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HARRIS INSTITUTE,

PRESTON.

PROSPECTUS, 1895-6.

PRESTON.

J. CRANE, Glover's Court Printing Works, Fishergate.

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THE
HISTORICAL
RECORD

1885-86

PROSPECTUS
1885-86

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Harris Institute, Preston.

Committees and Officers, 1895.

PRESIDENT :

Mr. WM. ASCROFT, J.P.

VICE-PRESIDENT :

The Rev. GEO. STEELE, M.A.

TREASURER :

COL. OLIVER, J.P.

COUNCIL :

Mr. W. Ascroft, J.P.	Rev. R. C. Fletcher, M.A.,	Mr. David Irvin, J.P.
Mr. R. W. Ascroft, M.A.,	C.A.	Colonel Oliver, J.P.
B.C.L.	Mr. E. Greenwood, J.P.	Rev. Jon. Shortt, M.A.
Mr. Y. W. Booth.	Mr. J. H. Hammond,	Mr. J. J. Sidgreaves, J.P.
Mr. Jas. Burrow, J.P.	M.D., J.P.	Mr. John Stanning, J.P.
Mr. H. Calvert, J.P.	Mr. John Healey, J.P.	Rev. Geo. Steele, M.A.
Mr. E. Dickson.	Mr. F. Hollins, J.P.	Rev. C. H. Wood, B.C.L.
Mr. R. F. Easterby.	Mr. Jas. Hibbert.	Rev. L. C. Wood, B.A.,
Mr. J. W. Fair, J.P., C.C.	Mr. John Holden, J.P.	C.A.

GENERAL PURPOSES COMMITTEE :

Chairman :—Mr. W. Ascroft. Vice-Chairmen :—The Rev. R. C. Fletcher
and Mr. Hy. Calvert.

All members of the Council are on this Committee.

FINANCE COMMITTEE :

Chairman :—Mr. Y. W. Booth. Vice-Chairman :—Mr. J. J. Sidgreaves.

Mr. R. F. Easterby.	Rev. R. C. Fletcher.	Mr. R. W. Ascroft.
Mr. Jas. Burrow.	Colonel Oliver.	

AGRICULTURAL COMMITTEE :

Chairman :—Rev. L. C. Wood. Vice-Chairman :—Rev. C. H. Wood.

Mr. R. C. Assheton.	Mr. J. H. Hammond.	Mr. J. J. Sidgreaves.
Mr. J. W. Fair.	Mr. H. P. Hornby.	Mr. Jno. Stanning.
Rev. R. C. Fletcher.	Mr. N. W. Helme.	Mr. H. F. Hibbert.

CLASS COMMITTEE :

Chairman :—The Rev. Geo. Steele. Vice-Chairman :—Mr. J. Healey.

Mr. R. W. Ascroft.	Mr. Y. W. Booth.	
Mr. J. Holden.	Mr. J. Stanning.	Rev. C. H. Wood.
Mr. E. Dickson.	Mr. E. Greenwood.	

COMMITTEE FOR SCHOOL OF COOKERY, &c. :

Chairman :—Dr. Hammond. Vice-Chairman :—Col. Oliver.

Mr. Y. W. Booth.	Rev. R. C. Fletcher.	Mr. Jas. Burrow.
Mr. E. Dickson.	Mr. Jno. Healey.	Mr. J. J. Sidgreaves.

BUILDING COMMITTEE :

Chairman :—Mr. W. Ascroft. Vice-Chairman :—Mr. J. Stanning.

Mr. A. E. Ascroft.	Mr. D. Irvin.	Rev. R. C. Fletcher.
Mr. Y. W. Booth.	Rev. C. H. Wood.	Colonel Oliver.
Mr. E. Greenwood.	Mr. J. Healey.	

The President and Vice-President are on all Committees.

T. R. JOLLY, SECRETARY.

HARRIS INSTITUTE, PRESTON.

SESSION 1895-6.

Notice to Students.

1. All Fees must be paid in advance and Students must obtain the official receipt in the Library, and show the same to the Teacher before their names can be entered on the Register.
2. Students are expected to attend regularly and punctually through the Session, and sit at all Examinations when required by the Teacher.
3. Students cannot take more than two Science Subjects unless a third subject is "Mathematics." The Council strongly advise all Students to limit the number of subjects, as success depends on a limited choice.
4. Students are expected to find all necessary Text Books and Material. Apparatus for experiments is provided by the Council free of charge. Broken or damaged articles must be made good by the Students damaging same. The Council will not be responsible for the loss of apparatus or material left by the Students in the Institute.
5. All Students attending any Science or Technical Class are recommended simultaneously to attend a Class in Arithmetic or Mathematics according to their capacity. Facilities for such attendance will be provided without extra charge.
6. Before joining the Classes in Mathematics Students may be tested by the Teacher as to their knowledge and capacity, and if not sufficiently advanced they will be required to join the Class in Arithmetic.
7. Candidates desirous of joining the Classes at the Institute, now attending Elementary Day Schools, must have passed the 4th Standard.
8. Science Teachers are permitted to nominate for the consideration of the Council, a limited number of Students for Scholarships who may fail to pass the May Examination, 1896, and who are considered especially deserving for their Class work and attendance.
9. Students who receive a Scholarship for an Elementary Pass must attend the Advanced Class the following Session in the same subject in which the Scholarship was awarded.
10. All business communications relating to the Classes, Examinations, &c., to be addressed to

T. R. JOLLY,

SECRETARY.

Harris Institute, PRESTON.

PRESIDENT :

WILLIAM ASCROFT, Esq., J.P.

VICE-PRESIDENT :

THE REV. GEORGE STEELE, M.A.

Syllabus, 1895-6.

THE SESSION COMMENCES
MONDAY, September 23rd, 1895.

Students can be enrolled on Friday Evening,
September 20th, from 7 to 9 p.m.

It is very important that all Students intending to join
any of the Classes should do so on the opening day.

ALL FEES PAYABLE IN ADVANCE.

Preston, September, 1895.

SCIENCE.

SUBJECT.	CLASS HOURS.	TEACHER.
Agriculture	Tuesday, 7-30 to 9 p.m. . .	Mr. J. Stacey
Applied Mechanics		
(Elementary) ..	Thursday, 7-30 to 8-30 p.m.	Mr. R. Pendlebury
Do. (Advanced) ..	Monday, 7-30 to 8-30 p.m.	Do.
Botany (Elementary)	Monday, 7-15 to 8-30 p.m.	Mr. T. H. Greenall
Do. (Advanced)	Monday, 8-45 to 9-45 p.m.	Do.
Building Construction		
(Elementary) ..	Tuesday, 7-30 to 9 p.m. . .	Mr. F. J. Pye
Do. (Advanced)....	Thursday, 7-30 to 8-45 p.m.	Assistant, Mr. A. Jolly
†Chemistry, Theoretical ..		
Inorganic (Elementary)...	Thursday, 7 to 8-15 p.m....	Mr. Frank T. Addyman,
Do. (Advanced)....	Thursday, 8-30 to 9-30 p.m.	B.Sc. Lond., F.I.C.
Chemistry (Practical)	Tuesday and Thursday,	
	7 to 10 p.m.	Assist., Mr. D. E. Bostock
Geology (Elementary)	Monday, 7 15 to 8-15 p.m.	Mr. G. Sutcliffe, F.C.S.
Do. (Advanced)	Monday, 8-30 to 9-30 p.m.	Do.
Human Physiology	Tuesday, 7-15 to 8-15 p.m.	Dr. Sergeant
Hygiene	Tuesday, 8-30 to 9-30 p.m.	Do.
Machine Construction		
(Elementary) ..	Monday, 7-45 to 9-15 p.m.	Mr. J. T. Buckley,
Do. (Advanced)....	Wednesday, 7-45 to 9-15 p.m.	M.I.M.E.
Mathematics, Stage 1	Tuesday, 7-30 to 8-45 p.m.	Assist., Mr. F. W. Ascroft
Do. Stage 2	Tuesday, 8-30 to 9-45 p.m.	Mr. H. Howarth, B.A.
Do. Stages 3 to 6	Monday, 8-15 to 9-45 p.m.	Do.
Magnetism & Electricity		Mr. F. W. Brewer, M.A.
(Elementary) ..	Monday, 7-30 to 8-30 p.m.	
Do. (Advanced)....	Monday, 8-45 to 9-45 p.m.	
Physiography		
(Elementary) ..	Wednesday, 7-30 to 8-30 p.m.	
Do. do.	Friday, 7-30 to 8-30 p.m.	
Do. (Advanced)....	Thursday, 8-45 to 9-45 p.m.	Mr. J. Gardner, F.R.G.S.
Sound, Light, and Heat		
(Elementary) ..	Thursday, 7-30 to 8-30 p.m.	
Heat (Advanced)....	Wednesday, 8-45 to 9-45 p.m.	
Practical Plane and Solid		
Geometry (Elementary)	Friday, 7-30 to 9 p.m.	Mr. F. J. Pye
Do. (Advanced) ..	Friday, 9 to 10 p.m.	Assistant, Mr. T. R. G.
Steam & Steam Engine		[Parker]
(Elementary) ..	Thursday, 8-45 to 9-45 p.m.	Mr. R. Pendlebury
Do. (Advanced)....	Monday, 8-45 to 9-45 p.m.	Do.
Theoretical Mechanics		
Solids (Elementary)	Monday, 7 to 8 p.m.	Mr. F. W. Brewer, M.A.
Do. Fluids (Elementary)	Wednesday, 7 to 8 p.m. . .	Do.

† Day Classes are held in Theoretical and Practical Chemistry.

For particulars see Special Syllabus.

Fee for Session, for any One, Two, or Three Subjects (of which one must be Mathematics or a Technical Subject), 5s., and 2s. 6d. extra for each additional Subject.

Classes in Elements of Physics, Elements of Chemistry, and Elements of Mechanics, with instruction also in Mathematics, and in special cases in Drawing, open to Boys from Elementary Day Schools, are taught by Messrs. G. Lynch, M.R.C.P., Wm. Clitheroe, and R. Pendlebury, at the English Martyrs', Christ Church, and St. Mary's Street Wesleyan Schools; and in Elementary Science and Mathematics at St. Michael's School, Ashton-on-Ribble.—Further particulars may be had from special Prospectus.

ART.

Head Master: MR. W. B. BARTON.

Assistant Master: MR. W. H. WOODALL.

Assistant Teachers: MISS B. H. SMITH, MR. WHITTAKER,

MISS F. BENTHAM, MISS B. BIBBY and MISS M. SNOWDEN.

CLASSES.	CLASS HOURS.	FEES.
Day Class	Monday & Thursday 11 a.m. to 1 p.m. & 2-30 to 4-30 p.m.	DAY CLASSES.
Do. (Life)	Wednesday, 11 a.m. to 1 p.m.	Per Session, 40s.
Evening Class	Monday, Wed., Thurs., and Friday, 7-15 to 9-15 p.m.	Two Terms, 30s.
Design Class	Tuesday, 2-30 to 4-30 p.m., Friday, 11 to 1 p.m.	One Term, 17s. 6d.
Modelling (Day Class)	Tuesday, 11 a.m. to 1 p.m.	EVENING CLASSES.
Do. (Evening Class)	Monday, Wed., Thurs., and Friday, 7-15 to 9-15 p.m.	Session, 10s.
		Two Terms, 8s.
		One Term, 5s.

Students may attend the Art Day Class one day per week for the following Fees:—
Session, 21s.; Two Terms, 17s. 6d.; One Term, 10s. 6d.

Pupil Teachers attending Elementary Day Schools, if examined at the Harris Institute, with the permission of the Managers of their School, 5s. per Session.
Do. if not sitting for examination at the Institute, 12s. 6d.

SCHOOL OF AGRICULTURE.

See Special Prospectus.

PUPIL TEACHERS' CENTRAL CLASSES.

See Special Prospectus.

TECHNICAL.

SUBJECT.	CLASS HOURS.	TEACHER.
Cabinet Making	Monday, 7 to 9-15 p.m. ..	Mr. S. D. M. Sykes
Brickwork and Masonry ..	Thursday, 8-45 to 10 p.m.	Mr. F. J. Pye
Carpentry and Joinery	Wednesday, 7-30 to 9-15 p.m.	Mr. F. J. Pye
* Cotton Spinning	Thursday, 7-15 to 9-15 p.m.	Mr. W. I. Hannan
Plumber's Work	Friday, 7-30 to 9 p.m.	Mr. F. W. Mackley
Weaving and Designing ..	Wednesday, 7-25 to 9-15 p.m.	Mr. J. T. Taylor
* Do. Do. (Practical) at intervals	Friday, 7-15 to 9 p.m.	Assistant, Mr. Z. Mawdsley
* Do. (Honours Grade)	Friday, 7-25 to 9-15 p.m. ..	
Do. (Practical)	Wednesday, 7-15 to 9-15 p.m.	
Fee, 2s. 6d. per Session, and 1s. for each additional Subject.		
Electric Lighting	Friday, 7-30 to 8-30 p.m. ..	Mr. W. R. Bowker
Telegraphy and Telephony	Friday, 8-45 to 9-45 p.m.	Do.
Woodcarving	Wednesday, 3 to 4 p.m. & 6 to 7-30 p.m.	Mr. T. Harrison
Electric Lighting and Woodcarving, 7s. 6d. each for Session.		
Telegraphy and Telephony, 5/- for Session.		

