays, at the Technical College, Rutland Street.

Instructor ... ... HOWARD H. MORGAN.

SYLLABUS.

Solids, liquids, and gases; changes of state; expansion of bodies when heated; use of the thermometer. Measurements of length, area, and volume, with simple calculations. Weight of bodies; use of the balance; relative weight; the specific gravity bottle; the U tube or Hare's hydrometer. Motion, inertia, and force. Representation of forces. Parallelogram of forces. Parallel forces. Levers. Weight and pressure of the air; the construction and uses of the barometer. Relative weight of hot and cold air. Other physical properties of the air. Constituents of the air; combustion; indestructibility of matter. Respiration; carbonic acid gas. Water in the air; general properties of water; solution; distillation; dew and rain. Composition of water.

Fee.—£1 10s 0d for the Session.

COMPOSITION FEES for students taking the full **Diploma Course** in Electrical Engineering: First Year, £2; Second Year, £2 10s; Third Year, £2 10s; Fourth Year, £3; and Fifth Year, £3 10s.

Time Table.—For complete Time Table of Electrical Classes, see pages 87 and 88.

Special Electrical Courses.

ELECTRIC TRACTION FOR MOTORMEN.

A Special Course of about thirty (30) lectures on the above subject will be arranged to suit the requirements of Motormen, Conductors, and others engaged upon the Auckland trams. The hours will be arranged so that men engaged on alternate shifts may attend. The subject will be dealt with in a simple and practical manner, and will be well illustrated with experiments and examples.

Class meets—Times to be arranged. (See separate leaflet.)

Instructor ... ... S. IRWIN CROOKES.

SYLLABUS.

Magnetism, magnetic properties of iron and steel. Magnetic field. Electricity. Conditions necessary to produce a current. Conductors. Insulators. Resistance. Heating. Chemical and magnetic effects. Electro-magnets. The magnetic circuit and its application to dynamos and motors. The measurement of current, resistance, pressure. Ohm's law and its various applications. Series and parallel circuits. Mechanical and electrical properties of conductors and insulators. Overhead equipment. Switches, fuses, circuit breakers, lightning arresters, and other accessories. The motor and controller. Feeder pillars and their equipment and connections. Faults, sparking, heating of commutator, brushes, armature fields, bearings, low and excessive speeds, failure to start and stop, brakes. Series and parallel working. Car wiring for lighting and bells.

Fee.—15s for the course of thirty Lectures.

Text Book.—Gant's Elements of Electric Traction, 6s.

Electricity for Telegraph and Telephone Operators.

Special courses will be arranged from time to time to suit the requirements of those in the Telegraph and Telephone Branches of the Post Office Service. For the present Session (1908) the course arranged will cover the work prescribed for the Technical Examination for Cadets. The course embraces Elementary Mathematics, and Lectures and laboratory work in Magnetism and Electricity, and all students are urged to take up both of these subjects.

ELECTRICITY AND MAGNETISM.

Class meets—From 7 p.m. to 10 p.m. on Thursdays, at the Technical College, Rutland Street.

Instructor ... ... S. Irwin Crookes.

SYLLABUS.

Lectures and Practical Work.—Fundamental Laws of Magnetism. Magnetic properties of iron and steel. Electro-magnets. Terrestrial magnetism. Primary and secondary cells (Accumulators); Galvanometers; Current; E.M.F.; Resistance; Electrolysis; Thermo-electricity; Induction; Electrostatics, etc.

The applied side of the subject will be kept prominent throughout, and as far as possible the practical work will be arranged to meet the special requirements of the students.

Fee.—£1 10s 0d for the Session.

Text Book.—Hadley's Electricity and Magnetism, 2s 6d.

ELEMENTARY PRACTICAL MATHEMATICS.

Students will take either the Preliminary Grade (see page 36) held on **Fridays,** from 7 p.m. to 8.15 p.m., or the Second Grade (see page 36) held on **Tuesdays,** from 7 p.m. to 9.30 p.m.

Fee.—10s for the Session if taken with the Electricity and Magnetism Course above, or £1 if taken alone.

Special Aspects of Applied Electricity.

Short Lecture courses of from ten to twelve lectures will be given from time to time on Special Branches of Electrical work, by the Chief Electrical Instructor, S. Irwin Crookes, A.M.I.E.E., F.C.S. It is expected that some of the following will be dealt with during the present (1908) Session:—(1.) Application of Electric Driving to Factories. (2.) Methods of charging for Electric Light and Power. This course will be specially suited to those with no knowledge of Electricity, and is intended to give users of Light and Power an intelligent knowledge of electricity tariffs and their underlying principles. (3.) Electric Ignition for Motor Cars and Motor Boats. (4.) Accumulators, their care and management.

Admission.—Any of the above courses will be open to the general public, as well as to Technical College students not due to attend other classes on the same evening.

Further details will be made public from time to time through the Press and by means of special leaflets.

Mechanical Engineering Department

Chief Instructor ... Charles Carrol Allen, Wh. Ex., late Chief Lecturer in Mechanical Engineering, Municipal Technical Institute, Coventry; Honours in Mechanical Engineering and in Motor Car Engineering, City and Guilds of London Institute.

A course extending over a period of five years has been drawn up to enable those who are engaged in Mechanical Engineering to obtain a knowledge of the principles and practice of their trade beyond what they can obtain in their trade workshops. Those taking the complete course will not only acquire a sound theoretical, but also a thorough practical, knowledge of Mechanical Engineering, such as will fit them for positions of responsibility. The courses as set forth below have been carefully arranged, and

students are urged to take up the various subjects, all of which are closely related to each other. Students need not necessarily take up all the subjects set forth for any particular year, in the one Session, but may make a selection according to the time at their disposal. Those who possess the necessary knowledge and qualifications will be admitted to the Second Year or more advanced courses.

The Five Years' Course is as follows:—

Preliminary or First Year's Course.	Elementary or Second Year's Course.	Intermediate or Third Year's Course.	Advanced or Fourth Year's Course.	Final or Fifth Year's Course.
Practical Mathematics	Practical Mathematics	Practical Mathematics	Practical Mathematics	Hydraulics
Trade Drawing	Machine Construction and Drawing	Machine Construction and Drawing	Applied Mechanics	Theory of Machines
Elementary Science	Applied Mechanics	Applied Mechanics	Heat Engines	Strength of Materials
English (See page 85)	English	Engineering Workshop Practice	Engineering Workshop Practice	Heat Engines (Oil, Gas, and Steam)
		Heat Engines	Engineering Drawing, including Graphics	Engineering Workshop Practice

DIPLOMA IN MECHANICAL ENGINEERING.—The Diploma of the College in Mechanical Engineering will be conferred on students who have attended the College for at least **three** Sessions, and have passed the following Examinations:—

CITY AND GUILDS OF LONDON INSTITUTE.—Mechanical Engineering, Honours Grade.

ENGLISH BOARD OF EDUCATION.—Practical Mathematics, Second Stage; Applied Mechanics, Second Stage; Machine Construction and Drawing, Second Stage; Heat Engines, Second Stage.

AUCKLAND TECHNICAL COLLEGE.—Workshop Practice, Third Grade; Strength of Materials.

EQUIPMENT.—The Mechanical Workshop is fitted up with some of the most modern British and American Machines, including 7-H.P. Oil Engine, seven lathes, planing machine, milling machine, two shapers, drilling machines, drill and tool grinders, etc., as well as the usual benches and tools.

The Mechanical Laboratory is well equipped with apparatus for teaching the principles of dynamics, statics, mechanism, theory of elasticity, elementary hydraulics and testing machines; other equipment for advanced work will be added during the present session.

APPLIED MECHANICS.

FIRST GRADE.

Class meets—From 7 p.m. to 9.30 p.m. on Mondays, at the Mechanical Laboratory, Lorne Street.

Instructor ... ... CHARLES C. ALLEN.

SYLLABUS.

Lectures.—Force. Unit of force. Graphic representation of force. Resultant and components. Parallelogram and triangle of forces. Moment of force. Centre of parallel forces. Couples. Centre of gravity. Friction. Coefficient of friction. Ordinary laws of friction. Work, horse-power, efficiency of machines. The lever, orders of levers and conditions of equilibrium, bent levers, lever safety valve. The use of measuring instruments, rules, callipers, micrometers, and other gauges used in workshops and mechanical laboratories. Surface plates. Measurement of energy. Calculations of work and power. Mechanical advantage and easy examples of the effect of friction in machines. Blocks and tackle, and other lifting appliances. Screws. Hydraulic presses, cranes, pumps, etc., and simple calculations concerning them. Communication of power by shafting, pulleys, couplings, clutches. Belt, rope, and chain driving. The elementary principles of force and motion as applied not only to bodies having a motion of translation, but also to fly-wheels and other rotating bodies. Force of a blow. Forces producing reciprocating motion. Centrifugal force. Properties of materials used in construction Stone, cement, bricks, timber, glass, cast iron, wrought iron, mild and cast steel. Tempering. Tie rods and struts. Stress and strain. Strength of thin vessels like boilers.

Laboratory.—Use of measuring instruments, such as vernier, micrometer, calliper, wire gauge, planimeter, optical lever. Triangle and polygon forces. Stresses in the members of a jib crane. Moment. The lever. Inclined plane. Sliding friction. Friction of pulley on spindle. Law of work. Force ratio, velocity ratio and efficiency of simple machines, such as wheel and axle, ordinary pulley block tackle, wheel and compound axle, Weston's differential pulley blocks, single and double purchase crab, screw jack, worm wheel crab. Energy of fly-wheel. Centrifugal force. Period of swing of simple pendulum. Stretching of India-rubber rods, wires, springs. Modulus of elasticity.

Fee.—£1 5s 0d for the Session.

Text Book.—Duncan's Applied Mechanics, 2s 6d.

SECOND GRADE.

Class meets—From 7 p.m. to 9.30 p.m. on Wednesdays, at the Mechanical Laboratory, Lorne Street.

Instructor ... ... CHARLES C. ALLEN.

SYLLABUS.

Mechanism. Conversion of motion. Velocity ratios. Belts, ropes, chains, links. Sliding and rolling. Wheel trains. Teeth of wheels. Chain gearing. A general knowledge of the effects of friction. Screw friction. Rolling friction. Roller bearings. The elementary principles of graphical statics. The resultant of forces not meeting at a point. Finding moments of inertia

of areas and centres of gravity. Lines of resistance in arches and buttresses. Bending moment and shearing force diagrams. Fuller's rule for masonry arches. Hydraulic and other lifts. Slipping of a belt. Length and strength of belts. Speed cones. Applications of the principles of the dynamics of rotating bodies as in fly-wheels. Effect of a blow. Reciprocating motions and vibration, linear and angular; measurement of torsional rigidity and fluid friction by torsional vibrations. Balancing of quick-moving machinery. An intimate knowledge of the properties of materials used in construction. How they behave in testing machines. Fatigue. Flow of metal. Initial strains. A better knowledge of stress and strain; shear stress and strain. Pressure of water and earth. Copper and its alloys; brass, gun metal, bronzes. Riveted joints. Strength of vessels with thin shells under fluid pressure. What occurs in a twisted shaft or bent beam. Bending movement and shearing force. Some knowledge of practical problems on railway girders. A general knowledge of the effects of combined bending and twisting, and bending and crushing. Struts. Metal and masonry arches. Spiral springs, carriage springs. Vibrations. Changes of pressure and velocity along the stream lines in fluids; in the various parts of a centrifugal pump or turbine. Gauge notches for measuring water. Thomson's jet pump. Friction in pipes. Hydraulic propulsion. The effects of friction in pipes and passages of hydraulic machinery.

Fee.—£1 5s 0d for the Session.

Text Book.—Jamieson's Applied Mechanics, 7s 6d.

THIRD GRADE.

Class meets—From 7 p.m. to 9.30 p.m. on Wednesdays, at the Mechanical Laboratory, Lorne Street.

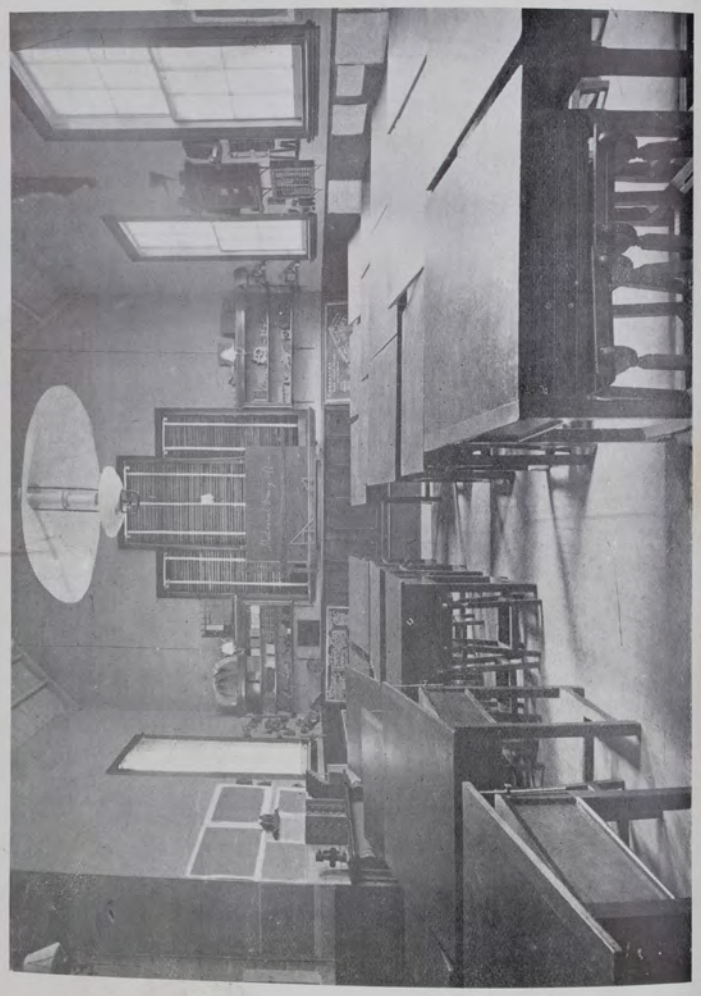
Instructor ... ... CHARLES C. ALLEN.

SYLLABUS.

Testing strength of materials; influence of shape of test piece. Balancing in hydraulic and other lifts. The results of experiments on friction at journals and pivots, in screws and in pipes, etc., conveying fluids. In graphical statics students will be taught to use their descriptive geometry to find the resultants of forces not in one plane, or the forces in part of a structure not in one plane. The principal moments of inertia of an area. Theory of masonry and metal arches with three, two, or no hinges. Effect of temperature on a hinged structure. Mechanism. The kinematics and kinetics of machines. Linkages in general. Wheel teeth. Worm wheel teeth. Sliding and rolling contact. Mechanical integrators. Rolling cylinders and cones and the most general motions of bodies. Slipping of belts. Centrifugal force in belts and rims of pulleys. Effect of a blow. Stoppage of water in a pipe. Vibration and the effect of friction in vibration. Velocity and acceleration diagrams of parts of mechanisms. The balancing of machinery. Long pump rod. Thick cylinders. Bending moment and strength and deflection of beams in general. Beams fixed at the ends. Continuous beams. Shear stress in beams. Combined bending and torsion; bending and thrust. Struts. A coupling rod as a strut and beam. Spiral springs. Springs of any shape subjected to bending. Whirling fluid. Centrifugal pumps. Fans and turbines. Hydraulic propulsion. The change in pressure and velocity along and across stream lines in water or air. "The rotation" in a fluid.

Fee.—£1 5s 0d for the Session.

Text Book.—Jamieson's Applied Mechanics, 7s 6d.



MECHANICAL DRAWING OFFICE.

MACHINE CONSTRUCTION AND DRAWING.

FIRST GRADE.

Class meets—From 7 p.m. to 9.30 p.m. on Thursdays, at the Normal School, Wellesley Street.

Instructor ... ... CHARLES C. ALLEN.

SYLLABUS.

In addition to instruction in mechanical drawing, students in this stage will be instructed in the principles underlying the arrangement, proportions, and strengths of simple machine details. The following is a brief outline of the course of instruction:—Drawing to scale and principles of projection. Use of sections.

Fastenings.—Bolts and nuts, setscrews, studs, nut-locks. Rivets and simple riveted joints. Keys. Cotters. Pins.

Mill-work.—Pedestals, hangers, brackets, wall-boxes, footsteps. Shafts and couplings. Countershafts. Fast and loose pulleys. Belt pulleys and belts. Spur and bevel gearing; form of pitch surfaces; drawing of wheels in sections.

Engine and Boiler Work.—Piston and rod. Crosshead and slide. Connecting rod. Crank and crank-shaft. Slide valve and rod. Eccentric and rod. Cylinder with covers and stuffing boxes. Construction of boiler shell; use of stays. Pipes and pipe joints. Stop valve.

Hydraulic Work.—Pipes and pipe joints. Use of cup leather. Gland and stuffing box. Stop valve. Force pump.

Bridge and Roof Work in Iron and Steel.—Forms of rolled sections in iron and steel. Built up ties, struts and girders. Simple joints.

Electric Generators and Motors.—Simple details.

Workshop Tools.—Use of the hammer and chisel, file, surface plate and scribing block. Screwing tackle. The lathe, drilling machine, planing machine, slotting machine, and shaping machine.

Physical Characteristics of the Common Materials used in Machine Construction.—Elementary information as to the relative strength, durability under wear, resistance to corrosion, and capability of being cast or forged, of iron, steel, brass, and copper.

In the preparation of drawings of the various parts of machines, the usual Drawing Office procedure will be adopted. Students will be taught to make pencil drawings on white paper from actual models, to make ink tracings of such drawings, and then to photograph these tracings.

Fee.—£1 5s 0d for the Session.

Text Book.—Low's Machine Drawing and Design, 2s 6d.

SECOND GRADE.

Class meets—From 7 p.m. to 9.30 p.m. on Fridays, at the Normal School, Wellesley Street.

Instructor ... ... CHARLES C. ALLEN.

SYLLABUS.

Ordinary proportions of rivets and riveted joints in boiler, bridge, and roof work; of nuts and bolt-heads; and of pins, keys, and cotters. Forms of Whitworth and other screw threads. Bearings constructed with complete provision against wear in any direction. Swivel bearings. High-speed bearings. Thrust bearings. Ball bearings. Provision against axial and lateral wear in footstep bearings. Bearings which work under water. Lubrication of bearings. Construction of wheels and pulleys in parts. Disengaging clutches. Use of guide pulleys. Rope gearing. Chain gearing. Ordinary proportions of wheels and wheel teeth. Fixings for carrying shafts connected by gearing. Simple forms of cams and ratchets. Various forms of pistons and piston packings. Metallic packings for stuffing boxes. Various forms of connecting rod ends. Piston valves. Expansion or cut-off valves. The common boiler fittings. Use of bridge and girder stays in boilers. Various forms of hydraulic valves. The centrifugal pump. The inward flow or Thomson turbine. Inward and downward flow turbines. Simple details of construction of railway girders. Connection of cross girders to main girders. Building up of bridge floors. Details of simple roofs in iron and steel. Details of electric generators and motors.

Fee.—£1 5s 0d for the Session.

Text Book.—Low and Bevis's Machine Drawing and Design, 7s 6d.

THIRD GRADE.

Class meets—From 7 p.m. to 9.30 p.m. on Fridays, at the Normal School, Wellesley Street.

Instructor ... ... CHARLES C. ALLEN.

SYLLABUS.

Strengths and proportions of bolts and screws, tie-rods, ropes, belts and chains. Strengths and proportions of rivets and riveted joints, and of pins, keys, and cotters. Strength of shafts; horse power transmitted. Strengths of levers, beams, and girders; of pipes, cylinders, and boilers. Bearing pressures on journals and pins in millwright and engine work. Pressures on slides and thrust bearings. Forced lubrication. The design of cycloidal and involute wheel teeth for spur and bevel gearing. Strength of wheel teeth. Details of gas and petrol engines. Electric generators and other dynamo machines and motors; motor generators and rotary convertors. Use of the milling machine; conditions suitable for its application. Foundry work; moulding and casting. Physical properties of such materials as wood, leather, and india-rubber, so far as these are useful in machinery.

Fee.—£1 5s 0d for the Session.

Text Book.—Low and Bevis's Machine Drawing and Design, 7s 6d.

LIST OF INSTRUMENTS REQUIRED BY STUDENTS IN MACHINE DRAWING CLASSES.

Drawing board **not more than** 2ft 8in by 2ft, with T-square; 8in set squares, one 45° and one 60°; set of mathematical instruments; set of scales, indiarubber, Indian ink, drawing pins, drawing paper, tracing paper, lead pencils and note-book.

HEAT ENGINES.

FIRST GRADE.

Class meets—From 7 p.m. to 8 p.m. on Tuesdays, at the Technical College, Rutland Street.

Instructor ... ... S. IRWIN CROOKES.

SYLLABUS.

Steam.—Temperatures. Thermometers. Unit of heat. Specific heat. Transfer of heat. Heat and work. Application of heat to water. Sensible heat. Latent heat. Total heat of evaporation. Saturated and superheated steam. Quantity of water required for condensation. Relation between pressure and volume of a gas. Graphic representation of same. Mean pressure. Work done by steam used expansively. Back pressure. Clearance in the cylinder.

The Steam Engine.—Engine details. Cylinder. Pistons. Crosshead and slide blocks. Crank and connecting rod. Eccentric. Slide-valve. Lap. Lead. Angle of advance. Piston. Double-ported and double-beat valves. Cut-off arrangements. The link motion. Governors. Fly-wheel. The jet and the surface condenser. Air pump. The indicator, and method of taking diagrams. Causes affecting the form of diagrams. Calculations of horse-power. The boiler: vertical, Lancashire, and locomotive types. Boiler fittings. Safety valves. Water gauge.

Gas and Oil Engines.—The principle of the gas and oil engine. Water jacket. Exhaust. Properties of burning oils. Motor car engines. Carburetters.

Fee.—£1 for the Session.

Text Book.—Jamieson's Elementary Manual of the Steam Engine, 3s 6d.

SECOND GRADE.

Class meets—From 7 p.m. to 8 p.m. on Tuesdays, at the Mechanical Laboratory, Lorne Street.

Instructor ... ... JOSEPH E. DANGERFIELD.

SYLLABUS.

Steam.—Relation between temperature and pressure of steam. Total and latent heat of evaporation. Pressure and volume of saturated steam. Internal and external work during evaporation. Wet steam. Superheated steam. Laws of the permanent gases. Boyle's law. Charles' law. Absolute temperature. Connection between pressure, volume, and temperature of a gas. Specific heat of a gas at a constant pressure and at constant volume. Adiabatic expansion. Change of temperature in the adiabatic expansion of a gas. Isothermal expansion. Carnot's cycle. Efficiency in Carnot's cycle. Entropy. Temperature entropy diagrams.

The Steam Engine.—The crank and connecting rod. Piston position and curve of same, taking the case of infinite and finite connecting rod. Locus of instantaneous centre. Curve of piston velocity, and influence of length of connecting rod on it. Tangential and radial pressure on crank pin. Polar and linear curve of crank effort with uniform pressure on crank pin, and also when steam is used expansively. Effect of connecting-rod length on these

curves. Influence of weight and velocity of the reciprocating parts. Watt's parallel motion. Governors: Watt's, Porter's, and other forms. Zeuner's valve diagram for simple slide valve. Link motions: Stevenson's, Gooch's, Allan's. Other valve gears, as Joy's, Hackworth's, and Marshall's. Meyer's expansion valves. Zeuner's valve diagram for same. Trip gears. Indicator and indicator diagrams. The boiler. Various types of boiler, as the Lancashire, marine, water-tube boiler. The injector. The Laval, Parsons, Curtis, and other turbines.

Gas and Oil Engines.—Details of construction.

Fee.—£1 per session.

Text Book.—Jamieson's Advanced Manual of the Steam Engine, 8s 6d.

PRACTICAL MATHEMATICS.

PRELIMINARY OR FIRST GRADE.

(See page 36.)

SECOND GRADE.

(See page 36.)

THIRD GRADE.

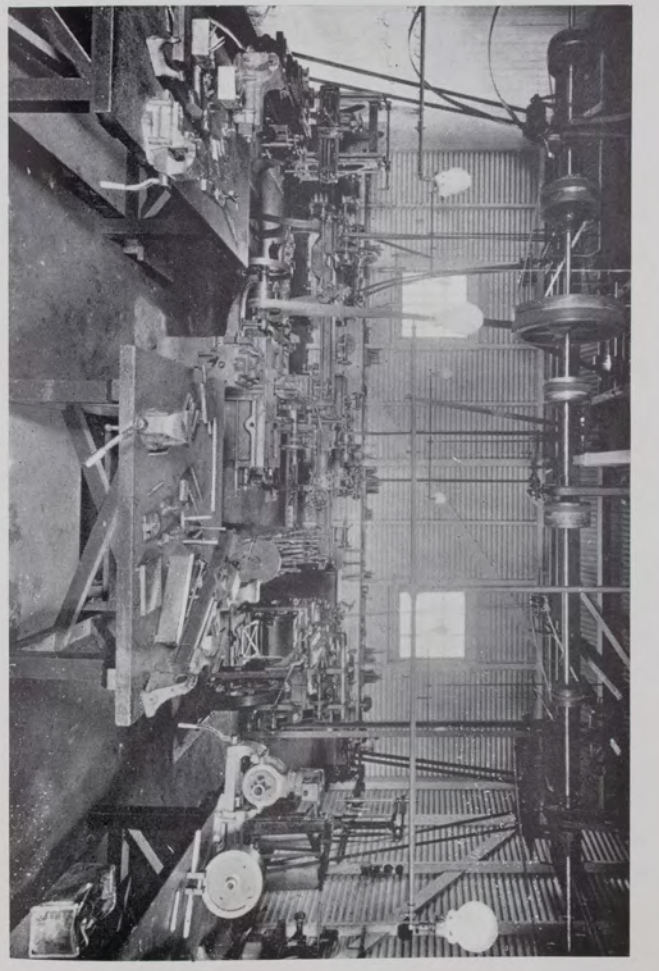
(See page 36.)

MECHANICAL WORKSHOP PRACTICE.

The Mechanical Workshop, which is one of the best equipped in Australasia, is intended to provide instruction for:—(1.) Engineering apprentices or lads who propose to enter the Engineering profession. (2.) Young men engaged in general and drawing offices of engineering firms who wish to acquire a knowledge of the use of tools, appliances, and methods adopted in works. (3.) Persons who, being already engaged in one or more branches of engineering work, desire to become acquainted with any other department. (4.) Persons who, having no trade interest, still desire instruction and practice in the use of tools.

The following will give some idea of the full course of instruction:—

Bench Work.—Use of the hammer, chisel, and file in the preparation of flat and other surfaces. The making of keys and keyways for shafts and pulleys. Use of gauges and templets in fitting work. Use of the file and scraper in the preparation of true plane surfaces, viz.:—Straight edges and surface plates. Use of the compasses, scribing block, square, etc., in marking work out preparatory to its being machined. The use of drifts in finishing square and other shaped holes.



MECHANICAL ENGINEERING WORKSHOP.

Turning—Hand Lathes.—Use of the hand lathe. The different forms of tools required in working upon various metals. Striking and chasing threads in the hand lathe. Chucking work in the hand lathe.

Slide and Screw Cutting Lathes.—Use of the slide lathe in turning, boring, and surfacing different kinds of work. The method of finding the wheels required in order to cut screws of various pitches. The cutting of single, double, and treble threads, both external and internal. Cutting speeds for various metals. Correct forms of tools required in lathe work. Various methods of chucking work in the lathe. The use of outside and inside laps, and the precautions necessary in order to produce accurate cylindrical work, such as plug and ring gauges, etc.

Machine Tools.—Use of the planing, shaping, slotting, and drilling machines, and the best methods of fixing work to be operated upon by the above-mentioned machines. Forms of the tools required, and manner of grinding the same.

FIRST GRADE.

Class meets—From 7 p.m. to 10 p.m. on Mondays and Thursdays, at the Machine Shop, Wellesley Street.

Instructor ... ... JOSEPH E. DANGERFIELD.

SYLLABUS.

Practical Work.—During the Session, each student will carry out the following:—

1. Inlay 1½ in. square within 3 in. square sheet steel.
2. Inlay 1¼ in. hexagon within 3 in. square sheet steel.
3. Make Nut and Drill Gauge for square and hexagon nuts.
4. Make Square Nut, and drill and tap it for ⅝ in. bolt.
5. Make Hexagon Nut, and drill and tap it for ⅝ in. bolt.

(1–5: Bright all over and polished.)

6. Turn ⅝ in. Bolt, and file up head to proper size.
7. Turn Collar Pin.
8. Make Centre Punch, turned at each end, octagonal in centre.
9. Surface Plate (small), chip and file, and scrap up surface true.
10. Make outside Callipers, and turn Washers, and rivet.
11. Make inside Callipers, and turn Washers, and rivet.
12. Make Try Square.

Lecture Work.—Short lectures on practical work, and on the construction and working of the various machines, will be given each evening.

Fee.—£1 for one night per week during the Session, and £2 for two nights.

Text Book.—Pearson's Metal Work, 2s.

SECOND GRADE.

Class meets—From 7 p.m. to 10 p.m. on Mondays and Thursdays, at the Machine Shop, Wellesley Street.

Instructor ... ... JOSEPH E. DANGERFIELD.

SYLLABUS.

Practical Work.—During the Session, each student will carry out the following :—

1. Make Try Square.
2. ,, Bevel.
3. ,, Keyway Square by use of Milling machine, etc.
4. ,, Depth Gauge.
5. ,, Universal Square.
6. ,, Scribing Block.
7. ,, Boring and Turning Gauges.
8. Cutting Single, Double, and Triple Threads.
9. Large Surface Plate, with handles complete.
10. Cutting Wheels from blanks on Milling machine.
11. Make Milling Cutter.
12. Various kinds of machining on Planing, Shaping, and Milling machines.
13. Boring and Turning on the Lathe.

Lecture Work.—Short lectures on practical work, and on the construction and making of the various machines, will be given each evening.

Fee.—£1 for one night per week during the Session, and £2 for two nights.

Text Book.—Pearson's Metal Work, 2s.

TRADE DRAWING.

(See page 38.)

ENGLISH.

(See page 18.)

ELEMENTARY SCIENCE.

(See page 39.)

COMPOSITION FEES for students taking the full **Diploma Course** in Mechanical Engineering. First Year, £2; Second Year, £2 10s; Third Year, £2 10s; Fourth Year, £3; and Fifth Year, £3 10s.

Time Table.—For complete Time Table of Mechanical Engineering Classes, see page 88.

Special Courses in Mechanical Engineering.

MARINE OIL ENGINES AND HOW TO USE THEM.

Class meets—From 8 p.m. to 9 p.m. on Tuesdays, at the Mechanical Laboratory, Lorne Street.

Instructor ... JOSEPH E. DANGERFIELD, First-class Honours in Mechanical Engineering, City and Guilds of London Institute.

A course of twelve (12) lectures on Marine Oil Engines has been arranged for those who have little or no knowledge of the subject, and who wish to familiarise themselves with the principles and working of Oil Engines as applied to Marine purposes. The course will be especially useful to those who own or are interested in Motor Launches. The lectures will be fully illustrated by experiments, drawings, etc., and every effort will be made to make the explanations as simple as possible. The course will also be especially useful for those desirous of obtaining Engineers' Certificates of Competency in the Mercantile Marine.

Fee.—£1 for the Course of 12 lectures.

The Course commences on Tuesday, March 10th, 1908.

MOTOR CARS AND HOW TO DRIVE THEM.

Class meets—From 7.30 p.m. to 9 p.m. on Tuesdays, at the Technical College, Rutland Street.

Instructor ... CHARLES C. ALLEN, Wh., Ex., Honours in Motor Car and Mechanical Engineering, City and Guilds of London Institute.