* These Classes are held at the Branch Institute, Lancaster Road, (opposite the Free Library).

MISCELLANEOUS.

SUBJECT.	CLASS HOURS.	TEACHER.
Music, Harmony (Elem.)..	Friday, 7 to 8 p.m.	Mr. J. Tomlinson
Do. (Intermediate)	Friday, 8 to 9 p.m.	Do.
Do. Do. (Advanced)	Wednesday, 7-45 to 9 p.m.	Do.
Latin (Elementary).....	Wednesday, 8 to 9 p.m. ..	Mr. F. W. Brewer, M.A.
Do. (Advanced).....	Wednesday, 9 to 10 p.m. ..	Do.
French (Elementary)	Friday, 7 to 8 p.m.	Monsieur H. A. Jutzi
Do. (Advanced)	Friday, 8 to 9 p.m.	Do.
Do. Conversation Class	Wednesday, 3 to 4-30 p.m.	Do.
German (Elementary)	Wednesday, 7-15 to 8-15 p.m.	Mr. H. A. Jutzi
Do. (Advanced)	Wednesday, 8-15 to 9-15 p.m.	Do.
Book-keeping (Elementary)	Wednesday, 7 to 8-15 p.m.	Mr. J. C. Forrester, C.A.
Do. (Intermediate)	Thursday, 7-15 to 8-30 p.m.	Do.
Do. (Advanced) ..	Wednesday, 8-15 to 9-30 p.m.	Do.
* Shorthand (Elementary)		
(Junior)	Monday, 7-15 to 8-15 p.m.	Mr. H. Cartmell
* Do. Do. (Senior)	Monday, 8-15 to 9-15 p.m.	Do.
Do. (Intermediate)	Tuesday, 7-15 to 8-15 p.m.	
	& Friday, 7-15 to 8-15 p.m.	Do.
Do. " Manual " ..	Thursday, 7-15 to 8-15 p.m.	Do.
Do. (Advanced) ..	Tuesday, Thursday, and	
	Friday, 8-15 to 9-30 p.m.	Do.
Fee, 5s. each for Session. Shorthand (Advanced), 3s. 6d.		
French Conversation Classes, Afternoon, 21s.		
Book-keeping and German (Advanced), 7s. 6d. each for Session.		
English (Elementary) ..	Tuesday, 7-30 to 8-30 p.m.	Mr. W. D. Smith
Do. (Advanced)	Tuesday, 8-30 to 9-30 p.m.	Do.
Singing, Tonic Sol-fa ..	Thursday, 7 to 9 p.m.	Mr. J. Smith
(Madrigal and Matriculation Class).		
Fee, 3s. 6d. each for Session.		
Singing, Tonic Sol-fa		
(Elementary) ..	Monday, 7-15 to 8-15 p.m.	Mr. J. Smith
Do. (Intermediate)	Monday, 8-15 to 9-15 p.m.	Do.
* Arithmetic (Elementary)	Tuesday, 7 to 8 p.m.	Mr. J. Renwick
* Do. do.	Wednesday, 7 to 8 p.m. ..	Do.
* Do. (Intermediate)	Tuesday, 8 to 9 p.m.	Do.
* Do. (Advanced)....	Wednesday, 8 to 9 p.m. ..	Do.
Fee, 2s. 6d. each for Session.		
Law Lectures	Tuesday and Thursday,	Mr. E. C. C. Firth,
	5 to 6 p.m.	M.A., B.C.L.
	Fee, 10/6 for Course.	
Type-Writing	Tuesdays and Fridays,	Mr. D. Sanderson
	7 to 9 p.m.	
	Fee, 10/- for Session.	
† School of Cookery & Domestic Science.		
Cookery		
Laundry Work		
Dress-making	(See Special Syllabus).	Mrs. Arnoux, <i>Principal</i> .
Millinery		
Sick Nursing		

* These Classes meet at Lancaster Road.

† These Classes meet at the School in Cross Street.

SCHOOL OF AGRICULTURE.

Principal: FRANK T. ADDYMAN, B.Sc. (Lond.) F.I.C.

AGRICULTURAL CHEMISTRY: FRANK T. ADDYMAN.

ASSISTANT: D. E. BOSTOCK.

GEOLOGY: FRANK T. ADDYMAN.

AGRICULTURE: H. S. DAINE, F.H.A.S., M.R.A.S.E.

VETERINARY SCIENCE: C. BLACKHURST, M.R.C.V.S.

AGRICULTURAL BOOK-KEEPING: J. C. FORRESTER, C.A.

MECHANICS AND STEAM: R. PENDLEBURY.

SURVEYING: F. E. DIXON, Assoc. M. Inst. C.E.

PREPARATORY WORK: J. H. BRITAIN, (Lond. Univ.)

The Session will consist of Three Terms, viz:

First Term from October 7th to December 20th, 1895.

Second Term from January 6th to March 14th, 1896.

Third Term from March 30th to May 1st, 1896.

PREPARATORY CLASS. (October to Christmas).

<i>Hour.</i>	<i>Monday.</i>	<i>Tuesday.</i>	<i>Wednesday.</i>	<i>Thursday.</i>	<i>Friday.</i>
a.m. a.m. 9-15 to 10-15	MECHANICS	Preparatory* Work	AGRICULTURE	Preparatory* Work	AGRICULTURE
a.m. a.m. 10-15 to 11-15	STEAM	CHEMISTRY	Preparatory* Work	VETERINARY SCIENCE	Preparatory* Work
a.m. p.m. 11-30 to 12-30	VETERINARY SCIENCE	AGRICULTURE	CHEMISTRY	AGRICULTURE	GEOLOGY

* This includes instruction in Arithmetic, English, &c.

JUNIOR CLASS. (Three Terms, October to May).

<i>Hour.</i>	<i>Monday.</i>	<i>Tuesday.</i>	<i>Wednesday.</i>	<i>Thursday.</i>	<i>Friday.</i>
a.m. a.m. 9-15 to 10-15	MECHANICS	—	AGRICULTURE	—	AGRICULTURE
a.m. a.m. 10-15 to 11-15	STEAM	CHEMISTRY	ARITHMETIC†	VETERINARY SCIENCE	ARITHMETIC†
a.m. p.m. 11-30 to 12-30	VETERINARY SCIENCE	AGRICULTURE	CHEMISTRY	AGRICULTURE	GEOLOGY

† This includes instruction in Agricultural Book-keeping.

SENIOR CLASS. (Three Terms, October to May).

<i>Hour.</i>	<i>Monday.</i>	<i>Tuesday.</i>	<i>Wednesday.</i>	<i>Thursday.</i>	<i>Friday.</i>
a.m. a.m. 9-15 to 10-15	MECHANICS	AGRICULTURE	ARITHMETIC†	AGRICULTURE	ARITHMETIC†
a.m. a.m. 10-15 to 11-15	STEAM	LABORATORY	Agricultural Chemistry	LABORATORY	Agricultural Chemistry
a.m. a.m. 11-30 to 12-30	AGRICULTURE	LABORATORY	VETERINARY SCIENCE	LABORATORY	VETERINARY SCIENCE
p.m. p.m. 2-30 to 4	—	SURVEYING	—	—	LABORATORY

† This includes instruction in Agricultural Book-keeping, Land Surveying, and Mensuration.

The Instruction will be free to approved Students resident in the Administrative County of Lancaster, and in addition the County Council will allow a sum, not exceeding Ten Shillings per week, either for board and lodging, or for travelling expenses to each Student in full attendance who fulfils the conditions laid down. No Student will be received under 14 years of age.

Arrangements will be made for Students to visit the County Council and other approved Farms, upon Wednesday afternoons, accompanied by Mr. H. S. Daine.

Students will be at liberty to attend appropriate Evening Classes at the Institute, conditionally on their making the required attendance and sitting for Examination under the Science and Art Department.

Students who are not residents in the administrative County of Lancaster will be admitted to the School at the following fees: Juniors £15 15s. Seniors £21 0s.

External Students are also admitted to any one or more Classes at Special Fees.

Attention is drawn to the consideration that whilst the primary object of the School is to prepare youths for the practical work of a farmer's life, it will at the same time greatly aid Students in preparing for the valuable Scholarships and Exhibitions offered by the Lancashire County Council.

For further information apply to T. R. JOLLY, Secretary, the Harris Institute, Preston.

Syllabus of Subjects.

Chemistry.

JUNIOR COURSE.—(CHEMISTRY).

The Chemistry of air and water; carbon, sulphur, phosphorus, chlorine, silicon, and their simple compounds; acids and alkalis, lime and clay, potash; the metallurgy of lead, iron, copper, zinc. Welding, galvanizing, soldering; Alloys. Vinegar, spirits, fats, oils, glycerine, starch, sugar, gluten, &c. Wind, snow, hail, rain. The barometer. Use of the thermometer. Simple calculations.

SENIOR COURSE.—(AGRICULTURAL CHEMISTRY).

The relations between the air, soils, plants, and animals. The chemistry of farm operations. The nature and use of artificial manures. The principles of feeding. The chemistry and bacteriology of dairy processes. Malting and brewing.

PRACTICAL CHEMISTRY.

General chemical manipulation. Experiments with the constituents of air, water, soils, manures, foods, and dairy produce. Qualitative analysis and testing.

Students who remain for a third year will spend a considerable portion of their time in the laboratory which will be open daily from 9-30 to 12-30 a.m., and from 2-30 to 4-30 p.m.

External Students will be admitted at a fee of £1 1s. per session for each two hours per week. No Student will be allowed to attend less than 4 hours per week.

Agriculture.

SOILS.

Origin, formation, distribution, classification, etc.

TILLAGE OPERATIONS.

Objects, mechanical and chemical changes, steam cultivation, autumn cultivation, cultivation of light and heavy soils, etc.

DRAINAGE.

Practical benefits, various systems, deep and shallow drains, materials used, effects on land, etc.

MANURES.

Classification, definition, farmyard manure, composition, management and application. Liquid manure. Covered yards. Lime, chalk, marl, as fertilizers. Artificial manures, nitrogenous, phosphatic, potassic, etc. Adulteration of manures, etc.

CROPS.

Origin of cultivated varieties, selection and culture, composition and distribution. Principles of cultivation. Influence of soil and climate on crops. Haymaking, etc.

LIVE STOCK.

Various breeds of horses, cattle, sheep, and pigs. Principles regulating breeding, variation, prepotency, heredity, etc. Influence of soil and climate. Relations of food to increase of growth, and value of manure.

FOOD.

Composition and classification, concentrated foods, pastures, natural grasses, clovers, etc. Systems of feeding stock, etc.

DISEASES OF CROPS.

Bunt and smut, mildew, blight, finger and toe, clubing, potato disease, ergot, etc.

DAIRY MANAGEMENT.

Milk, composition, production, and treatment. Separation of cream. Principles of butter and cheese making. Influence of food, treatment, exercise, etc.; air, yield of milk, butter, and cheese, etc.

FARM BUILDINGS.

Construction and arrangement according to description of farm, &c.

Geology.

Structure of the earth; volcanoes, earthquakes, rise and fall of land. Classification of rocks. Useful minerals, phosphates, gypsum, rock-salt, coal, iron, stone, &c. Fossils, coprolites. The history of the earth's crust, the use of geological maps. The formation of soils, causes of variation and fertility in soils.

Botany.

Elementary structural, physiological and systematic botany. Agricultural and economic plants: characters, habits, and uses of the more important species, especially of grasses, roots, cereals, and clovers. Weeds and noxious grasses. Diseases of plants. Identification of seeds of agricultural plants.

Entomology.

The common insects attacking crops, symptoms of attack, prevention, and remedy, etc. Classification and identification of insects and larvæ, etc.

Veterinary Science.

Classification of the animal kingdom as applied to Domesticated Animals.

Comparative osteology of the animals of the farm, inclusive of the arrangement of the bones in the formation of the skeleton.

Composition, structure, and use of bone, cartilage, ligament, and tendon. The formation and classification of joints.

Structure and function of muscle, voluntary and involuntary.

General anatomy of the brain and nervous system. Voluntary and involuntary motion.

Structure and function of the circulatory organs in Mammals. Heart, arteries, capillaries, veins.

Composition and properties of the blood, chyle, Chyme, and lymph.

Structure and function of the several organs of respiration. Animal heat. Normal and abnormal temperature.

General structure of the reproductive organs—male and female.

Impregnation, pregnancy, and parturition of domesticated animals.

Leading peculiarities in digestive organs of different classes of animals.

Development and structure of teeth. Dentition as indicating the age of animals of the farm.

Appropriation of food and water by the processes of digestion, assimilation, absorption, and nutrition. Secretory and excretory organs.

Disposal of excess of nutritive matter; waste of body, how effected and how repaired.

Structure and functions of the integumental parts of the body. Skin, mucous-membrane, and horny substance.

Structure and functions of the organs of sight and hearing.

Book-keeping.

Principles of book-keeping, description and uses of books. Cash-book, journal, ledger. Assets and liabilities, profit and loss, valuation, balance sheet, etc.

Surveying.

Ten lessons in practical land measurement to be given to the senior Students after Christmas.