A course of twelve (12) lectures on Motor Cars has been arranged for those who have little or no knowledge on the subject, and who wish to familiarise themselves with the principles underlying the working of various types of these most popular and up-to-date vehicles. The subject will be treated in a thoroughly practical manner, and will be fully illustrated with experiments and examples. The course is especially intended for Owners and Drivers of Motor Cars, and others who wish to obtain a thorough working knowledge of the Motor Car.

Fee.—£1 for the Course of 12 lectures.

The Course commences on Tuesday, March 10th, 1908.

COACHING CLASS FOR GOVERNMENT CERTIFICATES FOR MARINE ENGINEERS, AND FOR STATIONARY, LOCOMOTIVE, TRACTION, AND WINDING ENGINE DRIVERS.

Class meets—From 7 p.m to 9.30 p.m. on Wednesdays and Fridays, at the Mechanical Laboratory, Lorne Street.

Instructor ... JOSEPH E. DANGERFIELD, First-class Honours in Mechanical Engineering, City and Guilds of London Institute.

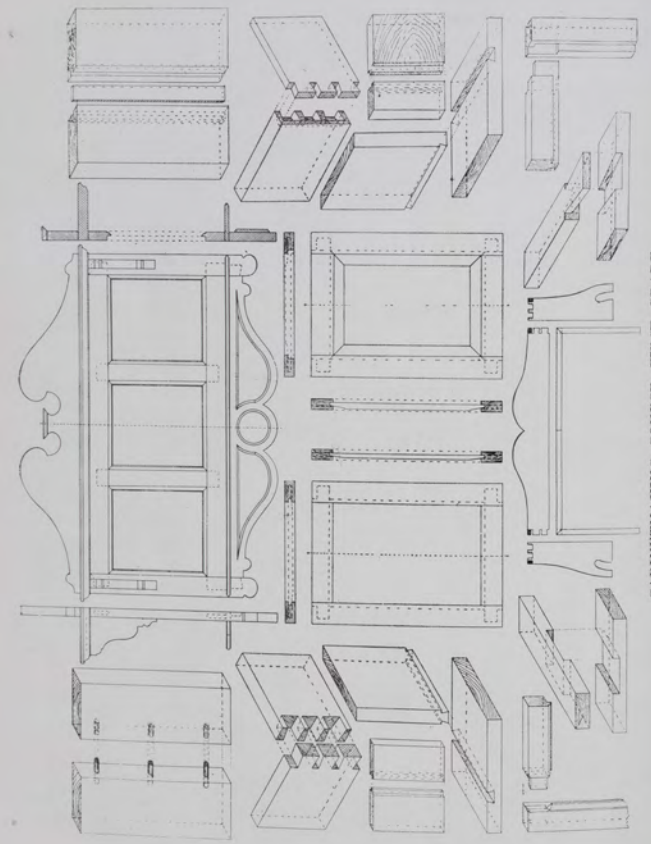
This class has been instituted to provide special coaching for those who are going up for the Government Examinations for Certificates of Competency as Stationary, Locomotive, Traction, and Winding Engine Drivers, or for the Examinations for Engineers in the Mercantile Marine. The College is well equipped with some of the best types of modern machinery and apparatus, including Gas and Oil Engines, Motors, Dynamos, Lathes, Planing and Shaping Machines, Working Models of various parts of engines, etc., so that the instruction given is of a **thoroughly practical nature** by a **practical** instructor, and every effort will be made to meet the individual requirements of every student. Students working for the Examinations of the **Mercantile Marine** are allowed to attend the special lectures on "Marine Oil Engines" (see page 51) **free** of charge.

The **Fee** for **complete** preparation for any one of the above Examinations is £2 2s 0d.

Special Aspects of Mechanical Engineering.

Short Courses, consisting of ten to twelve lectures, will be given from time to time on Special Branches of Mechanical Engineering, by the Engineering Instructors.

Full details will be given in the Press, and by means of special leaflets.



CABINETMAKING COURSE—FIRST GRADE.

Cabinetmaking Department.

Chief Instructor ... BENJAMIN P. RANDLE, Honours in Cabinetmaking, City and Guilds of London Institute; late Cabinetmaker at Messrs. Gillows and Co., Oxford Street, London.

In order that those engaged in the Cabinetmaking industry may obtain a thorough knowledge of the principles and practice of their trade, a five years' course of study has been arranged.

Apprentices are strongly urged to commence their studies at the Technical College as soon as they enter upon their apprenticeship.

Students need not necessarily take up all the subjects set forth for any particular year, in the one Session, but may make a selection according to the time at their disposal. Those who possess the necessary knowledge and qualifications, will be admitted to the Second Year or more advanced courses.

The Five Years' Course is as follows:—

Preliminary or First Year's Course.	Elementary or Second Year's Course.	Intermediate or Third Year's Course.	Advanced or Fourth Year's Course.	Final or Fifth Year's Course.
Practical Mathematics Trade Drawing Woodwork English (See page 85)	Cabinetmaking Practical Geometry Practical Mathematics	Cabinetmaking Practical Geometry Perspective	Cabinetmaking Elementary Design Principles of Ornament	Cabinetmaking Elementary Design Principles of Ornament

DIPLOMA IN CABINETMAKING.—The Diploma of the College in Cabinetmaking will be conferred on students who have attended the College for at least **three** Sessions, and have passed the following Examinations:—

CITY AND GUILDS OF LONDON INSTITUTE.—Cabinetmaking, Honours Grade.

ENGLISH BOARD OF EDUCATION.—Freehand Drawing in Outline, Model Drawing, Geometrical Drawing, Design, Stage I., and Principles of Ornament.

EQUIPMENT.—The Cabinetmaking workshop is fitted up with benches for forty (40) students working at once, and these are of the most modern type, being provided with "Lightning" vices. There is a liberal supply of all the latest English and American tools, and the machines include: Circular saw, fret saw, shaper, lathes, etc.

THEORY AND PRACTICE OF CABINETMAKING.

FIRST GRADE.

Class meets—From 7 p.m. to 9.30 p.m. on Tuesdays, at the Carpenters' Shop, Chancery Street, City.

Instructor ... ... BENJAMIN P. RANDLE.

SYLLABUS.

LECTURES.—Timber.—The nature and properties of the various kinds of New Zealand timbers used in cabinetmaking. Woods suitable for construction. Ground-work and veneers. Conversion, shrinkage, and warping of timber.

Furniture.—The technical terms and descriptions of the different parts, as pilaster, capital, frieze, plinth, base, surbase, and mouldings.

Veneering.—Flat and curved work. Preparation of grounds and veneers. Veneering appliances.

Brasswork.—As hinges, joint stays, bolts, locks. Method of fixing, and their different advantages.

Tools.—Hand cabinetmaking tools. Woodworking machinery.

PRACTICAL WORK.—Use and sharpening of different tools, sawing, planing, squaring, rebating, grooving and trenching, halving, mortice and tenon joints, dove-tailing, dowelling, mitreing, and working moulds of simple patterns.

Fee.—£2 for the Session.

Text Book.—Denning's Art and Craft of Cabinetmaking, 5s.

SECOND GRADE.

Class meets—From 7 p.m. to 9.30 p.m. on Tuesdays, at the Carpenters' Shop, Chancery Street, City.

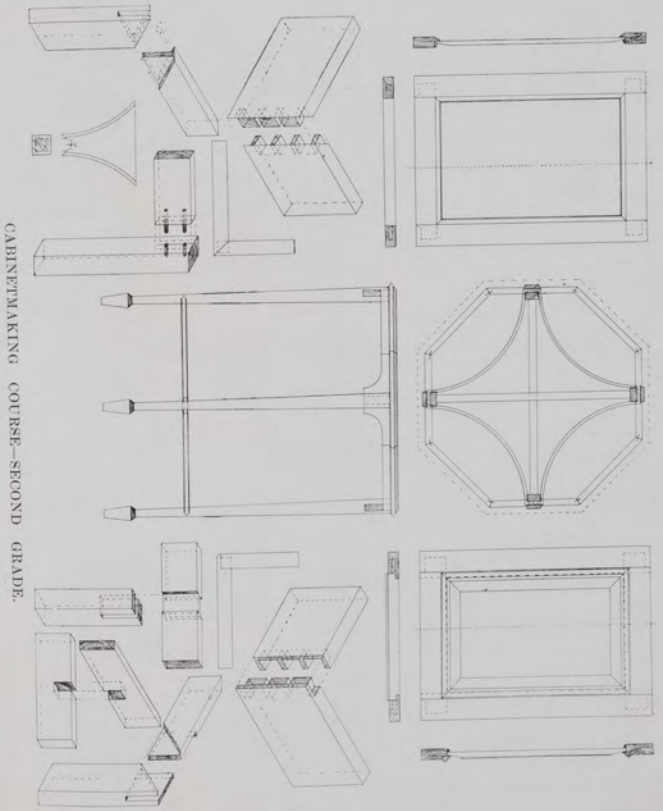
Instructor ... ... BENJAMIN P. RANDLE.

SYLLABUS.

The nature and properties of the various kinds of wood used in cabinetmaking, with their place of origin and the manner of their importation. The most suitable woods for construction. The best method of seasoning and preparing for the various uses. The veneers mostly used in cabinetmaking, their value and their nature. Cabinetmaking tools, their different uses and the economy and advantages of wood-working machinery. Plain jointing, cooper joint, dowelling, tongueing, and dove-tailing. The descriptions and names of pieces of furniture, such as pilaster, capital, frieze, plinth, base, surbase, and of the various mouldings. Freehand lines for brackets and mouldings. Modes of building circular rims. Curved panels. Veneering on flat and shaped work. Various appliances for veneering. Preparation of grounds and veneers, and the glue to be used. Manner of preparing for the various classes of work. Cabinet brass-work, hinges, joint-stays, bolts, and locks. Methods of fixing and their different advantages.

Fee.—£2 for the Session.

Text Book.—Denning's Art and Craft of Cabinetmaking, 5s.



CABINETMAKING COURSE—SECOND GRADE.

THIRD GRADE.

Class meets—From 7 p.m. to 9.30 p.m. on Tuesdays, at the Carpenters' Shop, Chancery Street, City.

Instructor ... ... BENJAMIN P. RANDLE.

SYLLABUS.

Principles and proportions in designing furniture with regard to its use and the materials employed. Mechanical actions such as are used in cylinder fall desks, writing tables, dumb waiters, etc. The different methods of expanding dining tables. Inlaying and veneering with tortoise-shell, ivory, mother-of-pearl, and metal. The preparation of the best methods of applying veneers to flat and sweep work. The different styles of furniture and the periods to which they belong.

Fee.—£2 for the Session.

Books of Reference.—The Cabinetmakers' Assistant, Cabinetmakers' Drawing Book, by Sheraton; History of Furniture, by Litchfield; and Ancient and Modern Furniture, by Hungerford Pollen.

PRACTICAL MATHEMATICS.

PRELIMINARY OR FIRST GRADE.

(See page 36.)

SECOND GRADE.

(See page 36.)

TRADE DRAWING.

(See page 38.)

ENGLISH.

(See page 18.)

PRACTICAL GEOMETRY.

FIRST GRADE.

Class meets—From 7 p.m. to 9.30 p.m. on Wednesdays, at the Newton Manual Training School, Upper Queen Street.

Instructor ... ... GEORGE I. ALLEN.

SYLLABUS.

Construction of triangles, quadrilaterals, and polygons from given data. Describing circles to satisfy given conditions; passing through given points, touching lines and circles. Drawing straight lines touching circles. Construction of figures similar to given figures. Proportional division of lines,

including third, fourth, and mean proportionals, extreme and mean ratio. Plain and diagonal scales. Scale of chords. Construction of the ellipse, drawing its tangents and normals. Drawing curves defined by simple conditions. Inscribing and describing rectilinear figures and circles within and about others. Plans, elevations, and sections of simple geometrical solids, singly or in combinations, in simple positions. The application of geometrical constructions to setting out schemes of ornamental patterns, construction of units of patterns, spacing of wall and other surfaces for decorative purposes, and construction of arch-forms, tracery, and mouldings, etc.

Fee.—£1 for the Session.

Text Book.—Morris and Husband's Practical Plane and Solid Geometry, 2s 6d.

SECOND GRADE.

Class meets—From 7 p.m. to 9.30 p.m. on Wednesdays, at the Normal School, Wellesley Street.

Instructor ... ... ARTHUR D. TRENDALL.

SYLLABUS.

Plane Geometry.—The use and care of drawing instruments. Proportional division of a line. Construction of plain and diagonal scales and scale of chords. Construction of triangles and regular polygons. Areas of plane figures. Circles passing through three points or touching three lines. Tangent lines and circles to one or two circles. Elementary constructions of the ellipse, its tangents and normals. Construction of the parabola, hyperbola, cycloids, involute of a circle. Simple case of plane loci.

Solid Geometry.—Principles of projection and definition of terms. Projection of points and lines. Traces, inclination, and true length of a line. Use of indices. Planes; their traces and inclinations. The straight line and plane. Projection of solids placed in simple positions. New plans and elevations of solids. Plane section of solids. Simple cases of intersection and development of surfaces.

Fee.—£1 for the Session.

Text Book.—Morris and Husband's Practical Plane and Solid Geometry, 2s 6d.

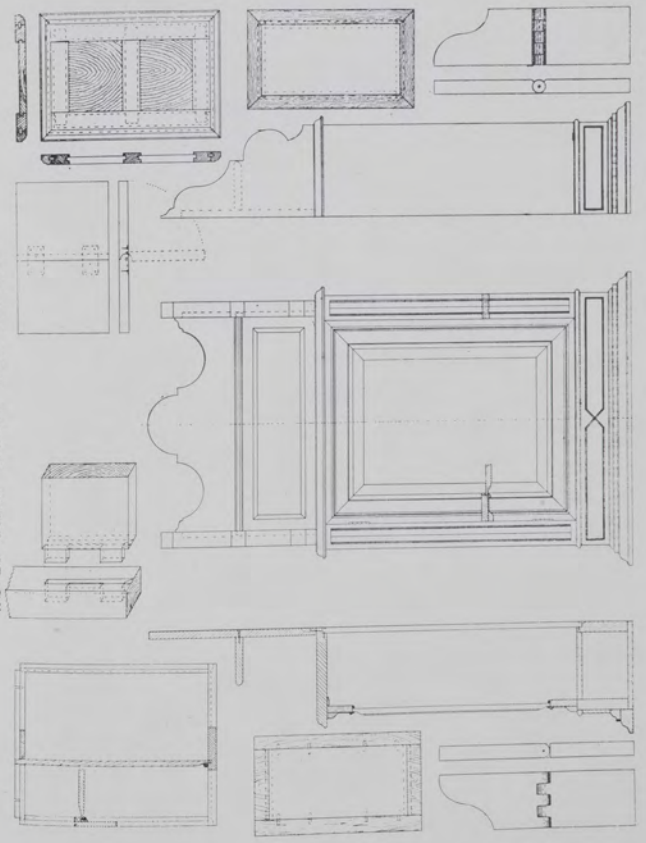
WOODWORK.

Class meets—From 7 p.m. to 9.30 p.m. on Thursdays, at the Newton Manual Training School, Upper Queen Street.

Instructor ... ... GEORGE I. ALLEN.

SYLLABUS.

Use of the common woodworking tools, such as:—Saws, planes, chisels, hammer, gauges, bevel, spokeshave, etc. Making of various joints, such as:—Housing, halving, mortice and tenon, bridle, tongue and groove, etc. Making of simple models such as:—Window wedge, square prism, flat ruler, round ruler, bench hook, pen tray, bracket, set squares, T square, drawing board, etc.



CABINETMAKING COURSE.—THIRD GRADE.

This course is especially intended for those who have just commenced their apprenticeship in the carpentry and joinery or cabinetmaking trade, and for those, who, whilst not actively engaged in a woodwork trade, wish to obtain a certain amount of facility in handling the common tools used in woodwork. The course will be found very suitable for those boys who have just left school and who wish to continue their course in Woodwork after having been at one of the Manual Training Schools.

Fee.—£1 for the Session.

PERSPECTIVE.

Class meets—From 7 p.m. to 9.30 p.m. on Thursdays, at the Normal School, Wellesley Street.

Instructor ... ... HARRY WALLACE.

SYLLABUS.