Explanation of the general principles of Surveying and Land Measurement, and of the instruments used. Explanation as to fences, watercourses, boundaries of land. Explanation of Estate Plans. Surveying with the chain. Measurement of haystacks, marlpits, &c. Surveying over obstacles and hilly ground. The Field Book—method of entering measurements. Making a Plan, from measurements taken, of any enclosure of land. Mensuration as applied to Surveying. Calculating from Plans the area of a field or enclosure.

Mechanics.

Force, standard units, composition and resolution of forces, simple machines, laws of motion, works of agents or machines. Fluid pressure, specific gravity, pressure of atmosphere, hydraulic appliances, pumps, &c.

Agricultural Engineering.

Mechanical energy, friction, simple machines, steady flow of water, loss of energy by flow of water in pipes, fly wheels, measurement of power, hydraulic transmission of power. Steam, hot air, gas and petroleum engines, steam boilers, nature and strength of materials used in structures. The mode of action and general principles involved in the construction of farm implements.

Preparatory Work.

Arithmetic up to decimal fractions. English grammar and composition. Essay writing.

Analytical Department.

Professor of Chemistry:—FRANK T. ADDYMAN, B.Sc., F.I.C.,
(Formerly Assistant to Dr. Voelcker in the Laboratory of the Royal
Agricultural Society of England.)

Analysis of feeding stuffs, manures, soils, and water will be made at especially low rates for farmers living in the County of Lancashire, provided that such analysis be required for *bona fide* agricultural purposes.—For scale of fees apply to F. T. ADDYMAN, Harris Institute, Preston.

SPECIAL FEES FOR ANALYSIS PAYABLE BY FARMERS.

The following Fees for Analysis will be payable by Farmers residing in the County of Lancaster, provided that such Analysis and Reports be required for *bona fide* agricultural purposes, and for the private information only of the Farmer applying for them; and they are, moreover, in no sense for the information or use of manufacturers or other persons.

In the event of any Analysis or Report showing a Manure or Feeding Stuff to be either impure or below the guarantee given to the purchaser, the latter is at liberty to show such Report and Analysis to the Vendor; but if the material proves to be up to the guarantee given, the Analysis and Report may *not* be communicated to either vendor or manufacturer.

No money value of a Manure or Feeding Stuff will be assessed, but if the Farmer names the price charged, the cost of carriage, and any other items which influence the cost, the Analyst will say whether the material be worth the sum charged.

In the event of any report being misused, the Farmer shall be called upon to pay the ordinary Analyst's Fee of One or Two Guineas.

All fees must be paid at the time of sending the Sample.

LIST OF FEES.

	£	s.	d.
1. Determination of the per centage of Nitrogen in a Sample of Sulphate of Ammonia, Shoddy, Horn Dust, Dried Blood or other Nitrogenous Manure	0	2	6
2. An Analysis of a Sample of Nitrate of Soda	0	2	6
3. Determination of the per centage of Soluble Phosphates in a Sample of Mineral Superphosphate or in any other Manure	0	2	6
4. Determination of the per centage of Insoluble Phosphates in a Sample of Basic Slag (Thomas' Phosphate Powder) or in any other Manure	0	2	6
5. Determination of the per centage of Soluble and Insoluble Phosphates in any Manure	0	3	6
6. Determination of the per centage of Nitrogen, together with the Soluble <i>or</i> Insoluble Phosphates in any Manure (such as Bone Meal, &c.)	0	3	6
7. Determination of the per centage of Nitrogen, together with the Soluble <i>and</i> Insoluble Phosphates in any Manure (such as Dissolved Bones, Compound Manures, &c.)	0	5	0

8. Determination of the per centage of Potash in Sulphate or Muriate of Potash, &c.	0	2	6
9. Determination of the percentage of Lime in a Limestone or Marl	0	3	6
10. Determination of the per centage of Lime, Magnesia and Phosphoric Acid in a Limestone or Marl	0	5	0
11. Determination of the per centage of the essential constituents in a Feeding Stuff (Oilcakes, Meals, &c.)	0	5	0
12. A <i>Complete</i> Analysis of any Manure or Feeding Stuff ...10/- to	1	0	0
13. A <i>Partial</i> Analysis of a Sample of Soil.....	0	10	0
14. A <i>Complete</i> Analysis of a Sample of Soil	1	10	0
15. Determination of the hardness of a Sample of Water.....	0	3	6
16. An Analysis of a Sample of Water to determine its suitability for domestic purposes	0	10	0

All Communications referring to Analysis to be addressed to Mr. ADDYMAN, the Harris Institute, Preston.

INSTRUCTIONS FOR SELECTING AND SENDING SAMPLES FOR ANALYSIS.

Please read this carefully.

ARTIFICIAL MANURES.

Take a large handful from each dozen bags, break down any lumps with the hand, and mix the whole well together on a large sheet of paper. From the heap select six small portions of about 4oz. each, and after mixing these thoroughly together, divide the whole into two equal parts, and put each into a clean, dry, wide-necked bottle with a well-fitting cork or stopper, or into a well-fitting tin box. Both samples should then be labelled, dated, and sealed. One of them is to be retained by the purchaser and the other by the vendor. *Samples for analysis should upon no account be merely put up in paper.*

N.B.—Samples—both of manure and feeding stuffs—should always be taken by the purchaser or his agent in the presence of the seller or his agent (or in the presence of two independent witnesses), to whom due notice of the time of sampling should be given.

SOILS.

Dig a little trench about two feet deep exposing the soil and subsoil. Cut from the side of this trench horizontal scrapings of the soil down to the top of the subsoil. Catch these on a clean board, and collect in this manner about one pound weight of soil taken from the whole surface of the section. Similar scrapings of subsoil immediately below should be taken and preserved separately. Five or six similarly drawn samples should be taken from different parts of the field, and kept separate while being sent to the chemist, that he may examine them individually before mixing in the laboratory.

WATERS.

The water should be sent in a perfectly clean Winchester quart bottle made of clear glass and with a well-fitting glass stopper, which is readily obtained at any chemist's shop. Or, better, such a bottle—chemically clean and ready for filling with the sample—will be despatched from the Chemical Laboratory of the Harris Institute upon application, the carriage to be paid by the sender of the water. The sample-bottle should be rinsed out with the water to be analysed before being filled. Well water should be allowed to run for some time before the sample is drawn. Standing water from cisterns, ponds, &c., should be sampled by immersing the bottle entirely under the water, and holding it, neck upwards, about 4 inches below the surface. Spring or stream water should be sampled in dry weather, by immersion, if possible; but, if not deep enough for that, a perfectly clean cup or glass should be used for transferring the water to the bottle. When the bottle has been filled, the stopper should be rinsed in the water before being replaced, after which it is to be securely tied down. For the determination of the degree of hardness, only one quart wine bottle of the water is required; this bottle must also, of course, be perfectly clean.

N.B.—Samples should be dated and despatched to the Laboratory *immediately* after being taken.

It ought to be unnecessary to add that the water supply of every farm should be above suspicion.

LIMESTONES, MARLS, IRONSTONES AND OTHER MINERALS.

Whole pieces, weighing from 4 to 8 oz. should be sent. These may be enclosed in small linen bags or wrapped in paper if there is no tin at hand.

OILCAKES.

Take three strips (of the entire breadth of the cake) from the middle of three whole cakes, breaking the latter into two halves for the purpose. The three strips should then be packed in a tin, and the latter dated, labelled and sealed down as above. Three duplicate pieces, similarly dated, labelled and sealed, should be retained by the purchaser.

FEEDING MEALS.

Samples of these should be taken in the same manner as samples of manure, and put into tins. About 4 to 6 oz. are sufficient for an analysis.

On forwarding samples, *separate* letters should be sent to the Institute addressed to Mr. ADDYMAN, specifying the nature of the information required, and if possible, the object in view.



Preston & District Pupil Teachers' School.

Head Master - Mr. J. H. BRITTAIN, Inter. B.Sc., (Lond.)

Assistant Lecturers : MISS WALMSLEY, Mr. W. D. SMITH,
Mr. J. SMITH.

Prospectus.

1.—This School now provides a four years' course of instruction in all the subjects of Schedule V. of the Education Code, and is open to Pupil Teachers of Preston and District with the following restriction :—

Except under special circumstances, no teacher can be admitted later than three months after the commencement of the Session, or allowed to join the Scholarship Class without having previously attended the Junior Classes.

2.—LENGTH OF SESSIONS :—

(A) October to October for 1st, 2nd, and 3rd Year Teachers.

(Next Session commences October 21st, 1895).

Pupil Teachers are prepared for the OCTOBER Examination only. The Education Department will allow all Pupil Teachers attending the School to be examined at one time (i.e. October) ; and they recommend that the Indentures of all Teachers date in future from the beginning of the Civil Year.

(B) January to December for Scholarship Candidates.

(Next Session commences January 6th, 1896).

N.B.—Teachers are required to begin attending certain (Evening) Science and Art Classes in September of each year. Names of intending students should therefore be sent in BEFORE THE END OF AUGUST.

3.—It is clear that the Education Department is requiring from Pupil Teachers a higher degree of scholastic attainment than formerly, and it is probable that in the near future these requirements will be still further increased. It is hoped, therefore, that considerable care will be exercised in the choice of boys and girls as candidates for the office of Pupil Teacher. In many towns such candidates are drawn from the Higher Grade Schools, where they have laid a foundation (in Mathematics, Science, Language, and Drawing) for their studies as Pupil Teachers. It is suggested that probable candidates be encouraged to study the elements of subjects more advanced than those covered by their standard work (e.g., by attending the Continuation Classes held under the auspices of the Harris Institute). The rudiments of Latin may be mentioned as especially desirable for boys.

Boys and girls are not prepared at the Institute to pass the "Candidates'" Examination. It is, however, very important that attendance at the 1st Year Class should not be delayed until the session has advanced. If a boy or girl fail as a "Candidate," and cannot therefore continue teaching, only a nominal fee will be charged for the partial attendance at the 1st Year Class.

4.—FEES. A Yearly Fee of £2 10s. 0d. (charged to the account of the Managers) is payable for each student attending the School. This fee admits to all the Classes (Day and Evening), and is not reduced for a portion of the session.

5.—The Syllabus of Subjects for the Pupil Teachers' Examinations is found in Schedule V. of the Day School Code. The "Queen's Scholarship Examination" Syllabus may be obtained (post free) on application to the Secretary, Education Department, Whitehall, London, S.W.

6.—Special attention is called to the recent decision of the Science and Art Department that there is nothing to prevent the Technical Instruction Committees of County and County Borough Councils from making grants in aid of the instruction in technical subjects (e.g., Needlework, Music, Modern Languages, Teaching) of Pupil Teachers employed in Elementary Schools. At present the rural Pupil Teacher is to a great extent shut out from the advantages of Central Classes, owing to the expense of travelling to and from the "Centre." Some Local Authorities have already assisted teachers by paying their railway fares to and from Preston, and there is no reason to doubt that similar assistance would be given in other districts if Managers and Head Teachers would make known the justice of the Pupil Teacher's claim.

Time Tables.

1.—AFTERNOONS (1st, 2nd, and 3rd Year Teachers).

	2-0 to 2-35	2-35 to 3-40	3-40 to 4-20	4-30 to 5-15
1ST YEAR (MONDAY)				
Boys	Reading and Composition	Mathematics	Latin	} Geography and Penmanship
Girls	Do.	Arithmetic and Needlework	English	
2ND YEAR (TUESDAY)				
Boys	Reading and Paraphrasing	Mathematics	English	} School Method and Penmanship
Girls	Do.	Arithmetic and Needlework	Do.	
3RD YEAR (THURSDAY)				
Boys	Reading and Paraphrasing	Mathematics	} English (3-50 to 4-30).	} School Method and Penmanship
Girls	Do.	Arithmetic and Needlework		

2.—“SCHOLARSHIP” CLASS (Friday).

2-0 p.m. to 2-30 p.m. ...	Reading and Composition
2-30 „ to 3-0 „ ...	Arithmetic
3-0 „ to 3-30 „ ...	History
3-30 „ to 4-0 „ ...	English
4-10 „ to 4-40 „ ...	School Method
4-40 „ to 5-30 „ ...	Geography and Penmanship
6-30 „ to 8-0 „ ...	Mathematics (Boys only)

3.—EVENING CLASSES (Between May & September).

TIME.	TUESDAY. (3rd Year and Scholarship)	THURSDAY. (1st and 2nd Years)
6-30 to 7-10	Geography or History	Geography
7-10 to 7-50	French	French
7-50 to 8-30	Algebra (Girls) Euclid (Boys)	History

4.—SATURDAY MORNINGS.

TIME	1ST YEAR	2ND YEAR	3RD YEAR	SCHOLARSHIP
9-15 to 10-0	English (Girls) Latin (Boys)	Literature	Music	English
10-0 to 10-45	History	Geography	Literature	Music
11-0 to 11-45	Literature	Music	Geography	Mathematics (Boys) Domestic Economy & Needlework (Girls)
11-45 to 12-30	Music	History		

Law School.

Syllabus of a Course of Classes conducted by
Mr. ERNEST C. C. FIRTH, M.A., B.C.L., Barrister-at-Law.

SUBJECT :—EQUITY.

- 1.—Married Women.
- 2.—Conversion and Re-conversion.
- 3.—Fraud and the rule in *Derry v. Peek*.
- 4.—Mortgages of Real and Personal Property.
- 5.—Partnership.
- 6.—Election.
- 7.—Specific Performance.