Representing in perspective from plan and elevation, or from specification, simple solids or objects of plane or curved surfaces having one line or surface on, or parallel to, the ground plane. Drawing and measuring lines inclined to the horizontal, and contained in vertical planes inclined to the picture plane. Drawing figures or solids in perspective, some of whose leading constructive lines are horizontal, and the others contained in vertical planes at right angles to the horizontal lines, e.g., a cube with one edge horizontal, and one face making a given angle with the ground. Drawing solids having plane or curved surfaces in oblique positions, and all their constructive lines inclined to the ground, such representations being limited to problems which can be solved by the treatment of an oblique plane and perpendiculars thereto. Drawing reflections of solids in plane mirrors, horizontal or vertical. Drawing shadows of lines, surfaces, and solids, rectilineal or curved, upon any specified planes and on surfaces of single curvature, by natural or artificial light.

Finding and describing from views given in perspective, the actual dimensions, position, and other particulars respecting the objects represented under the conditions of any of the foregoing classes of subjects, or, in the case of shadows and reflections, ascertaining the position of the source of light, reflecting surface, etc. Indicating how change in position, say of the spectator, of the object, or of the source of light, etc., affects the representations of the given objects, etc. Indicating effects of distance on the appearance of objects, shadows, etc. Pointing out and correcting errors in perspective in respect of given subjects.

Fee.—£1 for the Session.

Text Book.—Dennis's Second Grade Perspective.

THE PRINCIPLES OF ORNAMENT.

Class meets—From 7 p.m. to 9.30 p.m. on Tuesdays and Thursdays, at the Normal School, Wellesley Street

Instructor ... ... HARRY WALLACE.

SYLLABUS.

Symmetry and Balance. Proportion and Spacing. Subordination. Repost. Congruity. Radiation. Contrast, including Counterchange. Repetition and Rhythm, including Alteration. Unity. Methods of Expression. Division of surface. Variety of plane surface.

Fee.—£1 for the Session.

Text Book.—Ward's Elementary Principles of Ornament.

DESIGN.

Class meets—From 7 p.m. to 9.30 p.m. on Tuesdays and Thursdays, at the Normal School, Wellesley Street.

Instructor ... ... HARRY WALLACE.

SYLLABUS.

The decoration of flat surfaces with coloured ornament. Methods of drawing, tracing, transferring, etc. The use of charcoal, chalk, and colour, water colour, tempera, etc. Setting out patterns as the "drop," "trellis," "sprig," "diaper," etc. Stencilling. Pen and brush work. The decoration of borders, corners, and enclosed spaces, squares, circles, etc. Panelling with interlacing, running, or scroll patterns. The adaptation of simple natural forms for decorative purposes. Beauty of mass and line. Greek, Persian, and Italian treatments.

Fee.—£1 for the Session.

Text Book.—Pattern Design by Lewis F. Day, 7s 6d.

COMPOSITION FEES for students taking the full **Diploma Course** in Cabinetmaking: First Year, £2; Second Year, £2 10s; Third Year, £2 10s; Fourth Year, £3; and Fifth Year, £3 10s.

Time Table.—For complete Time Table of Cabinetmaking Classes, see pages 86 and 87.

Building Trades' Department.

Owing to want of space and suitable equipment in this Department, only those branches of the building trade which are associated more particularly with Carpentry and Joinery will be taken up for the present. Plumbing is dealt with under a separate department (see pages 69 to 78).

A course extending over a period of five years has been drawn up for Carpenters and Joiners, and students are strongly urged to take up the full course, as all the subjects chosen have an intimate relation to each other.

Students need not necessarily take up all the subjects set forth for any particular year, in the one Session, but may make a selection according to the time at their disposal. Those who possess the necessary knowledge and qualifications will be admitted to the Second Year or more advanced courses.

The Five Years' Course is as follows:—

Preliminary or First Year's Course.	Elementary or Second Year's Course.	Intermediate or Third Year's Course.	Advanced or Fourth Year's Course.	Final or Fifth Year's Course.
Practical Mathematics Trade Drawing Woodwork English (See page 85)	Practical Mathematics Practical Geometry Theory and Practice of Carpentry and Joinery	Practical Mathematics Practical Geometry Building Construction Theory and Practice of Carpentry and Joinery	Practical Geometry Building Construction Theory and Practice of Carpentry and Joinery	Practical Geometry Building Construction Theory and Practice of Carpentry and Joinery

DIPLOMA IN CARPENTRY AND JOINERY.—The Diploma of the College in Carpentry and Joinery will be conferred on students who have attended the College for at least **three** Sessions, and have passed the following Examinations:—

CITY AND GUILDS OF LONDON INSTITUTE.—Carpentry and Joinery, Honours Grade.

ENGLISH BOARD OF EDUCATION.—Practical Plane and Solid Geometry, Stage 2; Building Construction and Drawing, Stage 2; Practical Mathematics, Stage 1.

EQUIPMENT.—The Carpenters' Shop is fitted up with benches for forty (40) students working at once, and these are of the most modern type, being provided with "Lightning" vices. There is a liberal supply of all the latest English and American tools, and the machines include: Circular saw, fret saw, shaper, lathes, etc.

THEORY AND PRACTICE OF CARPENTRY AND JOINERY.

FIRST GRADE.

Class meets—From 7 p.m. to 9.30 p.m. on Mondays, at the Carpenters' Shop, Chancery Street.

Instructor ... ... GEORGE I. ALLEN.

SYLLABUS.

Timber.—The chief woods of New Zealand; their common names and properties; places where grown; uses in the building trade and for internal joinery.

Tools.—Their construction and correct use; grinding and sharpening; the mechanical principles underlying their use.

Drawing.—How to make and work from scale drawings. Oblique and Isometric projection. How to set out a rod, full size, for a door.

Practical.—Housing joint, and tongue and groove joint, showing the application and uses of each. Paring and grooving. Setting out and making geometrical figures. Chamfering and boring exercise. True planing and squaring. Making a square, octagonal and round prism. Slotting and sawing with the grain. Open mortice and tenon, and bridle joints. Jointing and glueing up. Bowsaw and spokeshave work. Making an elliptic mat. Mortising and tenoning. Haunched mortice and tenon, a joint for the top rail of a door. How to dovetail and brace a bracket to support a shelf. Dovetailing exercises. Common dovetail. Lapped dovetail. Setting out and making a two-panelled door, from student's own rod. Making a drawer from the scale drawing. Making a few mouldings of a simple pattern: Bead, scotia, ogee, etc.

If time permits during the Session, the student will make from his own drawing, a cupboard, utilising the drawer and door already finished.

Fee.—£2 for the Session.

Text Book.—Riley's Carpentry and Joinery, 7s.

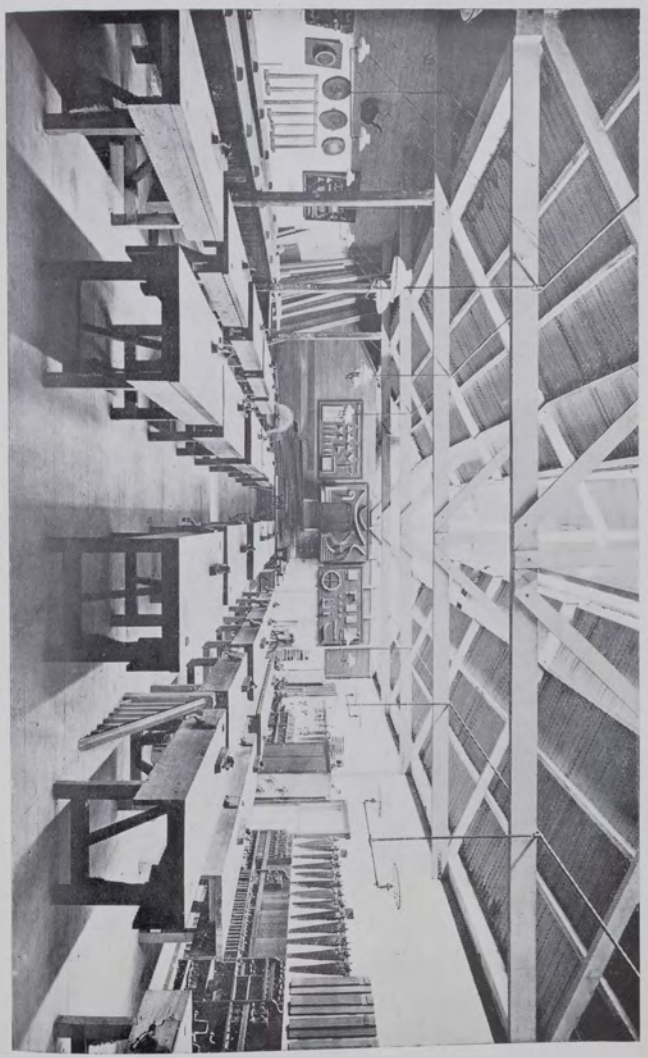
SECOND GRADE.

Class meets—From 7 p.m. to 9.30 p.m. on Fridays, at the Carpenters' Shop, Chancery Street.

Instructor ... .. ARTHUR D. TRENDALL.

SYLLABUS.

Principle of parallelogram and triangle of forces, and simple problems thereon. Simple mechanical contrivances, such as lever, pulley, wedge, screw. Problems illustrating their uses. Practical determination of densities of different woods. The principal tools used in Carpentry and Joinery, their names, shapes, uses, etc. The names and shapes of the commoner forms of mouldings. The practical setting out of simple pieces of joinery, such as door-frames, king posts, and of simple plane figures, including circular and elliptic curves. Nature and properties of the various kinds of wood used in Carpentry and Joinery, with the ports or places from which they are obtained. Methods of seasoning and preservation of timber. Strength of timber. Mode of planning and converting materials, so as to avoid waste and shrinkage, and obtain the maximum strength of stiffness. Tools, their names, shapes, uses,



CARPENTERS' AND CABINETMAKERS' WORKSHOP.

etc. Mechanical drawing as applied to Carpentry and Joinery. Drawings, full size, showing shoulder-lines, etc. on the material before it is cut; and the various joints in Carpentry and Joinery. Setting out rods. Working drawings of panelled and framed and braced doors, door frames, and casings, double hung sashes, sliding and hanging shutters, French casements, folding shutters, and boxings, rebates or linings for swing doors, etc.

Fee.—£2 for the Session.

Text Book.—Riley's Carpentry and Joinery, 7s.

THIRD GRADE.

Class meets—From 7 p.m. to 9.30 p.m. on Thursdays and Fridays, at the Carpenters' Shop, Chancery Street.

Instructor ... ... ARTHUR D. TRENDALL.

SYLLABUS.

A general knowledge of the proportions of stiles, rails, muntins, etc. in doors and windows, heights of rails in doors to suit knobs or latches, the usual sizes of doors, windows, etc., and of the kind of material and strength to be used. Mouldings, their forms and names. Intersection of mouldings at different angles, also of straight and circular mouldings. Enlarging and diminishing mouldings. Lines for determining the sections of moulded bars and hip-rafters in skylights and lanterns. Method of determining the true section of raking mouldings over square or oblique plans, also when the given moulding is on the rake. Bevels. Finding bevels for hip-rafters, jack-rafters, purlins, splayed linings, raking mouldings, and oblique work generally. Also a knowledge of the method employed to place bevel lines direct upon the work, without making a drawing of the same. Newel and geometrical stairs. Proportion of riser and tread. General planning of stairs to clear windows and other obstacles, and to obtain proper head room. Method of finding the proper position of winders and diminished fliers. General construction, and methods of support. Mechanical principles. The principles required in framing roof trusses, timber partitions, trussed girders, bracing large doors, gates, etc. Drawings to scale of the same, showing the comparative strain in different parts, by means of graphic statics. Methods of strengthening beams and girders by "flitching" and "trussing," etc. How wood roof trusses are acted upon by cambering the tie beam, and the motive for cambering. Different methods of shoring. Flying and raking shores. Joints. Mortice and tenon, the proportion tenons should bear to the thickness and width of material. The proportion of the parts of the tusk tenon, the position of mortices with regard to the neutral axis. Joints for oblique timbers, position of the shoulder with regard to the direction of the strain. Trimming round voids in roof, floors, etc. Different methods of scarfing. Proper position, and kind of straps and bolts used to secure joints. Hinges, various kinds of, and modes of applying them. Centre-pin joint, back-flap, rule-joints, etc. Working drawings, showing the path of different parts of the work so as to obtain clearance, etc. A general knowledge of the use of weather boards, water bars, throating, etc. for external work. Particular attention should be paid to the form of joints and manner of hanging French casements and skylights. Plumbing and Slating. Preparing and fixing flashings, tilting pieces, forming drips, rolls, cistern heads, etc. for plumber and slater, construction of flats for lead and zinc; also, preparing and fixing angle beads, grounds, etc., for plasterer.

Fee.—£2 for the Session.

Text Book.—Riley's Carpentry and Joinery, 7s.

FOURTH GRADE.

Class meets—From 7 p.m. to 9.30 p.m. on Thursdays and Fridays, at the Carpenters' Shop, Chancery Street.

Instructor ... ... ARTHUR D. TRENDALL.

SYLLABUS.

The various methods of constructing centres for segmental, elliptical, parabolic, and other arches, showing the direction of the joint lines of the arch. Fixing and striking large centres. Different forms of scaffolding, staging, and gantries and their construction. Circular work. Method employed to bend boards, ribs, or mouldings round circular work, by kerfing, grooving, steaming, etc. Moulds and bevels required for soffits in straight and circular walls—also for ribs in groins, domes, and niches, circle upon circle, etc. Handrailing. The proper height of handrails over fliers, winders and round landings. Method of describing handrail scrolls. The theory and use of tangent planes and tangent lines, as employed in the tangent system of handrailing. Method of determining the position of the face mould plane to pass through three points in the central line of rails—the moulds, bevels, length of balusters, etc. Construction of fittings for churches, shops, and domestic work. Pews and stalls, shop fronts and cases, tables, fitments for butler's pantry, house-keeper's room, etc. Labour-saving machinery. The "General Joiner." The "Elephant" band, frame, and circular saws. Planing, morticing, and moulding machines. A knowledge of these machines and of their control and management, powers and limitations. The process of manufacture of a given piece of work and the part played by the machine or machines employed.

Fee.—£2 for the Session.

Text Book.—Ellis's Modern Carpentry, 14s.
Ellis's Modern Joinery, 14s.

BUILDING CONSTRUCTION AND DRAWING.

FIRST GRADE.

Class meets—From 7 p.m. to 9.30 p.m. on Tuesdays, at the Normal School, Wellesley Street.

Instructor ... ... ARTHUR D. TRENDALL.

SYLLABUS.

The nature and properties of sand, lime, and cement; the composition of mortar or concrete and its application in floors, walls, etc.; the properties of bricks, stones, tiles, and slates; the various kinds of timber in ordinary use; the constituents of cast-iron, wrought-iron, and steel, and the essential or characteristic differences of their properties. Instruction will be given as to foundations in ordinary soils, footings for walls of moderate height; the construction of simple scaffolding; the various bonds of brickwork in plain walling, flues, arches, and fireplaces; varieties of simple masonry, such as rubble and ashlar walling and the plain mason's work on sills, reveals, etc.; plain carpentry in floor joists, stud partitions, ordinary roofs of span not exceeding that for a King-post truss; firrings of flats; simple joiner's work in floor laying, skirtings, deal-cased frames and double-hung sashes, and solid frames for simple casements, panelled doors and jamb linings, door frames and ledged and braced doors; ordinary plastering on walls, partitions, and ceilings, and the composition of the various coats; slating, including the dressing, cutting, and nailing of the slates; plain tiling and pan tiling and the various methods of hanging the tiles, and the treatment of valleys, hips, ridges, and eaves; and the meaning of "lap" and "gauge" roof plumbing, including the laying of flats with rolls, drips, etc., lead gutters, and flashings; simple glazing. Students will also be taught how to draw the sections of rolled joists, channels, angles, and tees. Students will be taught how to prepare drawings to scale in such a way as to give full information and exact guidance to the workmen who may have to use them. Pencil drawings on white paper will be made from actual details of building construction. Well-finished tracings will be taken of these pencil drawings, and from the tracings photographic prints will be produced.

Fee.—£1 for the Session.

Text Book.—Mitchell's Elementary Building Construction, 3s.

SECOND GRADE.

Class meets—From 7 p.m. to 9.30 p.m. on Wednesdays, at the Normal School, Wellesley Street.

Instructor ... ... ARTHUR D. TRENDALL.

SYLLABUS.

The class lessons and drawing practice will include the following subjects:—Excavation in various kinds of soil, including strutting and planking, concrete foundations for walls and piers, the use of damp courses, and the materials employed for them; gauged brickwork; hollow walls and the various methods of bonding them together; junctions of walls of various thicknesses and at different angles; chimney breasts and flues; irregular bonds; fireproof construction in floors and roofs; the best known building stones, their quarrying, bedding, cutting, and dressing; characteristics of timber, its conversion and seasoning. The use of machinery in treating timber for carpenters' and joiners' work; advanced carpentry and joinery; ordinary forms of staircase construction with close strings and bent strings; two and three-light windows with cased frames and hung sashes, also with solid frames, mullions, and transoms and casements, outside doors with bolection mouldings, sash doors and the finishings of door and window openings; finishing in eaves, hips, ridges, etc.; the nature, qualities, and weights of various kinds of slates; elementary drainage; the laying and jointing of glazed stoneware pipes; advanced constructional plumbers' work, including cold water supply to cisterns, and the position of the same in a house, baths, sinks, water-closets, and their connections, waste pipes, soil pipes, ventilation pipes, etc.; scaffolding for large buildings, shoring, strutting, needling, and under-pinning; centring for arches up to 15 feet span; the general principles of loaded beams; bending moments due to concentrated and distributed loads; the use of the triangle and polygon of forces in order to practically determine the resultant force in direction and magnitude, and to resolve such a resultant into its component forces; the determination of the stresses in simple braced structures; elementary exercises in the calculation of strength of materials.

Fee.—£1 10s 0d for the Session

Text Book.—Mitchell's Advanced Building Construction, 5s 6d.

THIRD AND FOURTH GRADES.

Class meets—From 7 p.m. to 9.30 p.m. on Tuesdays, at the Normal School, Wellesley Street.

Instructor ... ... HENRY S. MORRAN, A.R.I.B.A.

SYLLABUS.

The class lessons and drawing practice will include the consideration of:—Foundations—natural and artificial, upon land and under water, damp sites and their treatment. Brickwork, including all kinds of bonding, setting out bond in frontages, etc. Terra cotta and artificial stone; their manufacture and uses. Principles of sanitation; drains, traps, gulleys, disconnecting chambers, sewers, their ventilation and drain connections, iron drains. Drain testing and ventilation. Masonry. Character of various stones used in building and localities where found, how to test for quality and bed, fitness of various stones for different atmospheres, weight generally, approximate strength and chemical composition; stone stairs, composite walls, arches. More detailed knowledge of scaffolding, including gantries, elaborate centring, framing for concrete walls and modern methods of hoisting materials, roofing up to 60 feet span. Timber: Its seasoning, diseases, cause of decay, and means of preserving it. Roof timbering, open, hammer beam, and composite trusses. Modern iron trusses, including trussed purlins; all roof finishings, including slating, tiling, plumbing, etc., skylights and lanterns. Wood stairs of all kinds, including handrailing. Cast-iron, wrought-iron, and steel, properties, uses, strength, weight, and preservation. Iron and steel columns, stanchions and girders, including riveting, bolting, etc. The calculation of bending moments and shearing stresses. Ventilation and heating; hot water supply; provisions for gas and electric supply, in so far as these may affect the structure of the building; water supply; lightning conductors; various kinds of glass and glazing; plastering in all its branches. Attention will be specially directed to the increasing use of skeleton construction in steel, and to ferro-concrete construction.

Fee.—£2 for the Session.

Text Book.—Mitchell's Advanced Building Construction, 5s 6d.

Reference Books.—Adams' Building Construction, Rivington's Notes on Building Construction, Gray and Lowson's Graphical Arithmetic and Statics.

LIST OF INSTRUMENTS REQUIRED BY STUDENTS IN BUILDING CONSTRUCTION CLASSES.

Drawing board, not more than 2ft 8in by 2ft, with T-square, 8in set squares, one 45° and one 60°. Set of mathematical instruments. Set of scales. India-rubber. Indian ink. Drawing pins. Drawing paper. Tracing paper. Lead pencils and note-book.

PRACTICAL GEOMETRY.

FIRST GRADE.

(See page 55.)

SECOND GRADE.

(See page 56.)

THIRD GRADE.

Class meets—From 7 p.m. to 9.30 p.m. on Mondays, at the Normal School, Wellesley Street.

Instructor ... ... ARTHUR D. TRENDALL.

SYLLABUS.

Plane Geometry.—The construction of scales. The determination of third and fourth proportionals. The location of points by rectangular and radial co-ordinates, and by triangulation. The construction of any polygon from adequate data. Similar figures. Enlarging and reducing figures by radial projection and by the method of squares. Verification of the propositions of Euclid III., 34, 35, 36. Applications, including constructions for finding a mean proportional. Regular polygons. Figures inscribed in and circumscribing other figures, with applications to simple geometrical patterns, such as window tracery. This is intended more particularly for students taking Building Construction. To construct an ellipse having given the axes, or one axis and the foci. Tangent and normal at a point on the curve. Constructions relating to simple harmonic motions or harmonic functions. What is meant by periodic time, frequency, amplitude, phase, epoch, representative crank, advance, lag, lead. Interpretation of the expression $x = a \sin(qt + a)$ or $= a \sin(\theta + a)$. Plotting th: curve of sines from given data.

Vectors.—Meaning of the symbols $+$, $-$, $=$, when applied to vectors. Meaning of such expressions as $A = a_\alpha = 21_{55°}$, $A + B$. $A - B$, $a_\alpha + b_\beta - c_\gamma$, $2.4_{30°} + 1.7_{130°} - 3.5_{271°} = a_\alpha = A$. Verification by drawing of the bracket law as expressed by the equation $A - (B - C) = A - B + C$. Vector subtraction applied to relative positions, displacements, and velocities. Meaning of the scalar product of two vectors, with illustrations. Momentum and change of momentum, with applications. Force in a plane defined by the statement of a length, a magnitude, and an angle. The link polygon. Experimental illustration by means of spring balances or pulleys, cords, and weights; verification by drawing of the relations which exist between the weights, the form taken by the cord, and the tensions in the segments of the cord. Conditions of equilibrium of a set of forces in one plane (the force polygon and the link polygon must be closed). Applications. Moment of forces. Couples. Experimental verification of the principle of moments.

Solid Geometry.—General problems on lines and planes, with applications. Their inter-sections; the angles between them; parallel and perpendicular lines and planes. Auxiliary plans and elevations. Problems on trihedral angles and spherical triangles, with applications. Prisms and pyramids, the regular tetrahedron and octahedron, the sphere, the right circular cylinder and cone. Plans, elevations, and sections of these solids, singly or in combination. Interpenetrations and developments.

Fee.—£1 for the Session.

Text Book.—Harrison and Baxandall's Advanced Practical Plane and Solid Geometry, 4s 6d.

FOURTH GRADE.

Class meets—From 7 p.m. to 9.30 p.m. on Mondays, at the Normal School, Wellesley Street.

Instructor ... ... ARTHUR D. TRENDALL.

SYLLABUS.

Plane Geometry.—Cycloidal and trochoidal curves; the involute of the circle; tangent normal, and circle of curvature at any point. Envelopes. Setting out the forms of wheel teeth. The Archimedean and Logarithmic spirals. The Ionic volute. The setting out of the profiles of cams for mechanisms in which a given motion is required to be obtained. Geometry of the curves $y = ax$ and $y = ab^x$, with applications. Additional examples of simple vibration. Easy problems relating to the motion of the slide valve of a steam engine. To compound two simple vibrations of the same period and in parallel directions by the vector addition of their representative cranks. Applications to electrical problems and the motions of machines. The locus of a point whose motion consists of two simple vibrations of the same or different periods in directions inclined to one another. Plane motions in mechanisms. Instantaneous centre of rotation. Diagrams of velocity and acceleration. Degrees of freedom in plane motions.

Vectors.—Further applications of the link polygon. Determination of centre of gravity, moment of inertia, and radius of gyration. Uni-planar forces resolved along three given lines. Form of equilibrium of flexible cord or suspension chain under given conditions of loading. Bending moments and shearing forces in beams transversely loaded. Motion of fluids over fixed or moving vanes, with applications to turbines and centrifugal pumps. Linear and angular velocities and accelerations determined approximately by vector differences. Velocity and acceleration images for the links of machines having plane motions.

Solid Geometry.—General problems on the line and plane. The geometrical solids previously enumerated, together with polyhedra and oblique cones and cylinders. Solids of revolution of any form. Projections and sections of solids in various positions and in contact. Simple examples of tangent planes to them. Their interpenetrations. Developments of their surfaces (when possible), with applications to sheet metal work. Simple cases of their cast shadows, the rays of light being parallel. The perspective projection of solids in various positions and of simple buildings or other objects. Tortuous curves. Stereographic projection. The use of contours in problems relating to irregularly curved surfaces, such as those of earthworks, ships, etc. Volumes of solids.

Fee.—£1 for the Session.

Text Book.—Harrison and Baxandall's Advanced Practical Plane and Solid Geometry, 4s 6d.

PRACTICAL MATHEMATICS.

PRELIMINARY OR FIRST GRADE.

(See page 36.)

SECOND GRADE.

Class meets—From 7 p.m. to 9.30 p.m. on Thursdays, at the Technical College, Rutland Street.

Instructor ... ... FREDERICK J. OHLSON.

SYLLABUS.—(See page 36.)

THIRD GRADE.

Class meets—From 7 p.m. to 9.30 p.m. on Thursdays, at the Technical College, Rutland Street.

Instructor ... HOWARD H. MORGAN, B.Sc., A.R.C.S.

SYLLABUS.—(See page 36.)

TRADE DRAWING.

(See page 38.)

WOODWORK.

(See page 56.)

ENGLISH.

(See page 18.)

COMPOSITION FEES for students taking the full **Diploma Course** in Carpentry and Joinery: First Year, £2; Second Year, £2 10s; Third Year, £2 10s; Fourth Year, £3; and Fifth Year, £3 10s.

TIME TABLE.—For complete Time Table of Carpentry and Joinery Classes, see pages 86 and 87.

Tailoring and Catting Department.

Until the new College is erected and equipped, this Department will not be fully organised. For the present, instruction will be given in **Tailors' Cutting,** and this class will be open for **ladies** as well as for **men.** All students are strongly advised to take up a course of instruction in Free-arm drawing, as it is absolutely necessary to be able to use the chalk with freedom in order to draft patterns successfully.

Junior Free Pupils should take in their first year the course laid down on page 5.

TAILORS' CUTTING.

Class meets—From 7 p.m. to 9.30 p.m. on Tuesdays, at the Technical College, Rutland Street.

Instructor ... ... FREDERICK COLLEGE.

SYLLABUS.

1. The Principles of Measurement. Record of Measurements.

2. Study of the Male Figure. Normal proportions of the figure at different ages; comparative scale of sizes.

3. Abnormal figures. The stooping figure. The erect figure. The corpulent figure. High, low, round, and square shoulders. Enlarged scyes and large shoulders. Long neck. Short neck. Prominent calves. Knock knees. Bow legs.

4. The principles of scale drawing and drafting. Construction lines. The drawing of diagrams and the drafting of patterns from given measurements. Marking position of pockets.

5. Block patterns; their use and adaptation.

6. Materials. Influence of the nature of the material on the allowances for making up. Allowances for paddings. The methods of laying patterns to suit the various classes and designs of material.

7. **Trousers.**—The principles of trousers cutting. How to lay patterns (a) with a view to economy, and (b) to suit the various classes and designs of material. Trousers for normal and abnormal figures. Narrow legs. Wide legs. Straight legs. Riding trousers. Peg tops. Bell bottoms.

8. **Vests.**—The principles of vest cutting. How to lay patterns (a) with a view to economy, and (b) to suit the various classes and designs of material. Vests for normal and abnormal figures (with and without collars). Single and double-breasted ordinary vests. Single and double-breasted dress vests. Sleeved vests.

9. **Coats.**—The principles of coat cutting. How to lay patterns (a) with a view to economy, and (b) to suit the various classes and designs of material. Coats for normal and abnormal figures. Single and double-breasted frock coats. Single and double-breasted morning coats. Ordinary and roll collar dress coats. Dress jacket. Lounge, Norfolk, and Reefer coats. Overcoats. Frock overcoat. Single and double-breasted Chesterfields. Sac overcoat. Inverness. Ulsters. Hoods and capes. Covert coat. Prevailing style of overcoat.

10. **Ladies' Garments.**—Ladies' costume skirt. Ladies' close and loose fitting jackets.

Fee.—£2 for the Session.

Note.—Students attending this course will be permitted to attend the Art Class in Free-arm drawing, on Thursdays at the Normal School, Wellesley Street, **Free.**

Plumbing Department.

In this Department those who are engaged in plumbing will have an opportunity of receiving a thorough training in the principles and practice of their trade.

The full course extends over a period of five years and apprentices are strongly urged to enter the College as soon as they commence their apprenticeship. Students possessing the necessary knowledge and qualifications will be admitted to the Second Year or more advanced course.

The Full Five Years' Course is as follows:—

Preliminary, or First Year.	Elementary, or Second Year.	Intermediate, or Third Year.	Advanced, or Fourth Year.	Final, or Fifth Year.
Practical Mathematics Trade Drawing Elementary Science English (see p. 85)	Theory and Practice of Plumbing Practical Mathematics Drawing for Plumbers Physics and Chemistry	Theory and Practice of Plumbing Practical Mathematics Drawing for Plumbers Physics and Chemistry	Theory and Practice of Plumbing Building Construction	Theory and Practice of Plumbing Building Construction Hygiene

DIPLOMA IN PLUMBING.—The Diploma of the College, which is accepted by the Auckland City Council as qualifying for a Plumber's License, will be conferred on students who have attended the College for at least **three** Sessions, and have passed the following Examinations:—

CITY AND GUILDS OF LONDON INSTITUTE.—Plumbers' Work, Honours Grade

ENGLISH BOARD OF EDUCATION.—Practical Mathematics, First Stage; Building Construction, First Stage; Geometrical Drawing; Elementary Science of Common Life.

AUCKLAND TECHNICAL COLLEGE.—Drawing for Plumbers, Second Grade; Hygiene, First Grade.

EQUIPMENT.—The Plumbers' Workshop is fully equipped with all tools and materials that are necessary for up-to-date plumbing, including lead burning. For the lectures and theoretical instruction, there is a liberal supply of apparatus, models, charts, etc.

THEORY AND PRACTICE OF PLUMBING.

FIRST GRADE.

1. THEORY OF PLUMBING.

Class meets—From 7 p.m. to 8 p.m. on Tuesdays, at the Technical College, Rutland Street.

Instructor ... ... CHARLES T. HAYNES.

SYLLABUS.

Alloys, Solders, etc.—Properties, composition and preparation of different kinds of solders and other alloys used in plumbers' work; fusing points; means of purification.

The various tools used by plumbers, their use and maintenance. Reasons for the forms and materials of given tools.

The making of soldered seams and joints.

Lead Burning.—Its special advantages; different methods in use; hydrogen generators; precautions to be taken in the use of generators.

The cutting and straightening of sheet lead. Lead bossing.

The use of cast and milled lead, the advantages and disadvantages of each. The use of cast and drawn lead pipe, bends, traps, etc. Tinned and tin encased pipes. Galvanising and other methods of protecting metals. The composition and use of cements used in plumbers' work.

Fee.—See page 89.

Text Book.—Bennett's Technical Plumbing, 4s.

2. PRACTICAL PLUMBING.

Class meets—From 8 p.m. to 9.30 p.m. on Tuesdays, at the Plumbers' Workshop, Wellesley Street.

Instructor ... ... JOHN AULD.

SYLLABUS.

The principal object of this course is to accustom the student to the use of the various tools, to work with care and accuracy, and to allow him an opportunity of studying the character and properties of the materials used in workshops.