TEXT BOOK :—Snell's Principles of Equity.

The Classes will be held at the Institute, at 5 o'clock, on Tuesday and Thursday afternoons in each week, commencing on Tuesday, November 5th.

The Classes will be 13 or 14 in number, and each class will last one hour.

FEE FOR THE COURSE, 10/6.

Tickets of admission may be obtained at the Institute, and it is requested that intending students will send in their names before October 31st.

The President offers a Prize, value £1 1s., (to be competed for at the end of the session), for the best Essay on some Subject comprised in one of the above Divisions to be selected by the Lecturer, conditionally on not less than 4 Essays being submitted to the Examiner.

SCIENCE.

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Principles of Agriculture.

Teacher Mr. J. STACEY.

TUESDAY, 7-30 to 9.

Many persons, it is thought, have only a crude idea of what is intended to be taught at this Class. For the information of these, it may be said, the Lectures will embrace the Circulation of Organic and Inorganic matter from the Soil to the Plant; from Vegetable to Animal Life, and its return to the Soil to begin again; the Formation and nature of the Soil will be explained; the Development of Plants, their Food, how they take this food from the Soil and the Atmosphere; Animal Life and its Economy. From all this it may be seen that sufficient of the cognate sciences will be treated of to interest the Student who knows something of Geology, Chemistry, and Physiology. Agricultural Science is to these Sciences what the Applied Mathematics are to Pure Mathematics.

Pupil Teachers and Assistants would do well to add this Science to their others, for it is certain that Technical Knowledge, founded on the Principles of Agriculture, must come into demand if the most important industry of the Country—the Economical Supply of Food—is, as it must be better understood.

Applied Mechanics.

ELEMENTARY COURSE.

Teacher Mr. R. PENDLEBURY

THURSDAY, 7-30 to 8-30.

Applied Mechanics is one of the science subjects for which a certificate must be obtained, before the full technological certificate will be granted by the City and Guilds of London Institute, to students who have passed in the following technical subjects.

Cotton Manufacture, Weaving and Pattern designing, Plumbers' Work, Electrical Engineering, Mechanical Engineering, Carpentry and Joinery.

The list for the first stage is necessarily comprehensive, but the questions will be framed in such a manner that a student who has obtained a fair knowledge of a portion of the subject may hope to pass with some credit.

Easy questions involving arithmetical results may arise, and in particular the student will be taught to solve simple mechanical problems by graphic construction.

The subjects at the examination, for which the student will be prepared, are as follows :—

The Principle of Work, and its application to Simple Machines; Levers, Safety Valves, Inclined Plane, Screw Threads, the Screw and Lever in combination, Power gained by Wheelwork.

Conversion of Motion. Endless Bands, Fast & Loose Pulleys, Crank and Connecting Rod, Cams. Special contrivances such as the Wheel and Compound Axle, Weston's Pulley Block.

Energy,—What it means, the Fly Wheel and Fly Presses.

The Pressure of Water. Estimation of Water Pressure on plane surfaces, such as Sluice Gates, the Hydrostatic Press.

Machines for Raising Water. Lift Pump, Force Pump. Materials. The Shrinkage of Wood in Drying, Iron, qualities required for different purposes, Testing of Iron for Strength and Ductility. Steel, Hardening and Tempering.

Strength of Materials. Power of Resistance of different materials to Tensile and Compressive Strains, Power of Resistance to Transverse Strains, Position of Load and Distribution of Load.

Friction. The laws of Friction, Contrivances for lessening the effect of Friction.

Applied Mechanics.

ADVANCED COURSE.

Teacher Mr. R. PENDLEBURY

MONDAY, 7-30 to 8-30.

The Advanced Course includes everything mentioned in the elementary course, but the student must possess a more extended and thorough knowledge of the various details, as well as of theoretical principles.

The additional matter will be the following :—

Friction. Examples where Friction is useful.

Rolling Friction. Brakes. Friction Dynamometer.

Strength of Materials. Estimation of Transverse Strains on Rectangular Timber Beams. Cast and Wrought Iron Girders. Cantilevers.

Strains on Framework. Examples of Framework with corresponding Diagrams of Stress, Roofs, Lattice Girders, Trussed Beams.

Shearing and Twisting Strains. Cotters, Rivets, Joints of Plates. Strength of Shafting to resist Torsion. Hollow or Solid Shafting.

The Conversion of Motion. Quick Return Movements. Linkwork and Parallel Motion. Peancellier's Invention. Trains of Wheels for Screw-Cutting. Epicyclic Trains.

Hydraulic Machines. Hydraulic Press. The Hydraulic Jack. Hydraulic Cranes.

Machine Tools. Lathes, Ordinary and Screw-Cutting. Planing, Shaping, and Slotting Machines. Reversing Motions. Drilling and Boring Machines

Botany.

Teacher Mr. T. H. GREENALL.

FIRST STAGE, MONDAY, 7-15 TO 8-30.

SYLLABUS.

1.—General structure of the flowering plant. Structure and comparison of such typical flowers as are obtainable.

2.—Internal structure of the plant, illustrated and made practical throughout by means of sections prepared by the teacher. Students are also taught to prepare their own sections.

3.—Nutrition of plants; use of manures; conduction of water from the root to the leaves; transpiration; the distribution of the organic substances formed in the leaves; respiration.

4.—Reproduction of plants; the special modifications leading up to the process of reproduction; the various forms of flowers; nature of the reproductive process; origin of fruits; the different kinds of seeds and modes of germination.

5.—Description in technical language of plants generally; the outlines of classification; methods of recognising relationships amongst plants; characters of some of the principal orders.

The course is suited to Agricultural and Pharmaceutical Students, and to Medical and other students preparing for the universities and colleges. It is hoped to interest also Art students, and students of Natural History and Microscopy.

REQUISITES: Razor or sharp penknife; lens (triplet) or magnifying glass; one or two common needles or pins; two thin exercise books, (with limp covers), good quality; one common exercise book for rough notes.

ADVANCED STAGE.—A Class will be formed if a sufficient number of students present themselves. Syllabus and information on application to the Teacher.

Building Construction.

Teacher ...	...	Mr. F. J. PYE, (Honours)
Assistant ...	...	Mr. A. JOLLY

ELEMENTARY COURSE.—TUESDAY, 7-30 TO 9 P.M.

The student will be taught the elementary principles and practice of Building Construction. The lessons will include:—

The drawing to scale of details in all branches of the building trades.

The object of bond in brickwork. English and Flemish bond, &c., in walls of various thicknesses. Footings with offset. Angles of buildings, window and door openings with reveals and square jambs. Arches of various kinds, gauged, cut or rough, inverted arches, &c.

Corbelling, trimmer arches in fireplaces, &c.

Sections and elevations of the following kinds of Mason's Work:—

Uncoursed and coursed rubble, block in course, ashlar, with their bond and proper dimensions, and the following dressings:—Window sills and heads, window and door jambs, door steps, string courses, copings, cornices, blocking courses, and the following methods of connecting stones, cramps, dowels of various kinds, lead plugs, joggles, &c.

Use of wood plugs, lintels, and discharging arches. The proper cross section of cast and rolled iron beams and cast-iron cantilevers. Elevation and section of lead work connected with chimneys, ridges, hips, valleys, gutters, and lead flats. Sections of slating lead on boards or battons.

Elevations and sections of panelled, ledged, and braced doors, &c., single and double hung sashes, window boxings, casement sashes with solid frames, solid door and window frames, door casings, &c. Angle beads, skirtings, grounds, &c.

Elevations and sections of collar beam, king post and queen post trusses' framed partitions, with ironwork used; single, double, and framed floors, showing modes of supporting, stiffening, and framing the timbers; trimming round hearths and wells of stairs. Joints in floor boards, joining timber by halving, lapping, notching, cogging, scarfing, fishing; mortice and tenon as applied to wall plates, roof timbers, floors, ceilings. &c. Dovetailing, cross-grooving, rabbiting, plough-grooving, chamfering, housing.

Mouldings and beadings of various kinds used in Joinery.

ADVANCED COURSE.—TUESDAYS & THURSDAYS, 7-30 to 9 p.m.

In addition to the subjects taught in the Elementary Course, in all of which more advanced and complicated questions will be considered, will be taught:—The nature of the stresses to which the different parts of simple structures are subjected as follows:—Roof trusses, framed partitions, large centres, girders, beams, &c. Strength of iron and wood beams. The best forms for struts, ties, and beams. Joints for iron trusses, &c.

The nature, application, and characteristic peculiarities of the following materials in ordinary use for building purposes:—Bricks of different kinds, freestones, Bath or Caen (or stones of similar description), granite, limes of various kinds, cements, plasters, concretes, asphalte. Timber of different kinds. Lead.

Constructive details as follows:—Timbering, excavations, foundations, sewers, use of piles, hoop-iron bound in brickwork, diagonal and herring bone bond, damp courses, hollow walls, flues, fireplaces, chimneys, arches, mortar joints, setting of bricks and stones, stone stairs, stone walls, &c. Fireproof floors, circular and egg-shaped drains, concretes, floors, roofs of iron or wood, roof coverings in slate, tiles, and zinc, plastering, &c.

Wooden stairs and fixing skylights, architraves, linings, grounds, skirtings, &c.

Fees for Building Construction:—Practical, Plane, and Solid Geometry and one technical subject, 5s. per annum.

Each technical subject, 2s. 6d. per session.

Evening Chemistry Classes.

Lecturer ... Mr. FRANK T. ADDYMAN, B.Sc. (Lond.), F.I.C.
(Professor of Chemistry).

Demonstrator ... Mr. D. E. BOSTOCK.

THEORETICAL INORGANIC CHEMISTRY.

ELEMENTARY STAGE. THURSDAY, 7 to 8-15 p.m.

A Course of Lectures, fully illustrated by experiments, on hydrogen, oxygen, chlorine, nitrogen, carbon and sulphur, and the compounds of these elements, together with an introduction to the fundamental principles of the Science.

Book recommended:—Remsen's Elements of Chemistry.

ADVANCED STAGE. THURSDAY, 8-30 to 9-30 p.m.

In this Course the non-metallic and metallic elements and their compounds will be treated of much more fully than in the elementary stage, special attention being paid to those substances which are of manufacturing and commercial interest. Lectures will also be given on the atomic theory, and on the laws governing the combination of gases, etc., etc.

Books recommended (to be chosen from):—Remsen's Elements of Chemistry; Watt's Inorganic Chemistry (edited by Tilden); Kolbe's Inorganic Chemistry (edited by Lloyd Snape); Bloxam's Chemistry (edited by J. M. Thomson); Ramsay's Inorganic Chemistry.

HONOURS COURSE. Hour to be arranged subsequently.

In addition to the Subjects mentioned under the Elementary and Advanced Stages, candidates for Honours are expected to possess a knowledge of the following :—

The properties of the elementary bodies and their more important combinations (with the exception of the Organic Compounds).

Classification of the elements, relations between quantivalence and atomic weight, isomorphism, specific and atomic volumes, atomic heat, constitution of salts, theory of normal, acid and basic salts.

The thermal phenomena of chemical combination. Thermal unit. Heat of combustion. Absolute thermal effect and its equivalent in mechanical effect. Theory of flame. Cause of luminosity. Principles of spectrum analysis, as applied to the determination of the composition of terrestrial matter. Dissociation. Diffusion of gases. Laws of electrolysis.

The Candidates will also be expected to show a satisfactory acquaintance with the latest discoveries in Inorganic Chemistry.

NOTE.—No Candidate who does not pass the Practical as well as the Theoretical examination can obtain a medal or certificate in Honours.

Books recommended :—See under the “Advanced Stage”; Ramsey’s Inorganic Chemistry would be of great value here.

PRACTICAL INORGANIC CHEMISTRY.

ELEMENTARY & ADVANCED STAGES. TUESDAY & THURSDAY,
7 to 10 p.m.

Note.—An attendance of at least two hours is required in Practical Chemistry.

In the Practical Class the Student will himself have the opportunity of preparing many of the substances treated of in the elementary and advanced theoretical courses, and of demonstrating their properties. He will also study the reactions, wet and dry, of the principal bases and acids, concluding with the detection of the basic and acid radicles in simple salts and in mixtures of salts.

Books recommended :—Tilden’s Practical Chemistry, Clowes’ & Coleman’s Elementary Qualitative Analysis.

HONOURS STAGE. TUESDAY, 7 to 10 p.m.

After having acquired a thorough knowledge of the Qualitative Chemical Analysis of Inorganic Substances, the Student will be required to study the more important methods of Quantitative Analysis. (For particulars of this course see the “Science and Art” Syllabus). Candidates in the Honours Stage of Chemistry cannot obtain a medal or certificate unless they pass in Practical as well as Theoretical Chemistry. Students will further find the practical courses of the greatest assistance in helping them to a knowledge of the subjects treated of in the corresponding theoretical courses. The examinations of the Pharmaceutical Society and of other bodies are also largely practical.

Books recommended :—Clowes’ Qualitative Analysis; Clowes’ and Coleman’s Quantitative Analysis.

THEORETICAL ORGANIC CHEMISTRY.

ELEMENTARY STAGE.

This class will be formed if sufficient Students apply.