The student will be required to straighten sheet lead and tin, lead pipes, etc., prepare seams for soldering sheet lead and tin; practise various methods of soldering with fine, tinman's and plumber's solder; prepare solder of different kinds, and tarnish or soil; work simple exercises in sheet lead. All students qualified to carry out more advanced work will be allowed to work more difficult examples in the graded course of instruction.

Fee.—See page 89.

Text Book.—Bennett's Technical Plumbing, 4s.

SECOND GRADE.

1. THEORY OF PLUMBING.

Class meets—From 8.45 p.m. to 9.45 p.m. on Tuesdays, at the Technical College, Rutland Street.

Instructor ... ... CHARLES T. HAYNES.

SYLLABUS.

Roof Work.—The proper formation of gutters, flats, valleys, dormers, turrets, domes, etc., in order to render them damp and water proof. The proper arrangement of the woodwork to secure this object. Flashings, soakers, etc., for rendering weather proof the junctions of roofs, walls, and chimneys. Methods of conveying rain-water from roofs.

Applications of Elementary Physics to Plumbers' Work.—Expansion and contraction due to changes of temperature; frostburst; hot water circulation: heating apparatus. Elasticity of metals; tension and compression; strength of pipes and boilers; calculation of bursting pressure and safe load. Flow of metals, as of lead under great pressure, or in bossing. The principles of workshop appliances such as the lever, windlass, pulley blocks, and screw jacks.

Applications of Science to Plumbers' Work.—Water; soft, hard, mineral, and sea waters, and their effects upon pipes, cisterns, etc.; temporary and permanent hardness; contamination and purification of water. Head of water; flow of water in channels and pipes; calculation of velocities; the syphon; pumps, rams, and hydraulic jacks.

Sanitary Appliances in Common Use and the Principles of their Action.—Forms and materials for baths, lavatories, sinks, urinals, water closets, and their fittings; forms and principles of the various traps used in plumbers' work and their relative advantages; washing out and syphonage of traps, and methods of preventing the same.

Fee.—See page 89.

Text Book.—Bennett's Technical Plumbing, 4s.

2. PRACTICAL PLUMBING.

Class meets—From 7 p.m. to 8.30 p.m. on Tuesdays, at the Plumbers' Workshop, Wellesley Street.

Instructor ... ... JOHN AULD.

SYLLABUS.

The preparation of pipe joints (lead, copper, brass, iron). Joint making (copper bit, blowpipe, and plumbing). Calking joints with lead and rust cement. Making joints on earthenware and stoneware pipes. Working lead into various forms. Pipe fixing. Pipe bending.

Fee.—See page 89.

Text Book.—Bennett's Technical Plumbing, 4s.

THIRD GRADE.

1. THEORY OF PLUMBING.

Class meets—From 8 p.m. to 9.30 p.m. on Wednesdays, at the Technical College, Rutland Street.

Instructor ... ... CHARLES T. HAYNES.

SYLLABUS.

Water.—Sources of water supply, qualities and properties of water from deep and shallow wells, springs and other sources; storage, filtration and distribution, causes and prevention of pollution; quantity per head required for private supply purposes, rainfall.

Cold Water Supply.—Connection of pipes to mains, methods of fixing pipes, house cisterns, their construction and fittings, valves, taps, water waste preventers, flushing, tanks, stop and draining cocks, warning pipes, water hammer, air traps, water meters, filters, practical means of protection against frost, tracing leakage.

Hot Water Supply.—Systems of supply, storage, and arrangement for best results, safety arrangements, the cause and prevention of collapse of cylinders, cause and prevention of incrustation, cause and prevention of boiler explosions, the different forms of safety valves, the relations of temperature and pressure.

Pipe Fitting.—The cutting, bending, screwing, jointing, and fixing of iron, copper, and other metal pipes used for hot and cold water supplies, waste pipes, etc.

Drainage.—The fitting up and arrangement of soil and waste pipes. Laying out of drainage, materials, size, fall, traps, inspection and disconnecting chambers. Ventilation of drains, soil, and waste pipes.

Ventilation.—Different systems of ventilating for private dwelling-houses and public buildings; pressure systems, vacuum systems.

Fee.—See page 89.

Text Book.—Bennett's Technical Plumbing, 4s.

Reference Books.—Lectures to Plumbers, by J. W. Clarke.
Domestic Sanitary Drainage, by Maguire.

2. PRACTICAL PLUMBING.

Class meets—From 7.30 p.m. to 9.30 p.m. on Mondays and Fridays, at the Plumbers' Workshop, Wellesley Street.

Instructor ... ... JOHN AULD.

SYLLABUS.

The practical work will include:—Lead pipe bending and jointing; Sheet lead work of different kinds; Lead Burning.

Fee.—See page 89.

Text Book.—Bennett's Technical Plumbing, 4s.

Reference Books.—Standard Practical Plumbing, by Davies;
External Plumbing Work, by Hart.

FOURTH GRADE.

1. THEORY OF PLUMBING.

Class meets—From 7 p.m. to 8 p.m. on Wednesdays, at the Technical College, Rutland Street.

Instructor ... .. CHARLES T. HAYNES.

SYLLABUS.

Hot Water Supply and Heating.—Methods of obtaining large supplies of hot water, calorifiers, water heaters, central stations; heating buildings by hot water or steam, high and low pressure systems, sizes of pipes and boilers; radiating surface of heaters, heating surface of boilers.

Sanitary Appliances.—The arrangement and fitting of sanitary appliances in hospitals and other public buildings.

Drainage.—Setting out, construction, and principles of town and country house drainage; construction of sewers; storm overflows; sewage gases and ventilation; methods of sewage disposal for isolated country houses, access to and cleansing of drains; the testing of soil pipes, drains, etc., by smoke, water, chemicals, or air pressure.

Plans and Specifications.—The preparation of specifications and quantities and making of working drawings to scale; measuring work; Local Authorities' bye-laws and regulations.

Fee.—See page 89.

Text Book.—Bennett's Technical Plumbing, 4s.

Reference Books.—Lectures to Plumbers, by J. W. Clark.
Domestic Sanitary Drainage, by Maguire.

2. PRACTICAL PLUMBING.

Class meets—From 7.30 p.m. to 9.30 p.m. on Mondays and Fridays, at the Plumbers' Workshop, Wellesley Street.

Instructor ... ... JOHN AULD.

SYLLABUS.

The practical work will include:—Marking off and cutting out sheet-lead for cesspools of different shapes, cone pieces, etc.; lead laying, including gutters, flats, hips, and ridges, bossing-up cesspools, covering finials, torus rolls, breaks, etc.; pipe-bending; trap-making; joint wiping in vertical, horizontal, and other positions; lead burning by sand, copper bit and hydrogen burner; mixing solders, etc.

Fee.—See page 89.

Text Book.—Bennett's Technical Plumbing, 4s.

Reference Books.—Standard Practical Plumbing, by Davies.
External Plumbing Work, by Hart.

ELEMENTARY SCIENCE.

PRELIMINARY OR FIRST YEAR'S COURSE.

(See page 39.)

PHYSICS AND CHEMISTRY FOR PLUMBERS.

FIRST GRADE.

Class meets—From 8.15 p.m. to 9.45 p.m. on Thursdays, at the Technical College, Rutland Street.

Instructor ... HOWARD H. MORGAN, B.Sc., A.R.C.S.

SYLLABUS.

Explanation of fundamental terms. Matter, its states and properties. Properties of solids, liquids, and gases. The atmosphere, its composition; properties of oxygen, nitrogen, and carbon dioxide; combustion. Water, its composition and properties; pure water; distillation, solution; solubility; hard and soft water. Hydrogen and its properties. The balance. Measurement of volume and mass. Specific gravity of solids, liquids, and gases. Levers of various kinds and their application to practical work. The pulley block, windlass, screw, inclined plane, screw-jack, and wedge, and their application. Pressure. Fluid pressure. Action of the syphon. Head of water. Atmospheric pressure. Barometer. Boyle's law. Gas and water pressure gauges. Effects of heat on solids, liquids, and gases. Temperature. Thermometers. Distinction between heat and temperature. Measurement of heat. Specific heat. Latent heat. Melting, boiling, and evaporation. Transference of heat by conduction, convection, and radiation with their respective application. Cause of frost burst. Effect of heat in causing motion in liquids and gases. Hot-water circulation. Ventilation. Simple experiments in light.

Fee.—See page 89.

Text Book.—Bennett's Technical Plumbing, 4s.

SECOND GRADE.

Class meets—From 8.15 p.m. to 9.45 p.m. on Thursdays, at the Technical College, Rutland Street.

Instructor ... ... HOWARD H. MORGAN.

SYLLABUS.

Matter, its elements and compounds. Indestructibility of matter. Metals and non-metals. Nature of chemical action. Mixtures. Properties and forms of oxygen. Fire and flame; Welsbach mantle and ordinary incandescent electric lamp. Hydrogen, nitrogen, and carbon. Carbon and its oxides; coke, charcoal; soot, etc. Air and water, their constituents, properties, and impurities. Hard and soft water. Acids, hydrochloric, nitric, sulphuric. Alkalies. Formation of salts. Chemical and physical properties of sulphur, lime, clay, cement, iron, lead, copper, tin, zinc, and silver, and of the alloys, brass, gun-metal, solder, etc., and of white and red lead. Action of air, water, and the common acids on the metals used in plumbers' work, and its prevention. Coal Gas. Petroleum or Kerosene.

Fee.—See page 89.

Text Book.—Bennett's Technical Plumbing, 4s.

PRACTICAL MATHEMATICS.

PRELIMINARY OR FIRST YEAR'S COURSE.

Class meets—From 7 p.m. to 8.15 p.m. on Fridays, at the Normal School, Wellesley Street.

Instructor ... ... NELSON T. LAMBOURNE.

SYLLABUS.—(See page 36)

SECOND GRADE.

Class meets—From 7 p.m. to 8.15 p.m. on Thursdays, at the Technical College, Rutland Street.

Instructor ... ... HOWARD H. MORGAN.

SYLLABUS.

Approximate methods of arithmetical calculation; decimalisation of money; duodecimals; capacities of pipes and tanks of various dimensions; ratio; variation and proportion; simple equations and problems; indices; fractions; factors; mensuration of surfaces and volumes; Simpson's rule; use of squared paper; interpolation; meaning of sine, cosine, and tangent of an angle; logarithms and their use.

Fee.—See page 89.

Text Book.—Oliver and Boyd's Practical Mathematics, 1s 6d.

THIRD GRADE.

Class meets—From 7 p.m. to 8.15 p.m. on Thursdays, at the Technical College, Rutland Street.

Instructor ... ... HOWARD H. MORGAN.

SYLLABUS.

Problems on plane figures and curved surfaces, with special reference to the cutting out of sheet lead and other metals for covering dormers, gutters, lantern lights, and lining cisterns, with calculations as to the quantity of metal required for the purpose. Discharging capacities of pipes of various sizes and inclinations, and of flush tanks. Head of water. Calculations of pressure on surfaces under various conditions. Calculations to be made when pricing quantities. Calculations of areas and volumes.

Revision of the more advanced sections treated in the First and Second Grades.

Fee.—See page 89.

Text Book.—Practical Mathematics, by Knott and Mackay, 4s 6d.

BUILDING CONSTRUCTION AND DRAWING.

FIRST GRADE.

(See page 62.)

TRADE DRAWING.

PRELIMINARY GRADE.

(See page 38.)

DRAWING FOR PLUMBERS.

FIRST AND SECOND GRADES.

Class meets—From 7 p.m. to 9.30 p.m. on Wednesdays, at the Normal School, Wellesley Street.

Instructor ... ... WALTER FOSSEY.

SYLLABUS.

First Grade.

Freehand and model drawing especially relating to plumbers' work. Tools, etc. Methods of measurement. Scales. Orthographic, Isometric, and Oblique projection. Development of surfaces. Making simple plans, elevations and sections, and rough dimensions over sketches of plumbers' work.

Fee.—See page 89.

Text Book.—Bennett's Technical Plumbing, 4s.

SYLLABUS.

Second Grade.

More advanced work on the Syllabus set forth in the First Grade. Preparation of fully dimensioned and finished drawings. In all cases, the examples will be chosen as far as possible from actual plumbers' work.

Fee.—See page 89.

Text Book.—Bennett's Technical Plumbing, 4s.

ENGLISH.

PRELIMINARY OR FIRST GRADE.

(See page 18.)

PLUMBING FOR JOURNEYMEN.

PRELIMINARY GRADE.

1. THEORY OF PLUMBING.

Class meets—From 8 p.m. to 9.45 p.m. on Tuesdays, at the Technical College, Rutland Street.

Instructor .. ... CHARLES T. HAYNES.

SYLLABUS.

(See Second Grade, page 71.)

2. PRACTICAL PLUMBING.

Class meets—From 7.30 p.m. to 9.30 p.m. on Mondays and Fridays, at the Plumbers' Workshop, Wellesley Street.

Instructor ... ... JOHN AULD.

SYLLABUS.

(See Second Grade, page 71.)

Fee.—For Theory and Practice, £3 for the Session.

Text Book.—Bennett's Technical Plumbing, 4s.

ORDINARY GRADE.

1. THEORY OF PLUMBING.

Class meets—From 8 p.m. to 9.30 p.m. on Wednesdays, at the Technical College, Rutland Street.

Instructor ... ... CHARLES T. HAYNES.

SYLLABUS.

(See Third Grade, page 72.)

2. PRACTICAL PLUMBING.

Class meets—From 7.30 p.m. to 9.30 p.m. on Mondays and Fridays, at the Plumbers' Workshop, Wellesley Street.

Instructor ... ... JOHN AULD.

SYLLABUS.

(See Third Grade, page 72.)

Fee.—For Theory and Practice, £3 for the Session.

Text Book.—Bennett's Technical Plumbing, 4s.

HONOURS GRADE.

1. THEORY OF PLUMBING.

Class meets—From 7 p.m. to 8 p.m. on Wednesdays, at the Technical College, Rutland Street.

Instructor ... ... CHARLES T. HAYNES.

SYLLABUS.

(See Fourth Grade, page 73.)

2. PRACTICAL PLUMBING.

Class meets—From 7.30 p.m. to 9.30 p.m. on Mondays and Fridays, at the Plumbers' Workshop, Wellesley Street.

Instructor ... ... JOHN AULD.

SYLLABUS.

(See Fourth Grade, page 73.)

Fee.—For Theory and Practice, £3 for the Session.

Text Book.—Bennett's Technical Plumbing, 4s.

COMPOSITION FEES for Apprentices taking the full **Diploma Course** in Plumbing: First Year, £2; Second Year, £2 10s; Third Year, £2 10s; Fourth Year, £3; and Fifth Year, £3 10s.

TIME TABLE.—For complete Time Table of Plumbing Classes, see page 89.

Art Department.

Chief Instructor ... HARRY WALLACE, late Organising Instructor in Art and Handwork to the Burslem School Board, and Art Master at the Wedgewood Institute, Burslem.

In this Department provision has been made for teaching the artistic principles underlying the ordinary operations of various Trades and Industries in which Art plays an important part. The library contains most of the standard works on Architecture, Principles of Ornament, Anatomy, and the various branches of Design, and facilities have been provided for those students who wish to study the human figure. The Art room contains casts of ornaments, of animals, of anatomical studies, and of many of the finest examples of ancient and modern sculpture.

WORK OF STUDENTS IN ART CLASSES, AUCKLAND TECHNICAL COLLEGE.

The needs of public school teachers who require help in connection with the teaching of Art and Handwork in their schools have been carefully considered. A specially-designed set of blackboards has been provided for their use, and casts of carefully-selected objects have been secured for those who desire to study modelling for kindergarten purposes. Everything that is necessary for the teaching of Freehand Drawing, Model Drawing, Brush Drawing, Drawing in light and shade, Perspective, Design, and Drawing from nature is provided in the equipment of the College.

HOURS OF INSTRUCTION.

Instruction will be given to trade students on Tuesdays and Thursdays, from 7 p.m. to 9.30 p.m.; on Mondays, Wednesdays, and Fridays, to Teachers, from 6.45 p.m. to 9.15 p.m., as well as from 9.30 a.m. to 12 noon on Saturdays.