Note.—Evening Students in the Chemical Laboratory will be supplied with all the ordinary apparatus and reagents. Any breakages will be charged against them at cost prices; the main object of this is to induce care on the part of the Student.

For Day Chemistry Classes see Syllabus of School of Agriculture

Geology.

Teacher ... Mr. GEO. SUTCLIFFE, F.C.S.

ELEMENTARY STAGE—MONDAY, 7-15 to 8-15 p.m.

ADVANCED „ „ 8-30 to 9-30 p.m.

SYLLABUS.

Earth Sculpture. or the Evolution of Surface features by the process of erosion.

The changes which have taken place in past ages in the physical condition and appearance of the earth's surface.

Origin, Determination, and Classification of the Rocks and principal Minerals constituting the "Crust of the Earth."

The relative ages of Rocks, their mode of occurrence, and the changes produced in them by sub-aerial and subterranean causes.

Arrangement of the Stratified Rocks into Geological Systems.

The development of the various forms of life during successive Geological Periods

The Subject will be fully illustrated by specimens of Rocks, Minerals, Fossils, &c., &c.

Human Physiology.

Teacher ... DR. E. SERGEANT

TUESDAY, 7-15 to 8-15 p.m.

The course of Lectures will follow the Syllabus of the Science and Art Department, comprising the following :—

Anatomical Preliminaries—Chemical Preliminaries—General View of the Animal Body in Action. The Blood—The Circulatory System—The Alimentary System—The Liver.—The Respiratory System—The Urinary System—The Skin—Animal Heat—The Muscular System and Animal Mechanics—The Senses—The Nervous System.

The Lectures will be fully illustrated by means of diagrams, the Skeleton, and portions of Animals.

Text Books :—Animal Physiology, by W. S. Furneaux, and Huxley's Elementary Physiology.

Hygiene.

Teacher DR. E. SERGEANT

TUESDAY, 8-30 to 9-30 p.m.

The Course of Lectures will cover the Syllabus of the Science and Art Department, comprising the following :—

1. ELEMENTARY HUMAN PHYSIOLOGY.
2. FOOD, DIET, AND COOKING.—Classification & uses of food substances. Animal food, vegetable food, condiments; diet requisites for maintenance. Cooking, roasting, and boiling; Cooking apparatus.
3. WATER AND BEVERAGES.—Different kinds of water. Sources of water. Good drinking water. Sources of contamination of water and its deleterious effects. Tea, Coffee, & Cocoa; preparation and effects; fermented drinks; effects.
4. AIR.—Amount of air necessary for each person; movements of air brought about by changes of density; composition of air; impurities of air.
5. REMOVAL OF WASTE AND IMPURITIES.—Principles of ventilation; natural ventilation; washing and soap; removal of parasites; danger of dirt; removal of house refuse.
6. SHELTER AND WARMING.—Materials of clothing; sufficiency of clothing for Infants and Adults.
7. LOCAL CONDITIONS. Soil, and its drainage; aspect; elevation. Hill, plain, and valley; distance from the sea; influence of surrounding objects, winds.
8. PERSONAL HYGIENE. Habits; exercise, rest, and sleep; cleanliness, attention to the action of the skin and bowels.
9. TREATMENT OF SLIGHT WOUNDS AND ACCIDENTS.—Treatment of cuts, burns, scalds, bleeding, fits, drowning, suffocation, poisoning, bites, and stings.

Students are recommended to take both Hygiene and Physiology, as no Student can pass in Hygiene who fails to satisfy the Examiners in Elementary Human Physiology.

Text Book :—Newholme's Hygiene.

Machine Construction and Mechanical Drawing.

Teacher	...	...	...	Mr. J. T. BUCKLEY, M.I.M.E.
Assistant	...	...	...	Mr. F. W. ASCROFT.

MONDAY AND WEDNESDAY, 7-45 to 9-15 p.m.

Machine Construction and Mechanical Drawing form one subject, which it is essential those students should take up who desire to qualify for the full Technological Certificate granted by the City and Guilds of London Institute.

A knowledge of this science is invaluable to students in the subjects of Cotton Manufacturing, Weaving & Pattern Designing, Electrical Engineering, Mechanical Engineering, Applied Mechanics, Steam, and Steam Engine.

After a course of training in Machine Construction and Mechanical Drawing, the student is enabled to quickly comprehend, copy, sketch, measure or design the various details and proportions of any mechanical appliances. He can further place his ideas and impressions before others in the form of clear and graphic sketches or highly finished drawings.

It is necessary that the Elementary student in this subject should have a fair knowledge of Arithmetic.

The various sections of this subject in which the student will be prepared for examination are as follows:—

Riveted Joints. Forms of rivets, and arrangement of rivets in lap and butt joints. Junction of plates by angle and T irons.

Bolts, Studs, and Set Screws. Forms of these fastenings, pitch of screw, Whitworth and other threads, modes of locking nuts.

Keys and Cotters. Arrangement of key and cotter fastenings, taper of keys and cotters, knuckle joint, mode of fixing cotters.

Shafting. Shafts and axles, journals and pivots, collars and bosses, forms of couplings, fast, disengaging, and universal couplings.

Pedestals and Plummer Blocks. Form of pedestals and hangers for shafts, footstep bearings, modes of lubricating bearings.

Toothed Gearing. Forms of spur, bevel, mitre, worm and mortice wheels, proportions, shape and strength of teeth.

Belt Pulleys. Flat and round belt pulleys, speed cones, shapes of arms, velocity ratios of pulleys, use of guide pulleys, joints of belting.

Cranks and Levers. Cast, wrought, and built-up cranks and levers, modes of fixing cranks and pins, form of eccentrics.

Links and Link-work. Connecting rod ends, steps in connecting rods, methods of tightening and taking up wear. Crossheads, coupling rods, &c.

Pistons. Types of modern pistons, piston rings and packings, attaching piston to piston rods.

Stuffing Boxes. Use of packing, mode of tightening glands, metallic packings for piston rods, and valve spindles.

Valves. Slide valves, Cornish valves, piston valves, Corliss valves. Lap lead, and travel of slide valve.

Boilers. Locomotive, marine, and stationary boiler construction.

Engines. Locomotive, marine, and stationary engine construction, &c., &c.

Students, on joining this class, can procure a complete list of the necessary text books, instruments, &c., from the teacher.

Mathematics.—Stages I. & II.

Teacher Mr. H. HOWARTH, B.A.

TUESDAY.—STAGE I.—7-30 to 9-30 p.m.

„ STAGE II.—7-30 to 9-30 p.m.

SYLLABUS FOR STAGE I.

(AS ISSUED BY THE SCIENCE AND ART DEPARTMENT).

ALGEBRA.—As far as Fractions and Simple Equations.

GEOMETRY.—Euclid, Book 1.

ARITHMETIC.—General, including Fractions and Decimals, Proportion, Interest, Percentages, Stocks and Shares. Early in the Session Students will be tested in Arithmetic, and only those who show a very fair knowledge of the subject will be allowed to proceed. Those who are deficient should join the Arithmetic Class. Algebra and Euclid alone require the whole of the Session. Home Work is required from every Student.

TEXT BOOKS.

STAGE I.—The Specific Euclid, Book I (Ledsham), 8d.
Chamber's Standard Algebra, parts I and II., 4d. each.

SYLLABUS FOR STAGE II.

GEOMETRY.—Euclid.—Books 1—3.

ALGEBRA, including Surds, Quadratics, Ratio and Proportion.

PLANE TRIGONOMETRY, as far as the Solution of Triangles.
Logarithms and Logarithm Tables.

TEXT BOOKS.

STAGE II.—Chambers's Standard Algebra, (enlarged edition), part III., 6d.; Barclay's Geometry, Books 1—3 (Oliver and Boyd), 1/3; Lock's Trigonometry for Beginners (Macmillan), 2/6.

Mathematics, III. IV. V. & VI.

Teacher Mr. F. W. BREWER, M.A.

MONDAY, 8-15 to 9-45 p.m.

The Lectures are designed to meet the Syllabus of the Science and Art Department, as set forth in their Directory.

TEXT BOOKS.

- III. STAGE.—Euclid's Elements of Geometry, by A. E. Layng (Blackie), 3/6.
 Ball's Elem. Algebra (Pitt Press), 4/6; or Hall and Knight's Higher Algebra (Macmillan), 7/6.
 Hall & Knight's Trigonometry (Macmillan), 4/6.
- IV. STAGE.—Euclid's Elements of Geometry, by A. E. Layng (Blackie), 3/6.
 Geometrical Conics, Cockshott and Walter's (Macmillan), 5/-.
- V. STAGE.—Todhunter's Spherical Trigonometry (Macmillan) 4/6.
 C. Smith's Conic Sections (Macmillan), 7/6.
- VI. STAGE.—Miller's Differential and Integral Calculus (Percival & Co.), 3/6.

Magnetism & Electricity.

Teacher Mr. J. GARDNER, F.R.G.S.

ELEMENTARY, MONDAY, 7.30 to 8.30.

ADVANCED, MONDAY, 8-45 to 9-45.

Classes will be organised in this subject in the elementary and advanced stages. The courses will follow the syllabus of the Science and Art Department. The applications of electricity are now so numerous that this subject should form a part of every educational course. To mechanics it is indispensable, and to the general student it is full of interest.

Magnetism and Electricity is one of the science subjects for which pupil teachers and others who obtain a pass in the elementary stage, or a first or second-class in the advanced stage, will be credited with marks at any subsequent examination for entrance to Training Colleges. As in future all pupil teachers will be required to pass this examination, it is desirable that they should obtain the marks for this or one of the other qualifying science subjects.

Magnetism and Electricity is one of the alternative subjects that may be taken at the Matriculation examination of the London University. The requirements nearly correspond with the elementary stage.

Physiography.

Teacher Mr. J. GARDNER, F.R.G.S.

ELEMENTARY, WEDNESDAY, 7-30 to 8 30.

,, FRIDAY, 7-30 to 8-30.

ADVANCED, THURSDAY, 8-45 to 9-45.

In this subject separate classes will be formed for the elementary and advanced stages. The courses will follow the syllabus of the Science and Art Department.

Physiography is a subject of general interest, as it deals with many of the Phenomena, celestial and terrestrial, of common experience. Its study is especially useful to teachers. All who contemplate joining the classes in this subject are strongly urged to join the class in Light and Heat, as their study of Physiography will be greatly facilitated thereby.

Physiography is one of the science subjects for which pupil teachers and others who obtain a pass in the elementary stage, or a first or second-class in the advanced stage, will be credited with marks at any subsequent examination for entrance to Training Colleges. As in future all pupil teachers will be required to pass this examination, it is desirable that they should obtain the marks for this or one of the other qualifying science subjects.

TEXT BOOKS:—Gregory's Elementary, and Gregory's Advanced Physiography.

Practical, Plane and Solid Geometry.

Teacher Mr. F. J. PYE, (Honours)

Assistant Mr. T. R. G. PARKER

FRIDAY,—ELEMENTARY, 7-30 to 9 p.m.

ADVANCED, 9 to 10 p.m.

The course of instruction will follow the Syllabus as set forth in the Science and Art Directory.

Sound, Light, and Heat.

Teacher ... Mr. J. GARDNER, F.R.G.S.

ELEMENTARY, THURSDAY, 7-30 to 8-30.

ADVANCED, WEDNESDAY, 8-45 to 9-45.

In this subject separate classes will be formed for the elementary stage, Sound, Light, and Heat, and for Advanced Heat. The courses will follow the syllabus of the Science and Art Department.

A knowledge of the subjects dealt with in these classes is essential to science students generally. Those who contemplate joining the classes in Physiography are strongly urged to join the classes in Light and Heat, as they will thereby greatly facilitate their study of that subject, and enlarge their chance of success in it. To the general student it is full of interest, as it deals with many of the phenomena of daily life.

Sound, Light, and Heat is one of the science subjects for which pupil teachers and others who obtain a pass in the elementary stage, or a first or second-class in the advanced stage, will be credited with marks at any subsequent examination for entrance to Training Colleges. As in future all pupil teachers will be required to pass this examination, it is desirable that they should obtain the marks for this or one of the other qualifying science subjects.

Light and Heat is one of the alternative subjects that may be taken at the Matriculation examination of the London University. The requirements nearly correspond with the elementary stage.

Steam and the Steam Engine.

ELEMENTARY COURSE.

Teacher ... Mr. R. PENDLEBURY

THURSDAY, 8-45 to 9-45.

Steam is one of the science subjects which qualify the student for the full Technological certificate in "Weaving and Pattern Designing, and Mechanical Engineering."

In the elementary course of this subject the student will be required to have a fair knowledge of Arithmetic as far as decimals.

The instruction given will prepare the student to answer questions in the following subjects.

The theory of heat. The effects of heat on matter:—such as expansion, elasticity, vaporisation, the conversion of heat into work, and work into heat, the boiling temperature of water, high pressure steam, the latent heat of steam, the quantity of water required to produce condensation.

Early Engines. Newcomen's atmospheric engine, its defects. The discoveries of Watt.

Single-acting Condensing Engine. Details connected with Watt's single-acting pumping engine.

Double-acting Pumping Engine. Details of various parts.

Non-condensing Engines. Various types of direct acting engines.

The expansion of Steam. Common and superheated steam; law of expansion, the object of expanding steam.