FEES.

£1 for two evenings per week during the Session.

COURSES OF INSTRUCTION.

Courses have been arranged to meet the requirements of:—

1. Teachers in Public Schools.
2. Cabinetmakers and Furniture Designers.
3. Architects' Pupils.
4. Art Students.

COURSES FOR TEACHERS IN PUBLIC SCHOOLS.

(See pages 82 to 84.)

COURSES FOR CABINETMAKERS AND FURNITURE DESIGNERS.

(See Cabinetmaking Department, pages 53 to 58.)

COURSES FOR ARCHITECTS' PUPILS.

The following courses have been arranged to prepare students for the Preliminary and Intermediate Examinations for the Associateship of the Royal Institution of British Architects.

Students who have already passed the Preliminary Examination or its equivalent will not take the Preliminary Course, but will be admitted to the Intermediate Course.

TIME TABLE.—PRELIMINARY COURSE.

Subject.	Instructor.	When Held.	Remarks.
English, Preliminary Grade	Charles Wilson	Monday, 8.15—9.30	See page 18
Practical Mathematics		Monday, 7—8.15	See page 36
French	H. Bruce Wallace	Wednesday, 7—9	See page 24
Geometrical Drawing Perspective Freehand Drawing	Harry Wallace	Tuesday and Friday, 7—9.30	See pages 80 and 81
Mechanics and Physics (Elementary Science), First Grade	H. H. Morgan	Thursday, 8.15—9.45	See page 39

Junior Free Place Pupils (see page 3) will be admitted to the above course **Free**; other students will pay a fee of £3.

TIME TABLE.—INTERMEDIATE COURSE.

Subject.	Instructor.	When Held.	Remarks.
Practical Geometry (First Grade)	George I. Allen	Wednesday, 7—9.30	See page 55
Practical Geometry (Second Grade)	Arthur D. Trendall	Monday, 7—9.30	See page 56
Building Construction (First Grade)	Arthur D. Trendall	Tuesday, 7—9.30	See page 62
Building Construction (Second Grade)	Arthur D. Trendall	Wednesday, 7—9.30	See page 63
Building Construction (Third Grade)	H. S. Morran, A.R.I.B.A.	Tuesday, 7—9.30	See page 64
Architecture	Harry Wallace	Thursday and Friday, 7—9.30	See page 82

Senior Free Place Pupils (see page 5) will be admitted to the above course **Free**; other students will pay a fee of £3.

COURSES FOR ART STUDENTS.

Every facility is given at the College for the training of persons who intend to adopt Art as a profession, and every assistance will be given to those who desire to make a knowledge of Art a part of their general education. The stages of instruction will be arranged progressively, and to suit the individual requirements of students.

FREEHAND DRAWING IN OUTLINE.

SYLLABUS.

Students will be taught to draw with the pencil or brush from photographic representations, or diagrams of flat ornament, such as inlays, patterns on pottery, mosaics, and textiles. Special attention will be paid to the development of a free hand and to the observation of proportion.

MODEL DRAWING.

SYLLABUS.

The instruction will deal with the method of drawing solid objects, complicated models, articles of furniture and domestic use, and tools used in trades and agriculture, etc.

Exercises will be arranged in drawing simple solid forms, as the cone, cylinder, etc., and in the combination of such forms with flowers, foliage, and architectural structure, showing the importance of rendering the same truthfully by means of line and flat washes of colour.

Students will be expected to make memory drawings at their homes of the models used in class.

PERSPECTIVE.

(See page 57.)

GEOMETRICAL DRAWING.

SYLLABUS.

(See Practical Geometry, First Grade, page 55.)

BLACKBOARD DRAWING.

SYLLABUS.

Students will be directed to the acquirement of freedom and skill in the use of chalk or brush with tempera on the blackboard, for the purpose of making diagrams or drawings in outline and in the mass on a large scale, and of illustrating various lessons to a class. The subjects treated will include natural forms, common objects, geometrical models.

BRUSH DRAWING.

SYLLABUS.

The technical fitness of the various appliances used for Brush drawing; the mixing of water colours to produce secondary and tertiary tints; the production with these, of harmonious colour effects. The various types of brush impressions, straight and curved lines, and the simpler typical brush strokes. The application of these elements to the ornamentation of given geometric spaces, and to the production of simple borders and patterns. The drawing of simple leaf, flower, and plant forms, and the adaptation of these forms to decorative purposes.

MODELLING IN PLASTICINE.

SYLLABUS.

Modelling a slab of Plasticine and building up simple forms upon it, such as ball, dome, oval, ovoid, etc. Making designs for border or filling a square, circle, etc., by various arrangements of such shapes.

Modelling simple natural forms, arranged so as to give relief, such as a leaf of the laurel, rhododendron, oak, sycamore, plane, etc., or simple flowers, such as crocus, tulip, harebell, rosebud, narcissus, etc., or simple shells, such as the mussel, oyster, snail, etc.

Modelling simple objects in the round, such as the apple, plum, lemon, orange, tomato, pear, onion, pea-pod, broad bean, egg, banana, etc.

Making rapid studies of simple natural objects, sufficient to show their character, proportion, mass, etc.

DESIGN.

(See page 58.)

PRINCIPLES OF ORNAMENT.

(See page 58.)

ARCHITECTURE.

SYLLABUS.

The orders. The Greeks' use of the orders. Doric, Ionic, and Corinthian. The Romans' addition of two others, the Tuscan and composite.

Sources from which the orders were derived. Rudimentary and archaic forms in which they appear in early Greek work. The mode in which they were employed by Greek and Roman architects. The way the Romans combined the orders with arches and pedestals, and variously extended the scope of the orders. The use made of the orders by Renaissance architects and the variations introduced.

Mouldings made use of with each order; the capital considered as the index to each; the enrichments applied to the various mouldings; the ornaments customarily made use of.

Buildings of architectural character, Ancient, Classic, Early Christian, Mediaeval, Renaissance, and Modern.

Terms in ordinary use in architectural books.

Special Classes for Teachers.

Teachers in the employ of the Board will be admitted to any of the classes of the College on the **payment of a deposit** of **ten shillings** for **each** class, the deposit being returned to those who make **eighty** (80) per cent. of the possible number of attendances, and who sit for the Examinations in the various subjects which they have studied at the College.

Application Forms can be obtained at the College, Rutland Street, where all deposits must be lodged before attendance to any class will be granted.

PLANT DRAWING FROM NATURE, DONE IN ART CLASSES FOR PUBLIC SCHOOL TEACHERS.

HYGIENE.

SYLLABUS.

Composition, characters and classification of drinking waters. Systems of water service. Chemical and microscopic examination of air. Principles and methods of ventilation. General principles of diet. Care and preservation of food. Properties of materials used in construction of various parts of a building. Materials and principles of clothing. Disposal of surface and rain water, of excreta and house refuse. Disinfectants, antiseptics, and deodorisers. General properties and composition of soil. Prevention of endemic and epidemic diseases.

Text Book.—Reynold's Hygiene for Beginners, 2s 6d.

HUMAN PHYSIOLOGY.

SYLLABUS.

The general build of the body. The blood and lymph. The heart, blood vessels, and lymphatics. Food and its digestion. The absorption and distribution of the digested products. Respiration. Excretion. The muscular system, animal mechanics and animal heat. The senses. The nervous system.

Practical demonstrations of the chief physiological phenomena connected with blood and its circulation, food and its digestion, respiration, and vision will be given

The dissection of some typical animal to show the relationship of the various systems will be carried out.

Text Book.—Foster and Shore's Physiology for Beginners, 2s 6d.

WOODWORK FOR TEACHERS.

FIRST YEAR'S COURSE.

SYLLABUS.

Lessons on the Principles of Manual Training, on Tools, and on Timbers, the latter as a branch of Nature Study. During the year each teacher will make a Board for his school, with a complete set of Exercises and Models, which will include garden tools, scientific apparatus, etc. The common knots and splices will also be taught

SECOND YEAR'S COURSE.

SYLLABUS.

Teachers taking up the Second Year's Course must have gone through that of the First Year, or show themselves qualified, to the satisfaction of the Instructor, to benefit by the more advanced instruction. In this course, special attention will be given to the making of models, etc., which will be helpful to the teaching, in the Public School, of History (e.g., weapons, shields, implements, etc., used by various nations in different ages), Mensuration (e.g., models to show the relation in length, areas, and volumes between the Metric and English systems), Science (e.g., balance, lever, inclined plane), Astronomy (e.g., sunstick), etc.

FREE RAILWAY PASSES.

Teachers will be granted Free Railway Passes in cases where they need them.

Time Table for Teachers' Classes.

Subject.	Examination.	Instructor.	When Held.	Where Held.	Remarks.
Freehand, Blackboard, Model, and Brush Drawing for First and Second Year Pupil Teachers	"D"	Harry Wallace	Mondays, 6.45 p.m. to 9.15 p.m.	Normal School, Wellesley Street	See pages 80 and 81
Freehand, Blackboard, Model, and Brush Drawing for Third, Fourth, and Fifth Year Pupil Teachers	"D" and "C"		Wednesdays, 6.45 p.m. to 9.15 p.m.		See pages 80 and 81
Drawing from Nature, Plasticine Modelling, etc., for Assistant and H ad Teachers	"C"		Fridays, 6.45 p.m. to 9.15 p.m.		See page 82
Drawing from Nature, Plasticine Modelling, etc., for Assistant and Head Teachers	"C"		Saturdays, 9.30 a.m. to 12 noon		See page 82
Hygiene and Physiology	"D" and "C"	G. P. Darnell-Sm th, B.Sc.	Mondays, 6.45 p.m. to 8.50 p.m.	Technical College, Rutland Street	See page 83
Dressmaking, Elementary Grade	"C"	Miss A. Campbell	Saturdays, 9.30 a.m. to 12 noon.	Room No. 12, Strand Arcade	See page 11
Cookery	"D" and "C"	Miss E. Lawson	Thursdays, 7 p.m. to 9.30 p.m.	Newton Manual Training School	See page 10
Woodwork	"D" and "C"	A. D. Trendall	Saturdays, 9.30 a.m. to 12 noon	Carpenters Shop, Chancery Street	See page 83

For Time Table of other subjects suitable for "D" and "C" Examinations for Teachers, see Junior Civil Service Time Table on page 26 and Senior Civil Service Time Table on page 28

TIME TABLE.—MORNING AND AFTERNOON DRESSMAKING AND MILLINERY CLASSES.

Subject.	Instructor.	When Held.	Where Held.	Fee.
Dressmaking	Miss A. Campbell	Wednesday, 10 to 12	Room No. 12, Strand Arcade	£1 5s.
Dressmaking	Miss A. Campbell	Tuesday, 2.30 to 4.30		£1 5s.
Millinery	Madame "Marion"	Monday, 2.30 to 4.30		£1 5s.

TIME TABLE.—FIRST YEAR COURSES FOR JUNIOR FREE PLACE PUPILS.

Subject.		Instructor.	When Held.	Where Held.
Preliminary Art Course.				
English	See page 4	Charles Wilson	Mon., 8.15 to 9.30	Normal School, Wellesley Street
Practical Mathematics		Charles Wilson	Mon., 7 to 8.15	
Art		Harry Wallace	Tues. and Thur., 7 to 9.30	Normal School, Wellesley Street
Preliminary Commercial Course.				
English	See page 5	Norman H.S.Law or William Kay	Wed., 8.15 to 9.30	Normal School, Wellesley Street
Commercial Arithmetic			Wed., 7 to 8.15	
Commercial Geography		R. H. Paterson or F. H. Brown	Tues., 7 to 8.15	Normal School, Wellesley Street
Commercial Correspondence			Tues., 8.15 to 9.30	
Shorthand or Typewriting		John Payne or Miss M. H. Cook	Mon., 7 to 9.30 Thur. or Friday, 7 to 9.30	Technical College, Rutland Street
Preliminary Domestic Course.				
English	See page 5	Norman H.S.Law or A. J. C. Hall	Wed., 8.15 to 9.30 Wed., 7 to 8.15	Normal School, Wellesley Street
Practical Mathematics		Miss E. Lawson	Mon., 7 to 9.30 or Thur., 7 to 9.30	Cookery Room, Newton Manual Training School
Household Cookery	- Any two	Miss E. Lawson	Tues., 7 to 9	
Laundrywork		Miss A. Campbell	Tues. or Friday, 7 to 9 Tues., 2.30 to 4.30 or Wed., 10 to 12	Room No. 12, Strand Arcade
Dressmaking				
Millinery		Madame "Marion"	Mon., 2.30 to 4.30 or Mon., 7 to 9	
Preliminary Plumbing and Engineering Course.				
English	See page 5	Nelson T. Lambourne	Fri., 8.15 to 9.30 Fri., 7 to 8.15	Normal School, Wellesley Street
Practical Mathematics		F. C. J. Cockburn	Wed., 7 to 9.30	Normal School, Wellesley Street
Trade Drawing				
Science		Howard H. Morgan	Tues., 7 to 9.30	Technical College, Rutland Street
Preliminary Cabinetmaking and Carpentry Course.				
English	See page 5	Charles Wilson	Mon., 8.15 to 9.30	Normal School, Wellesley Street
Practical Mathematics		Charles Wilson	Mon., 7 to 8.15	Normal School, Wellesley Street
Trade Drawing		F. C. J. Cockburn	Tues., 7 to 9.30	
Woodwork		George I. Allen	Thur., 7 to 9.30	Newton Manual, Training School
Preliminary Tailoring and Cutting Course.				
(Same as Preliminary Art Course above)	See page 5			

TIME TABLE.—EVENING CLASSES.

Subject.	Instructor.	When Held.	Where Held.	Fee.	Composition Fee.
ART DEPARTMENT.					
Preliminary or First Year's Course (see page 4)	—	—	—	—	£2
Advanced Courses.					
Freehand and Model Drawing, Light and Shade, Perspective, Drawing and Painting from Nature, etc.	Harry Wallace	Tuesday and Thursday, 7 to 9.30	Normal School, Wellesley Street	£1	
BUILDING TRADES DEPARTMENT.					
Preliminary or First Year's Course (see Preliminary Cabinetmaking and Carpentry Course, pages 5 and 54).	—	—	—	..	£2
Elementary or Second Year's Course.					
Carpentry and Joinery, 1st Grade	George I. Allen	Monday, 7 to 9.30	Carpenters' Shop, Chancery Street	£2	
Practical Geometry, 1st Grade	George I. Allen	Wed., 7 to 9.30	Newton Manual Training School	£1	£2 10s
Practical Mathematics, 2nd Grade	Frederick J. Ohlson	Thursday, 7 to 9.30	Technical College, Rutland Street	£1	
Intermediate or Third Year's Course.					
Building Construction and Drawing, 1st Grade	Arthur D. Trendall	Tuesday, 7 to 9.30	Normal School, Wellesley Street	£1	
Carpentry and Joinery, 2nd Grade	Arthur D. Trendall	Friday, 7 to 9.30	Carpenters' Shop, Chancery Street	£2	
Practical Mathematics, 3rd Grade	H. H. Morgan	Thursday, 7 to 9.30	Technical College, Rutland Street	£1	£2 10s
Practical Geometry, 2nd Grade	Arthur D. Trendall	Monday, 7 to 9.30	Normal School, Wellesley Street	£1	
Advanced or Fourth Year's Course.					
Carpentry and Joinery, 3rd Grade	Arthur D. Trendall	Thursday, 7 to 9.30 / Friday, 7 to 9.30	Carpenters' Shop, Chancery Street	£2	
Building Construction and Drawing, 2nd Grade	Arthur D. Trendall	Wed., 7 to 9.30	Normal School, Wellesley Street	£1 10s.	£3
Practical Geometry, 3rd Grade	Arthur D. Trendall	Monday, 7 to 9.30	Normal School, Wellesley Street	£1	
Honours or Fifth Year's Course.					
Carpentry and Joinery, 4th Grade	Arthur D. Trendall	Thursday, 7 to 9.30 / Friday, 7 to 9.30	Carpenters' Shop, Chancery Street	£2	
Building Construction and Drawing, 3rd Grade	H. S. Morran, A.R.I.B.A.	Tuesday, 7 to 9.30	Normal School, Wellesley Street	£2	£3 10s
Practical Geometry, 4th Grade	Arthur D. Trendall	Monday, 7 to 9.30	Normal School, Wellesley Street	£1	
Special Course.					
Building Construction and Drawing, 4th Grade	H. S. Morran, A.R.I.B.A.	Tuesday, 7 to 9.30	Normal School, Wellesley Street	£2	
CABINETMAKING DEPARTMENT.					
Preliminary or First Year's Course (see pages 5 and 53).	—	—	—	—	£2
Elementary or Second Year's Course.					
Cabinetmaking, 1st Grade	Benjamin P. Randle	Tuesday, 7 to 9.30	Carpenters' Shop, Chancery Street	£2	
Practical Geometry, 1st Grade	George I. Allen	Wed., 7 to 9.30	Newton Manual Training School	£1	£2 10s
Practical Mathematics, 2nd Grade	Frederick J. Ohlson	Thursday, 7 to 9.30	Technical College, Rutland Street	£1	

TIME TABLE—EVENING CLASSES.