Expansion Valves. The slide valve, back cut-off, double-beat valves.

Taking of indicator diagrams. Calculating the horse power from them, the consumption of fuel per horse power per hour.

Stationary Boilers. The Lancashire and Cornish boilers, appendages, safety valves, stop valves, pressure gauges.

The Marine Engine. Various types of paddle wheel engines, Penn's trunk engine, surface condensers.

Marine Boilers. General forms and construction.

The Locomotive Engine. The general construction of a locomotive engine and boiler.

Steam and the Steam Engine.

ADVANCED COURSE.

Teacher Mr. R. PENDLEBURY

MONDAY, 8-45 to 9-45.

The students in this course will be instructed in the following additional subjects, as well as in those set forth in the elementary course.

Condensation. Surface condensers, circulating pumps. The amount of water required for condensation.

Compound Cylinder Engines. Arrangement of cylinders, details of valves.

Practical Working of Engines. Priming, its causes and remedies.
Expansive working. Management of fuel.

The Indicator. Method of taking diagrams. The general configuration of diagram to be expected under various circumstances. The indicator diagram in engines of various types.

Theoretical portion. Work done by conversion of water into steam; work done in the steam cylinder when the steam is expanded; work developed by the crank; meaning of absolute temperature; isothermal and adiabatic curves; dynamometer, its use in finding the horse power of an engine; Zeuner's slide valve diagram.

The Gas Engine.—The arrangement of the Mechanism. The principle of its action, and the theoretical indicator diagram.

Theoretical Mechanics.

Teacher ... Mr. F. W. BREWER, M.A.

ELEMENTARY STAGE (Solids)—MONDAY, 7 to 8 p.m.

„ „ (Fluids)—WEDNESDAY, 7 to 8 p.m.

The Lectures are designed to meet the Syllabus of the Science and Art Department, as set forth in the Science Directory.

This course covers the requirements, in Mechanics, for the Matriculation Examinations of the London, Victoria, Royal, and other Universities.

Text Books recommended to Students :

ADVANCED STAGE (for which a knowledge of Mathematics, Stages I. and II. is required)—“Todhunter's Mechanics for Beginners (Macmillan), 4/6; and Besant's Hydrostatics (George Bell and Sons), 4/6.

ELEMENTARY STAGE (Solids) South Kensington Mechanics of Solids by Ben Jonson (Gill's) 2/-; or Taylor's Theoretical Mechanics of Solids (Longman's) 2/6.

(Fluids) South Kensington Mechanics of Fluids by Ben Jonson (Gill's), 2/-; or Taylor's Theoretical Mechanics of Fluids (Longman's), 2/6.

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ART.

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Government School of Art,

In connection with the Science and Art

Department, South Kensington.

Teaching Staff.

Head Master:—Mr. W. B. BARTON.

Assistant Master:—Mr. W. H. WOODALL.

Assistant Mistress:—Miss B. H. SMITH.

Assistant Teachers:

Mr. T. WHITTAKER, Miss F. BENTHAM, Miss B. BIBBY, and
Miss M. SNOWDEN.

The School provides instruction in the principles and practice of Art, as they are applied in the form of design to Manufacturers, Handicrafts, and Industrial Occupations generally, and also as they relate to its pictorial and decorative branches, thus furnishing a sound and methodical course of study for those desiring to follow Art professionally, and encouraging its study as a part of general education desirable for everyone.

Syllabus of Subjects of Instruction.

GEOMETRY

PERSPECTIVE

FREEHAND DRAWING

MODEL DRAWING

ARCHITECTURAL DRAWING

DRAWING AND SHADING

in Chalk, &c., or with the Brush.

PAINTING IN OIL, WATER

Colour, Tempera, &c., from Flat Copies and from Casts of Decorative Art, Antique Figures, Flowers, Fruit, Still Life, Drapery, Landscape, &c.

STUDY FROM THE LIVING Model.

ANATOMICAL DRAWING

MODELLING IN CLAY

from Flat Copies, and from Casts of Decorative Art and Antique Figures. Moulding and Casting.

DESIGNING FOR ART MANUFACTURES and Decoration, and for Printing and Weaving Textile Fabrics, and the Analysis of Ornament and of Plant and other Forms which are employed in Decoration.

LECTURES.

A series of Class Lectures are given in connection with the above subjects, of which the dates are fixed for the following as below :—

Geometry, Monday, 7-15 to 9-15 p.m.

Design, Wednesday, 7-15 to 9-15 p.m.

Perspective, Thursday, 7-15 to 9-15 p.m.

Anatomy, Friday, 7-15 to 9-15 p.m.

Lectures will also be delivered to the Day Classes.

EXAMPLES.

The School is completely supplied with Casts of Ornament and of the Figure, as well as models and Copies, to which are periodically added valuable pictures and other objects of artistic excellence, lent by the Government Art Department.

LIBRARY.

The Library contains a collection of works of reference relating to the various subjects of study, and a selection of various kinds of illustrations for use in the practical work of the School. These are supplemented by periodical loans of rare books from the National Art Library at South Kensington.

SCHOLARSHIPS AND PRIZES

Prizes offered by the Government Art Department, including Gold, Silver, and Bronze Medals, and Books, and also the various Scholarships for Art Students, ranging in value from £11 to £160, may be competed for by students of the School. Also a number of Local Prizes, for particulars of which see Special List.

THE SCHOOL YEAR OR SESSION IS DIVIDED INTO

Three Terms of about 13 weeks each.

Winter Term—September to Christmas.

Spring Term—Early in January to April.

Summer Term—April to July.

Half-Terms may be commenced midway between these dates for the Morning Classes.

VACATIONS.

Winter—About Two Weeks, commencing at Christmas.

Spring—About One Week, at Easter or Whitsuntide

Summer—About Nine Weeks, commencing in July and terminating in September.

CLASSES.	CLASS HOURS.	FEEs.
Day Class for General Study {	Monday and Thursday, 11 a.m. to 1 p.m., and 2-30 to 4-30 p.m.	Session, 40s.
Day Class for Modelling in Clay {	Tuesday, 11 a.m. to 1 p.m.	
Day Class for Design {	Tuesday, 2-30 p.m. to 4-30 p.m., and Friday, 11 a.m. to 1 p.m.	Two Terms 30s.
Day Class Study of Living Model {	Wednesday, 11 a.m. to 1 p.m.	
Evening Classes for General Study {	Monday, Wednesday, Thursday, and Friday, 7-15 to 9-15 p.m.	One Term, 17s. 6d.
Special Evening Class for Modelling in Clay {	Tuesday, 7-15 to 9-15 p.m. (The modelling room is also open every other evening excepting Saturday)	
Special Evening Class for Drawing from Living Model {	Tuesday, 7-15 to 9-15 p.m.	Two Terms, 8s.
		One Term, 5s.

Students may attend the Art Day Class one day per week for the following fees :—Session, 21s. ; Two Terms, 17s. 6d. ; One Term, 10s. 6d.

Pupil Teachers attending at the Elementary Day Schools, if examined at the Harris Institute, with the permission of the Managers of their School, 5s. per Session.

Ditto if not sitting for examination at the Institute, 12s. 6d.



TECHNOLOGICAL.

THE UNIVERSITY OF CHICAGO

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Brickwork & Masonry.

Teacher Mr. F. J. PYE, (Honours)
Medalist, City and Guilds of London Institute.

Students joining this Class are strongly advised to take the science
subject, "Building Construction."

THURSDAY, 8-45 to 10 p.m.

The Course will include instruction in :—

- Detail Drawing, use of scale and drawing instruments.
- BRICKS.—The names, nature, and properties of various kinds in general use; the work for which each kind is best fitted; making, burning, and testing quality of bricks.
- Excavations in various soils; Timbering Excavations; Piling.
- Laying drain pipes, brick sewers, ventilating drains, &c.
- Nature and properties of Limes and Cements, modes of testing.
- Mortars and Concretes, ingredients used, with proportions and method of mixing. Sand of various kinds.
- Foundations, height and width of footings, bonding, concreting.
- Planking, damp proof courses, position of and materials used.
- Air bricks, dry areas, and general methods used for prevention of damp, ventilating floors, &c.
- Bond in brickwork, Angles of walls in English and Flemish bond. Raking and Garden-wall bond. Bond at acute and obtuse angles, in hollow walls of various kinds, in brick walls with stone facings. Arches, names and descriptions of the different kinds, cutting and setting Arches.
- Paving, joints and pointing of various kinds. Chimney shafts, flues, fireplaces, &c.
- Stone. description and testing of various classes of building stone.
- Stone for use under different conditions of climate, for external and internal work. Decaying of stone. Mode of ascertaining natural bed of stone.
- Stone walls in rubble of various kinds, Ashlar, Flintwork.
- Stone Dressings, Heads and Sills, Cornices, Copings, String courses, Quoins, Bases, &c. Mode of connecting Stones, Arches, Draining, Silling, and Bonding.
- Mouldings, names, descriptions, and drawing with intersections.
- The general Mechanical Principles involved in Brickwork and Masonry.

Carpentry & Joinery.

Teacher Mr. F. J. PYE (Honours)

Students joining this Class are strongly advised to take the science subject, "Building Construction."

WEDNESDAY, 7-30 TO 9-15 P.M.

The Examinations will include questions founded on such subjects as the following :—

Nature and properties of the various kinds of wood used in Carpentry and Joinery. Methods of seasoning and preserving timber. Strength of timber. Mode of converting timber so as to avoid waste & shrinkage, and obtain the maximum strength, &c. Drawings, full size, showing shoulder lines, &c. and the various joints used in Carpentry and Joinery.

Working drawings of panelled and framed and braced doors, door frames and casings, double hung sashes, sliding and hanging shutters, folding shutters and boxings. French casements rebates or linings for swing doors. Architraves and skirtings, grounds, &c. Hinges of various kinds and mode of applying them. Proportion of styles, rails, mutins, &c., in doors and windows; kind and strength of materials used.

Mouldings, their forms and names, intersection of moulds, large and circular, enlarging and diminishing mouldings. Lines for determining the sections of moulded bars and hip-rafters in skylights and lanterns, true sections for raking moulds over square or oblique plans, &c. Bevels and lengths of hip-rafters, jack-rafters, purlins, splayed linings, raking mouldings, and oblique work generally.

Methods of strengthening beams and girders, by flitching and trussing; how roof trusses are acted upon by cambering. Method of framing roof trusses, dimensions of timber, shapes of straps, and bolts used. Correct form of joints.

Single, double and framed doors, dimensions of materials used, joints, trimming hearth, well holes, &c., bridging, pugging joints of floor boards, &c.

The principles required in framing roof trusses, partitions, trussed gardens, bracing large doors, gates, &c. Fixing and striking large centres.

Knowledge of the use of weather boards, water bars, throating, joints for external work, as casements and skylights. Joints, mortice and tenon of various kinds, proportion of tenons, proportion of parts of tusk tenon, joints for oblique timbers, position of shoulders, scarfing, position, size and shape of straps and bolts to secure joints, &c.

Preparing gutters, rolls, drips, cistern heads, tilting pieces, flashing boards for plumber and slater, construction of flats for lead and zinc.

Newel and geometrical stairs, proportions of users and heads, planing stairs to obtain head-room and clear obstacles, proportions of winders and diminished fliers, general construction and method of support.

Cabinet Making.

Teacher Mr. S. D. M. SYKES

MONDAY, 7 to 9-15 p.m.

I. Syllabus.—The Examination will include questions founded on such subjects as the following :—

ORDINARY GRADE.

1. The nature and properties of the various kinds of wood used in cabinet making, with the parts or places from which they are obtained.
2. The most suitable woods for construction. Ground work and veneers, the best methods of seasoning and preparing for their various uses.
3. Cabinet-making tools: their different uses. The economy and advantages of wood-working machinery.
4. Plain jointing, cooper joints, dowelling, tonguing, dovetailing.
5. Plane and solid geometry as applied to cabinet making. The preparation of plans, elevation and section from small scale drawings
6. The descriptions and names of different parts of pieces of furniture, such as pilaster, capital, frieze, plinth, base, surbase &c., also of mouldings. Freehand lines for brackets and mouldings. Modes of building circular rims; curved panels.
7. Veneering on flat and shaped work. Various appliances for veneering. Preparation of grounds and veneers and the best methods of making work stand after veneering.
8. Cabinet brass work, hinges, joint stays, bolts and locks. The best methods of fixing and their different advantages.

HONOURS GRADE.

I. Written Examination.—Advanced questions on some of the preceding subjects, and, in addition, a knowledge will be required of :—

1. Principles and proportions in designing furniture with regard to its use, and the material employed.
2. Mechanical actions such as are used in cylinder fall desks, writing tables, dumb waiters, &c.; the different methods of expanding dining tables.

3. Inlaying and veneering with tortoiseshell, ivory mother-of-pearl, and metals. The preparation and best methods of applying veneers to flat and sweep work.

4. The different styles of furniture and the periods to which they belong.

II. Drawing.—Each candidate will be required to prepare a working drawing (certified to be the candidates own work) of a piece of cabinet work in which the details are original, and the work specially designed for its use. No ornaments or mouldings to be introduced except such as are absolutely necessary for the construction or the outcome of the materials used.