Subject.	Instructor.	When Held.	Where Held.	Fee.	Composition Fee.
Cabinetmaking Department—*Contd.*					
Intermediate or Third Year's Course.					
Cabinetmaking, 2nd Grade	Benjamin P. Randle	Tuesday, 7 to 9.30	Carpenters' Shop, Chancery Stree	£2	
Practical Geometry, 2nd Grade	Arthur D. Trendall	Monday, 7 to 9.30	Normal School, Wellesley Street	£1	£3
Perspective	Harry Wallace	Thursday, 7 to 9.30	Normal School, Wellesley Street	£1	
Advanced or Fourth Year, and Honours or Fifth Year Courses.					
Cabinetmaking, 3rd and 4th Grades	Benjamin P. Randle	Tuesday, 7 to 9.30	Carpenters' Shop, Chancery Street	£2	£3
Elementary Design and Principles of Ornament	Harry Wallace	Tuesday and Thursday, 7 to 9.30	Normal School, Wellesley Street	£1	
COMMERCIAL DEPARTMENT.					
Preliminary or First Year's Course (see pages 5 and 15)	..	..	..	..	£2
Elementary or Second Year's Course.					
Commercial Arithmetic	William Kay	Monday, 7 to 8.15	Normal School, Wellesley Street	15s.	£2 1 s.; or with Shorthand or Book-keeping or Typewriting, £3
Commercial English	William Kay	Monday, 8.15 to 9.30	Normal School, Wellesley Street	15s.	
Commercial Correspondence	R. H. Paterson	Thursday, 7 to 8.15	Normal School, Wellesley Street	15s.	
Commercial Geography	R. H. Paterson	Thursday, 8.15 to 9.30	Normal School, Wellesley Street	15s.	
Book-keeping, Elementary	John Payne	Wednesday, 7 to 9	Technical College, Rutland Street	£1 10s.	
Shorthand	John Payne	Tuesday, 7 to 9.30	Technical College, Rutland Street	£1 10s.	
Typewriting	John Payne	Friday, 7 to 9.30	Technical College, Rutland Street	£2	
Accountancy, Special for Students over 18 years	John Payne	Monday, 7 to 9	Technical College, Rutland Street	£1 10s.	
Book-keeping, Intermediate	John Payne	Thursday, 7 to 9	Technical College, Rutland Street	£1 1 s.	£1
French	H. Bruce Wallace	Wednesday, 7 to 9	Technical College, Rutland Street	£1	
DOMESTIC DEPARTMENT.					
Preliminary Course (see pages 5 and 10)	..	..	..	..	£2
Dressmaking, Elementary	Miss A. Campbell	Friday, 7 to 9	Room No. 12, Strand Arcade	£1 5s.	
Dressmaking, Advanced	Miss A. Campbell	Wednesday, 7 to 9	Room No. 12, Strand Arcade	£1 5s.	
Cookery, Theory and Practice	Miss E. Lawson	Monday, 7 to 9.30	Newton Manual Training School	£1 5s.	For any two subjects, £2; for any three, £3
Cookery, Theory and Practice	Miss E. Lawson	Thursday, 7 to 9.30	Newton Manual Training School	£1 5s.	
Laundrywork	Miss E. Lawson	Tuesday, 7 to 9	Newton Manual Training School	£1	
Millinery	Madame "Marion"	Monday, 7 to 9	Room No. 12, Strand Arcade	£1 5s.	
Hygiene	G. P. Daynell-Smith	Monday, 6.45 to 7.45	Technical College, Rutland Street	£1 5s.	
Human Physiology	G. P. Daynell-Smith	Monday, 7.50 to 8.50	Technical College, Rutland Street	£1 5s.	
ELECTRICAL ENGINEERING DEPARTMENT.					
Preliminary or First Year's Course (see pages 5 and 29)	..	..	..	..	£2
Elementary or Second Year's Course					
Magnetism and Electricity, 1st Grade	S. Irwin Crookes	Thursday, 7 to 10	Technical College, Rutland Street	£1 10s.	£2 10s.
Applied Mechanics, 1st Grade	Charles C. Allen	Monday, 7 to 9.30	Mechanical Laboratory, Lorne Street	£1 5s.	
Practical Mathematics, 2nd Grade	Frederick J. Ohlson	Tuesday, 7 to 9.30	Technical College, Rutland Street	£1	
Intermediate or Third Year's Course.					
Applied Mechanics, 1st Grade	Charles C. Allen	Monday, 7 to 9.30	Mechanical Laboratory, Lorne Street	£1 5s.	£2 10s.
Electric Lighting, 1st Grade	S. Irwin Crookes	Wednesday, 7 to 9.30	Technical College, Rutland Street	£1 10s.	
Practical Mathematics, 3rd Grade	Leonard Cullis	Tuesday, 8 to 10	Technical College, Rutland Street	£1	
Heat Engines, 1st Grade	S. Irwin Crookes	Tuesday, 7 to 8	Technical College, Rutland Street	£1	
Workshop Practice, 1st Grade	J. E. Dangerfield	Thursday, 7 to 10	Machine Shop, Wellesley Street	£1	

TIME TABLE.—EVENING CLASSES.

Subject.	Instructor.	When Held.	Where Held	Fee.	Composition Fee.
Electrical Engineering Department—*Contd.*					
Advanced or Fourth Year and Honours or Fifth Year Courses.					
Applied Mechanics, 2nd and 3rd Grades	Charles C. Allen	Wednesday, 7 to 9.30	Mechanical Laboratory, Lorne St.	£1 5s.	£3 for Advanced Course. £3 10s. for Honours.
Electric Lighting, 2nd and 3rd Grades	S. Irwin Crookes	Friday, 7 to 10	Technical College, Rutland Street	£1 10s.	
Heat Engines, 2nd and 3rd Grades	J. E. Dangerfield	Tuesday, 7 to 8	Mechanical Laboratory, Lorne St.	£1	
Practical Mathematics, 4th and 5th Grades	L. Cullis	Tuesday, 8 to 10	Technical College, Rutland Street	£1	
Workshop Practice, 2nd and 3rd Grades	J. E. Dangerfield	Monday, 7 to 10	Machine Shop, Wellesley Street	£1	
Electric Wiring	James Pearce	Thursday, 7 to 9.30	Technical College, Rutland Street	£1 10s.	
Special Short Course for Motormen	Complete Prospectus	and Special Leaflets.	See page 39		
MECHANICAL ENGINEERING DEPARTMENT					
Preliminary or First Year's Course (see pages 5 and 41).	..	..	..	.	£2
Turning and Fitting Elementary or Second Year's Course.					
Applied Mechanics, 1st Grade	Charles C. Allen	Monday, 7 to 9.30	Mechanical Laboratory, Lorne St.	£1 5s.	£2 10s.
Machine Drawing, 1st Grade	Charles C. Allen	Thursday, 7 to 9.30	Normal School, Wellesley Street	£1 5s.	
Practical Mathematics, 2nd Grade	Frederick J. Ohlson	Tuesday, 7 to 9.30	Technical College, Rutland Street	£1	
Intermediate or Third Year's Course.					
Applied Mechanics, 2nd Grade	Charles C. Allen	Wednesday, 7 to 9.30	Mechanical Laboratory, Lorne St.	£1 5s.	£2 10s.
Machine Drawing, 2nd Grade	Charles C. Allen	Friday, 7 to 9.30	Normal School, Wellesley Street	£1 5s.	
Practical Mathematics, 3rd Grade	L. Cullis	Tuesday, 8 to 10	Technical College, Rutland Street	£1	
Heat Engines, 1st Grade	S. Irwin Crookes	Tuesday, 7 to 8	Technical College, Rutland Street	£1	
Workshop Practice, 1st Grade	J. E. Dangerfield	Mon. and Thur., 7 to 10	Machine Shop, Wellesley Street	£2	
Advanced or Fourth Year and Honours or Fifth Year Courses.					
Applied Mechanics, 3rd and 4th Grades	Charles C. Allen	Wednesday, 7 to 9.30	Mechanical Laboratory, Lorne St.	£1 5s.	£3 for Advanced Course. £3 10s. for Honours Course.
Machine Drawing, 3rd and 4th Grades	Charles C. Allen	Friday, 7 to 9.30	Normal School, Wellesley Street	£1 5s.	
Practical Mathematics, 4th and 5th Grades	L. Cullis	Tuesday, 8 to 10	Technical College, Rutland Street	£1	
Heat Engines, 2nd and 3rd Grades	J. E. Dangerfield	Tuesday, 7 to 8	Mechanical Laboratory, Lorne St.	£1	
Workshop Practice, 2nd and 3rd Grades	J. E. Dangerfield	Mon. and Thur., 7 to 10	Machine Shop, Wellesley Street	£2	
Special Courses.					
Special Coaching Classes for Government Certificates for Marine and Stationary Engineers (see page 52)	J. E. Dangerfield	Wed. and Fri., 7 to 9.30	Mechanical Laboratory, Lorne St.	£2 2s.	
Motor Cars, and how to Drive them (12 Lectures, see page 51)	Charles C. Allen	Tuesday, 7.30 to 9	Technical College, Rutland Street	£1	
Marine Oil Engines, and how to use them (12 Lectures, see page 51)	J. E. Dangerfield	Tuesday, 8 to 9	Mechanical Laboratory, Lorne St.	£1	
PAINTING AND DECORATING DEPARTMENT.					
Preliminary or First Year's Course. (Preliminary Art Course, see page 4).	..	..	..		£2
Drawing for Painters	Harry Wallace	Tues. and Thurs., 7 to 9.30	Normal School, Wellesley Street	£1	

TIME TABLE EVENING CLASSES.

Subject.	Instructor.	When Held.	Where Held.	Fee.	Composition Fee.
PLUMBING DEPARTMENT.					
Preliminary or First Year's Course (see pages 5 and 69).	...	...	...	...	£2
Elementary or Second Year's Course					
Drawing for Plumbers, 1st Grade	Walter Fossey	Wednesday, 7 to 9.30	Normal School, Wellesley Street	...	£2 10s.
Physics and Chemistry, 1st Grade	H. H. Morgan	Thursday, 8.15 to 9.45	Technical College, Rutland Street	...	
Practical Mathematics, 2nd Grade	H. H. Morgan	Thursday, 7 to 8.15	Technical College, Rutland Street	...	
Practical Plumbing, 1st Grade	John Auld	Tuesday, 8 to 9.30	Plumbers' Shop, Wellesley Street	...	
Theory of Plumbing, 1st Grade	Chas. T. Haynes	Tuesday, 7 to 8	Technical College, Rutland Street	...	
Intermediate or Third Year's Course.					
Drawing for Plumbers, 2nd Grade	Walter Fossey	Wednesday, 7 to 9.30	Normal School, Wellesley Street	...	£2 10s.
Physics and Chemistry, 2nd Grade	H. H. Morgan	Thursday, 8.15 to 9.45	Technical College, Rutland Street	...	
Practical Mathematics, 3rd Grade	H. H. Morgan	Thursday, 7 to 8.15	Technical College, Rutland Street	...	
Practical Plumbing, 2nd Grade	John Auld	Tuesday, 7 to 8.30	Plumbers' Shop, Wellesley Street	...	
Theory of Plumbing, 2nd Grade	Chas. T. Haynes	Tuesday, 8.45 to 9.45	Technical College, Rutland Street	...	
Advanced or Fourth Year's Course.					
Theory of Plumbing and Sanitary Law, 3rd Grade	Chas. T. Haynes	Wednesday, 8 to 9.30	Technical College, Rutland Street	...	£3
Practical Plumbing, 3rd Grade	John Auld	Monday and Friday, 7.30 to 9.30	Plumbers' Shop, Wellesley Street	...	
Honours or Fifth Year's Course.					
Theory of Plumbing and Sanitary Law, 4th Grade	Chas. T. Haynes	Wednesday, 7 to 8	Technical College, Rutland Street	...	£3
Practical Plumbing, 4th Grade	John Auld	Monday and Friday, 7.30 to 9.30	Plumbers' Shop, Wellesley Street	...	
Building Construction and Drawing, 1st Grade	Arthur D. Trendall	Tuesday, 7 to 9.30	Normal School, Wellesley Street	...	
Plumbing for Journeymen.					
Preliminary Grade, Theory	Chas. T. Haynes	Tuesday, 8 to 9.45	Technical College, Rutland Street	...	£3
Preliminary Grade, Practice	John Auld	Monday and Friday, 7.30 to 9.30	Plumbers' Shop, Wellesley Street	...	
Ordinary Grade, Theory	Chas. T. Haynes	Wednesday, 8 to 9.30	Technical College, Rutland Street	..	£3
Ordinary Grade, Practice	John Auld	Monday and Friday, 7.30 to 9.30	Plumbers' Shop, Wellesley Street	...	
Honours Grade, Theory	Chas. T. Haynes	Wednesday, 7 to 8	Technical College, Rutland Street	...	£3 10s.
Honours Grade, Practice	John Auld	Monday and Friday, 7.30 to 9.30	Plumbers' Shop, Wellesley Street	...	
TAILORING AND CUTTING DEPARTMENT.					
Preliminary Course or First Year's Course (Preliminary Art Course, see pages 5 and 67)	...	...	...	...	£2
Practical Tailors' Cutting (open also to Ladies)	Frederick College	Tuesday, 7 to 9.30	Technical College, Rutland Street	£2	

SPECIAL CLASSES FOR JUNIOR AND SENIOR CIVIL SERVICE EXAMINATIONS. (See pages 28 and 29.)

SPECIAL CLASSES FOR MATRICULATION EXAMINATIONS. (See pages 28 and 29.)

SPECIAL TEACHERS' CLASSES IN ART, HYGIENE, HUMAN PHYSIOLOGY, COOKERY, DRESSMAKING, AND WOODWORK. (See pages 82 to 84.)

EVENING CONTINUATION CLASSES

AT

THE NORMAL SCHOOL, WELLESLEY STREET.

As the Government now provides free education at the Technical College for boys and girls who have passed Standard VI. previous to 1905, or have gained Standard VI. Certificates of Proficiency during 1905, 1906, or 1907, the Auckland Education Board has established Evening Classes at the Normal School, Wellesley Street, to enable those who have left school without having passed Standard VI. to continue their studies and thus obtain this qualification.

At the end of the year an examination will be conducted by the Chief Inspector, and Standard VI. Certificates will be awarded to the successful pupils.

Fee.—The fee charged will be 12s 6d per term. First term, March 2nd to May 29th; second term, June 1st to August 28th; third term, August 31st to December 4th.

All fees are payable in advance to the teacher of the class.

TIME TABLE.

Name of School.	When Held.	Hour.	Name of Teacher.
Normal School, Wellesley Street.	Mnodays, Tuesdays, Thursdays.	7 p.m. to 9.30 p m.	J. Vuglar, Assistant Master, Ponsonby School

Classes Commence Monday, March 2nd, 1908.

GEORGE GEORGE, F.I.C., F.C.S.,

Director of Technical Education and Manual Training

Rutland Street.

January 24th, 1908.