III. Practical Work. Each candidate will be required, during the year preceding the examination, to design and execute a piece of work, and to forward the same to London (carriage paid) a week prior to the date of the examination, together with a certificate signed by his employer or by the Class Teacher and a Member of the School Committee, stating that the work has been done by the candidate without assistance. The work must be accompanied by a working drawing showing the construction, and must not exceed 18 by 12 by 12 inches.

The specimen may be an example of construction, veneering, or inlaying, or it may comprise all three.

IV. Full Technological Certificate. A provisional certificate will be granted on the results of the examination in the foregoing subjects. For the full technological certificate in the ordinary grade, candidates, who are not otherwise qualified will be required to have passed the second grade examination of the Science and Art Department in geometrical as well as in freehand or model drawing; and for the full certificate in the honours grade, they will be required to have passed in geometrical as well as in freehand and model drawing.

V. Works of Reference.—"Specimens of Ancient Furniture," by H. Shaw, F.S.A. (B. T. Batsford, 52, High Holborn); "Cabinet Makers' Drawing Book," by Thomas Thereaton (B. T. Batsford, 52, High Holborn); "Cabinet Makers' Assistant," (Blackie & Son, Edinburgh and London); "London Book of Prices," Secretary Cabinet Makers' Society, "Wheatsheaf," Rathbone Place, Oxford Street, W.; "History of Furniture, by Litchfield (Truelove and Shirley, 143, Oxford Street, W.); "Ancient and Modern Furniture," by Hungerford Pollen (Chapman & Hall, 11, Henrietta Street, Covent Garden, W.C.); "Furniture and Decoration," by John Aldham Heaton (B. T. Batsford, 52, High Holborn); "Dictionnaire de l'Ameublement," par Henry Harvard (Maison Quanton, 7, Rue St. Benoit, Paris); "Cabinet Maker and Art Furnisher," by J. Williams Benn (15A, Finsbury Square, E.C.)

Cotton Spinning.

Teacher Mr. WM. I. HANNAN.

Teacher of Cotton Spinning, Weaving, and Botany to Parish Church School, Ashton-under-Lyne, of Botany, to Ashton Technical School, and Formerly Lecturer on Cotton Spinning and Botany to Huddersfield Technical School, Stockport, Hyde, and Mossley Mechanics' Institutes, Industrial Co-operative Society and the School of Science and Art, Oldham.

THURSDAY, 7-15 to 9-15 p.m.

SYLLABUS OF COTTON CLASS.

The geographical position of the world's cotton fields and suitable regions to which it may be introduced.

Cotton cultivation and the various causes of damage to the fibre during growing and picking seasons, with the dates of planting and picking in all cotton growing countries.

The mode of preparing the raw material, cotton gins, ginning, packing, &c. Methods of adulteration.

The nature and properties of the various kinds of cotton grown in the United States of America, India, Egypt, South-America, The Sea Islands &c.

The selection of raw cottons and the suitabilities of each variety, alone or mixed with other growths, for various classes of cotton yarn and goods.

The mill buildings, power and transmission, Commercial handling, methods of transport, and classification as regards the raw material. Commercial customs, methods of packing and distribution of the produce of spinning, together with the ultimate use of the yarn.

The mixing of cotton by hand and machine, mode of cleaning the raw material by opening and scutching. The construction and function of the bale breaker, the feed hopper, compound opener and lap machines.

The Carding Engine, its object and function. The nature of carding the cotton without injury in low medium and fine counts. Carding and combing Sliver, its attenuation in drawing, slubbing, intermediate and roving frames.

Spinning machines, how the roving is converted into yarn in throstle ring frames and self-acting mules. How the cop is built in the self-actor mule, the pirn in the ring frame, and the uses they are put to at home and abroad. The principles of Mule Copping.

The doubling of single and compound yarns, gassing yarn. Warping and bundling for the home trade and export with the accompanying process of winding and reeling.

The special Yarn required for fabricating Velvets of fast and loose Piles, Gauze and Lenos. Yarns for imitation Embroidery—Robes, Mantles, Shirts, for India and China; Longcloths, Mediums, Matelasses, Muslins, Sheetings, Sateens, Drills, & Croydeus, most of which are woven in Preston, also Weft Yarns for the above fabrics.

Buying and selling of yarns, terms of purchase, &c.

An examination, under the Union of Lancashire & Cheshire Institutes, will be held during the Session.

THE CLASS IS PROVIDED WITH A COPPING RAIL AND PLATES.

The Lectures are illustrated by samples of Cottons and Yarns analogous to the trade, and the necessary calculations in each process through which the Cotton passes.

As Preston is mainly dependent on the Cotton industry—the Council invite the attention of any who are engaged in Cotton Spinning to the above class, and further particulars may be had from the Secretary.

Electric Lighting and Power Transmission.

Teacher WM. R. BOWKER, (Vict. Univ.)

ORDINARY, FRIDAY, 7-30 to 8-30 p.m.

HONOURS, FRIDAY, 8-30 to 9-30 p.m.

With a view of encouraging Artisans to take a complete course of instruction in this subject, an Elementary Examination will be held preliminary to that in the Ordinary Grade. Candidates may take the Ordinary Grade without having passed the Preliminary, or both Examinations may be taken in the same year. Those who pass the Preliminary Examination as well as the Ordinary Grade (whether in the same year or in a previous year) will not be required to produce a Science and Art Departments Certificate in the subject of Electricity and Magnetism before they are eligible for the full Technological Certificate. The Preliminary Examination will be held on Wednesday, April 30th, 7 to 10, and the Ordinary Grade Examination will be held on Monday, May 5th, from 7 to 10.

SYLLABUS.

The Preliminary Examination will include questions founded on the following subjects —

1. General notions about electro-motive force, current, resistance, and the principles of electric circuits, simple and branching. The voltage required to produce any required current in a wire of given resistance.
2. The construction and action of electric bells, the arrangements of battery cells. and of circuits for bells.
3. General descriptive knowledge of magnets and electro-magnets. Best method of winding electro-magnet coils for various services.
4. Simple principles and use of electric measuring instruments; ampere-meters, volt-meters, delicate mirror galvanometers, resistance coils.
5. The induction of currents by motion of magnets. Notions about magnetic lines of force. Magneto-generators for electric bells. Simple descriptive knowledge of the common sorts of dynamos and alternators.
6. The induction of currents by action of currents in neighbouring circuits. The effect of iron cores. Simple descriptive knowledge of induction-coils and of transformers for alternate currents.

7. Simple principles of electric motors and of electro-magnetic mechanism. The magnetic drag on wires carrying currents.

8. Elementary descriptive knowledge about Glow Lamps and Arc Lamps, and their arrangement in parallel and in series. The necessary parts of Arc Lamps and their action.

9. The relations between mass, weight, and force. Distinction between work and power. Relations between heat and work. Relations between the watt, the kilowatt, and the horse-power. Watt-meters.

Syllabus.—Ordinary Grade.

1. Comparison between the British units of mechanical measurement and the international units based on the centimetre and the gramme.

2. The laws of Ohm and of Faraday respecting steady currents.

3. Electric measuring instruments for the laboratory, and the manner of using them. Wheatstones bridge. Standards of resistance, electro-motive force and capacity.

4. Practical ampere-meters, volt-meters, and watt-meters. Electro-dynamo meters, current balances, electro-static volt-meters, hot-wire instruments.

5. Magnetic properties of materials, magnetizing force, induction and permeability. Hysteresis.

6. The solenoid and its properties. The electro-magnet.

7. The electric properties of materials. Conductivity of metals and alloys, and its change with temperature. Mechanical qualities and resistance of insulating materials, and the influence of temperature.

8. Condensers. Work stored in a condenser.

9. Fundamental points of magneto-electric induction. Self and mutual induction.

10. Outline of theory of continuous current dynamos and motors. Characteristic curves.

11. The magnetic circuit as applied to dynamo machines. Types of field-magnets and armatures, considered magnetically.

12. The winding of field-magnets and armatures.

13. The mechanical features of dynamos and motors as regards strength of parts; heating, durability, ease of repair, construction of brushes, commutators, terminals, &c.

14. Motor generators, fundamental rules as to winding, speed, and output.

15. The electrical and mechanical efficiency of dynamos and motors.
16. The construction of alternators and transformers.
17. The transmission of power by direct currents over moderate distances.
18. Practical methods of arranging lamps and circuits.
19. Glow lamps and Arc lamps, watts per candle.
20. Secondary batteries (accumulators), construction, use, and theory.
21. Distribution of electrical energy from central stations, direct and transformer systems, continuous and alternating currents, two-wire and multiple-wire mains.

HONOURS GRADE.

More difficult questions will be set in subjects 4, 9, 12, 13, 14, 17, 18, 19, 20, 21, and in addition a knowledge will be required of electric transmission and distribution of power by continuous and alternating currents, electric railways and tramways, private electric light installations, the electrical equipment of central stations, including arrangement of dynamos, batteries, switchboard, and regulating appliances; overhead and underground mains, safety devices, fire office rules, size of the feeders and mains in the two and three-wire systems; use of substations; and practical information will be given on the following subjects:—

Electric Bell and Indicator Fitting, Management of Dynamos and Motors; Outside Telephone and Telegraph Construction, including staying and strutting of poles, &c., and different methods of jointing wires and cables.

FEE, 7/6 FOR SESSION.

Telegraphy & Telephony.

Teacher ... WM. R. BOWKER, (Vict. Univ.)

FRIDAYS, 8-45 to 9-45.

SYLLABUS.—ORDINARY GRADE.

1. The Fundamental Principles of Electricity in their application to the Electrical Engineering Industries.

2. Units of Measurement. Standards of resistance, their practical construction and adjustment; electromotive force and capacity; effects of temperature variation.
3. Galvanometers, principles and manufacture of (a) absolute, (b) sensitive, (c) dead beat, (d) astatic, (e) differential. Shunts, ordinary and constant resistance.
4. Resistance Coils—construction of; gauge and kind of wire for; methods of winding and insulating.
5. Condensers—construction and testing of.
6. Instruments necessary for the equipment of an electrical testing-room, (a) for land telegraph lines, (b) for cables; methods of using the apparatus in the simpler forms of testing; apparatus required by linemen.
7. Electrical Testing as applied to the inspection of apparatus and to the detection and removal of faults.
8. Essential qualities of iron and steel for temporary and permanent magnets respectively; methods of making permanent magnets, and the treatment of iron for electro-magnets.
9. The construction of telegraph and telephone lines, overhead and underground.
10. The construction of submarine cables and the simpler of the phenomena connected therewith.
11. The simpler systems of telegraphy worked by hand, including the double current duplex.
12. Batteries used in telegraphy and telephony; principles, action and construction; methods of grouping; universal battery working; application of secondary batteries to universal working.
13. The principles involved in the transmission of sound and speech; the various systems of telephony and the instruments employed therein, including receivers, transmitters, call bells, and exchange switchboards.
14. Faults in land and submarine lines, their nature, and the general principles of localization.
15. Nature and methods of preventing disturbances and damage by earth currents and lightning.
16. Testing of materials employed in the construction of lines and apparatus.

Students will be prepared for the City & Guilds of London Examination in the above Subject.

FEE FOR SESSION, 5/-.

Theoretical and Practical Plumbers' Work.

Teacher Mr. F. W. MACKLEY

FRIDAY, 7-30 to 9 p.m.

SYLLABUS OF PLUMBING.

1. Properties and Qualities of Lead, Zinc, Tin, Iron, White and Red Lead, Lead Oxides, Cements, &c.—Their special uses.
2. The Action of Air, Water, &c., on the above.
3. Solders and Soldering. Autogenous Soldering.
4. The Tools used in Plumbers' Work; their forms, uses, &c.
5. Manufacturers of the various Metals used, &c.
6. Gas Fittings and Gas Meters.
7. Sanitary Arrangements in Dwelling-houses and other Buildings, &c.
8. Water Closets and their Fittings.
9. Water Supply, &c. Filters and Water Meters, &c.
10. Roofing, External Plumbers' Work, &c.
11. Varieties of Traps, &c. Soil Pipes: sizes, &c.
12. Disinfectants and Deoderants: their action and application.
13. The various Systems for the Disposal of Town Sewage.
14. Drainage and Testing Drains, &c.
15. Pump Work.

Cotton Weaving & Designing.

Teacher Mr. JOHN T. TAYLOR,

Lecturer on Cotton Weaving and Designing in the Ashton-under-Lyne, Chorley, and
Todmorden Technical Schools.

Assistant Demonstrator Mr. Z. MAWDESLEY

SYLLABUS.

ORDINARY CLASS—WEDNESDAY, 7-25 to 9-15 p.m. }
Practical on FRIDAYS at intervals of 3 or 4 weeks, 7-30 to 9-15. }

- 1.—The structure of Woven Fabrics, such as Plain, Twills, Satins, Cords, &c.
- 2.—The plain Power Loom; its construction and uses.
- 3.—Tappet Looms of various kinds such as Ordinary Tappets, Barrels Woodcroft's Tappets, Oscillating and other Tappet motions.

- 4.—Under and over motions for Tappets ; Spring motions, Rollers, Pulleys, &c
 - 5.—The systems of numbering yarns. Calculations to determine the weight and cost of material in a piece and other yarn calculations met with in practice.
 - 6.—Dobbies of various kinds ; their constructions, advantages, &c.
 - 7.—Picking motions of various kinds. The advantages and disadvantages of each.
 - 8.—Beating up the weft ; difference in the force exerted by the Slay in looms with longer or shorter cranks and crank-arms ; also variations caused by the difference of position of the crankshaft and connecting pin.
 - 9.—Minor movements such as fast and loose Reeds, Weft Stopping motions, Tappet Driving. Taking up motions Positive and Negative, Pickles and other motions for obtaining exact fractions of a pick, &c. Letting off motions, split motions, &c.
 - 10.—The proper timing together of the various movements in a Power Loom to produce different effects in cover, &c., on the cloth and proper working of the Loom.
 - 11.—The principles of Designing and Cloth Structure, as simple and fancy Twills, Checks, Diapers, Honeycombs, Cords, Crimps, Loops, and similar effects. Mock Leno and Lace effects ; Crepes, Crepons, &c. Extra warp figures as in Dhooties, &c. Extra Weft Spots, Zephyrs, Double Cloths, Methods of producing new styles of fabrics.
 - 12.—Analysis of Woven Fabrics of various kinds, to determine the draft and pegging plan, reed, pick, and counts of yarn.
 - 13.—Leno weaving by Tappets, and single or double lift dobbies. Analysis of Leno fabrics to determine draft and pegging plan and denting, &c.
 - 14.—The construction of the machinery employed in the preparatory processes, such as Winding, Warping, Sizing, &c. ; and calculations necessary in preparing plain and fancy warps for the Loom. Size mixings and their preparation.
 - 15.—Single and double lift Jacquards and Harness building, &c. ; Card cutting, &c. ; Designing for Jacquard Weaving.
 - 16.—Check Looms, Diggle's Drop Box, Wright Shaw's, Whitesmith's, Cowburn & Peck's & other Drop Box motions. Circular Box Looms
 - 17.—Calculation of cost of different fabrics in detail, including cost of Winding, Beaming, Slashing, Looming, Weaving, Tackling, Warehouse work, Working expenses, &c. Diameters of Yarns and fabric structure.
 - 18.—Coloured effects obtained in woven fabrics by different weaves, &c.
- TEXT BOOK : "Cotton Weaving and Designing," by John T. Taylor.
Published by Longmans & Co.—Price 7/6.

ADVANCED CLASS.

FRIDAY, 7-25 to 9-15. WEDNESDAY, 7-30 to 9-15.—Practical.

The Students in this class will receive more advanced instruction in the above syllabus, and, in addition, the following :—

- 19.—Harness Building for bordered and other fancy Jacquard fabrics.
- 20.—The various kinds of Jacquard Machines such as single and double lift, Open Shed, Centre Shed, Bessbrook or Twilling Jacquard, &c.

- 21.—The Split Harness, Pressure Harness, Compound Harnesses, Double Cloth Harnesses, &c.
- 22.—Leno Jacquards
- 23.—Designing for all kinds of Jacquard Weaving, including:—Brocades, Damasks, Figured Dress Goods, Figured Lenos, Double Cloths, Quilts, Tapestries, Figured Velvets, Lappets, &c., &c.
- 24.—The Lappet Loom, Circles, Swivels, &c.
- 25.—Card Cutting and Repeating Machinery.
- 26.—The proper balancing of Cloth.
- 27.—Harmony and contrast of colours, &c., &c.

TEXT BOOK : "Cotton Weaving & Designing," by John T. Taylor.

Published by Longmans & Co.—Price 7/6.

The Council have provided at the Lancaster Road School a number of Dobby and Jacquard Looms and other apparatus, to enable the students to work out in the loom the Designs, &c., made in the class.

By kind permission of Messrs. ATHERTON BROS., the students of these classes are instructed in the Power Loom at the Hanover Street Works, where a number of Power Looms are in motion.

FEE FOR SESSION, 2/6.



MISCELLANEOUS.

MISSOURI

MISSOURI

Arithmetic.

Teacher Mr. JOHN RENWICK

* TUESDAY AND } 7 to 8, ELEMENTARY.
WEDNESDAY }

* TUESDAY, 8 to 9, INTERMEDIATE.

* WEDNESDAY, 8 to 9 ADVANCED.

Three Classes will be held—Elementary, Intermediate, and Advanced.

It will be assumed that all Students joining the **ELEMENTARY CLASS** know the Multiplication Tables and Tables of Weights and Measures; also the four Simple and Compound Rules.

The work of the Session will be Vulgar and Decimal Fractions, Simple and Complex Problems (Simple and Double Proportion), Practice, and Square Root.

The work of the INTERMEDIATE CLASS will be determined by the requirements of the Society of Arts Intermediate Examination in Arithmetic.

The work of the **ADVANCED CLASS** will be the requirements of the Society of Arts Examination in Arithmetic.

It is essential that all Students joining this Class shall have a good knowledge of the above Rules—especially of Vulgar Fractions and Decimals.

The Class in advanced Arithmetic is particularly adapted to assistant teachers preparing for Certificate Examination.

Modern Methods will be taught to the Class, and be expected in the Home-work.

TEXT BOOKS.

ELEMENTARY CLASS.—“Arithmetic for beginners.”—
Rev. J. B. Lock, M.A.

INTERMEDIATE & ADVANCED CLASSES.—“Hamblin Smith’s Arithmetic.”

* Meet at Lancaster Road.

FEE, 2/6 FOR SESSION.

Book-keeping.

Teacher Mr. JOHN C. FORRESTER, C.A.
(Chartered Accountant, Bolton).

Elementary Class, Wednesday Evening, 7 to 8-15.

Intermediate Class, Thursday Evening, 7-15 to 8-30.

Advanced Class, Wednesday Evening, 8-15 to 9-30.

The Students will be instructed in the principles of Book-keeping by Double Entry system, partly by lectures and partly by exercises to be worked out by the Students.

The course of lectures will embrace the meaning of mercantile terms and phrases, and the nature and use of the books usually kept by a merchant.

The TEXT BOOKS recommended are :—

Hamilton & Ball's Treatise on Book-keeping.

Examination Questions in Book-keeping by Double Entry, by the Rev. J. Hunter, M.A.

NOTE.—The members of the Elementary Class will be required to sit at a local Examination.

FEE FOR ELEMENTARY CLASS, 5/-; ADVANCED 7/6.

English.

Teacher Mr. W. D. SMITH

The Classes in English Grammar and Composition will meet as under :—

ELEMENTARY CLASS—TUESDAY, 7-30 TO 8-30.

ADVANCED ,, TUESDAY, 8-30 TO 9-30.

The work of the Elementary Class will include the rudiments of English Grammar, with special regard to the rules of Syntax, and their application to every-day Speech Parsing and Analysis of Sentences, with knowledge of the chief Latin Prefixes and Terminations, Paraphrasing of short passages of Poetry.

In the Advanced Class particular attention will be paid to Analysis of Sentences, Punctuation, Paraphrasing, and the rules relating to accuracy and clearness of expression. The course

will also include a careful study of the outlines of the history of the English Language, the formation of English words, and the meaning of the more common prefixes and affixes. All members of the Advanced Class are required to sit at the Society of Arts' Examination. The Entrance Fee (2/6) will be paid by the Council of the Institute.

These Classes will be especially useful to Pupil Teachers; the Elementary to the first and second years, and the Advanced to the third and fourth years.

TEXT BOOKS :—Elementary—"A New Grammar of the English Tongue," (Prof. Meiklejohn's) 2/6. Published by A. M. Holden, 23, Paternoster Row.

ADVANCED :—(Prof. Meiklejohn's) "The English Language" 4/6.

FEE, 3s. 6d. FOR SESSION.

French.

Teacher Monsieur H. A. JUTZI.

(Of the University of France).

The following Classes in the above Language are arranged for the forthcoming Session.

ELEMENTARY CLASS,—FRIDAY, 7 to 8 p.m.

ADVANCED " " 8 to 9 p.m.

The number of lessons during the Session will be twenty-six, thirteen before Christmas, commencing on September 27th, 1895, and thirteen after Christmas.

FEE FOR THE COURSE 5/-.

TEXT BOOK FOR THE ELEMENTARY CLASS :—Henri Bué's Conversation Grammar, 1st Course.

The work of the Elementary Class will be confined to the elementary portion of the French Grammar, and easy sentences for translation into English and French.

TEXT BOOKS FOR THE ADVANCED CLASS :—

Henri Bué's Conversation Grammar, 1st and 2nd Course for the Lancashire and Cheshire Examinations; also the French book to be read for the Queen's Scholarship Examination.

In the higher class it is proposed to deal with the more advanced portions of French Grammar, including the conjugations of Irregular Verbs, and a knowledge of the Rules of the Syntax and French Composition; it is also intended to make a thorough study of the above mentioned reading book.

Classes for French Conversation will also be held on Wednesday afternoons, from 3 to 4-30.

FEE :—ONE GUINEA FOR THE SESSION.

It is hoped that the Conversational Classes will be well attended. Now that travelling abroad is of so frequent occurrence, it should be the aim of those who study a foreign language to learn how to speak it. "Any person travelling on the Continent without knowing French must be content," as an English Tourist says, "with a third of the pleasure he might otherwise enjoy, and that at double the expense." Anyone wishing to join the Conversational Classes should have some knowledge of the French Grammar.

TEXT BOOKS FOR THE CONVERSATIONAL CLASSES:—

Guide to French Conversation—*La poudre aux yeux*.

It is very important that all the Students intending to join any of the French Classes should do so, if possible, on the opening day.

The Conversational Classes commence on the 4th of October, and will consist of two terms of thirteen weeks each.

German.

Teacher Mr. H. A. JUTZI

WEDNESDAYS, 7-15 to 8-15 p.m.

SYLLABUS.

ELEMENTARY.—Accidence, easy German passages to be translated into English, and English sentences to be translated into German.

TEXT BOOKS.—Macmillan's German Course, 1st year 1/6.
H. Lange's German Grammar, (Clarendon) 3/6.

INTERMEDIATE.—Accidence, German translation, and easy composition.

TEXT BOOKS.—H. Lange's German Grammar (Clarendon) 3/6.
Niebuhr's *Heroen Geschichten* (Norgate) 2/6. Macmillan's German Course, 2nd year 3/6. Also the German book to be read for the Lancashire & Cheshire Examination.

ADVANCED.—Accidence, German author, unseen translation, and prose composition.

TEXT BOOKS.—H. Lange's German Grammar (Clarendon) 3/6.
Goethe's *Hermann and Dorothea* (Pitt Press) 3/-.
Buchheim's German Prose Composition (Bell).

FEE.—Elementary or Intermediate Class, 5/- for Session.
Advanced Class, 7s. 6d. for Session.

Latin.

Teacher Mr. F. W. BREWER, M.A.

Two Courses of 24 Lessons will be given in the above Language, (12 Lessons before Christmas, commencing on September 25th, 1895, and 12 after Christmas commencing on January 8th, 1896.

An Elementary knowledge of English Grammar is desirable, and in order to make progress in the Language work at home is necessary.

Assistance will be given in the Language to those intending to take the London Matriculation, Institute of Chartered Accountants' Preliminary and similar Examinations.

The Classes will meet on Wednesdays.

Elementary Stage from 8 to 9 p.m.

Advanced „ „ 9 to 10 p.m.

Text Books recommended to Students:—

Elementary Stage:—Macmillan's Shorter Latin Course by A. W. Cook, M.A., (1/6).

Advanced Stage:—To be arranged at the Class.

FEE FOR EITHER COURSE, 5/-.

Music.

Theory, Harmony, Counterpoint, &c.

Teacher Mr. JAMES TOMLINSON.

(Organist to the Corporation of Preston).

ELEMENTARY, FRIDAY, 7 to 8 p.m.

INTERMEDIATE „ 8 to 9 p.m.

ADVANCED, WEDNESDAY, 7-45 to 9 p.m.

Three Classes will be formed for the above Subjects.

The Course will consist of twenty Lessons for each Class, and the instructions will be based on the requirements of the Examination held by the Society of Arts, which include

The Elementary Rudiments.

Harmony.

Counterpoint.

TEXT BOOKS—Stainer's Harmony Primer (2/-), and for Advanced Class Bridge's Counterpoint Primer, (2/-).

FEE 5/- FOR SESSION.

Shorthand.

Teacher Mr. H. CARTMELL.

Classes in this subject will meet as under:—

*Elementary (Junior)	Monday,	7-15 to 8-15 p.m.
" (Senior)	"	8-15 to 9-15 p.m.
"Manual" Class	Thursday,	7-15 to 8-15 p.m.
Intermediate	Tuesday,	7-15 to 8-15 p.m.
"Manual" (Practice)	Friday,	7-15 to 8-15 p.m.
Advanced	Tuesday,	8-15 to 9-30 p.m.
"	Thursday,	8-15 to 9-30 p.m.
" (slower)	Friday,	8-15 to 9-30 p.m.

Classes Re-commence Monday, 23rd September, 1895

BOOKS REQUIRED.—*Elementary*: "Shorthand Primer" part 1, two "Harris Institute Manuscript Exercise Books." *Intermediate & Advanced*: "Reporter's Companion," 2/6; "Reporting Exercises," 6d.; "Key to Reporter's Exercises," 1/-.

The Junior Elementary Class is for students under the age of 15 years and those above that age whose opportunities for study are limited. The Senior Class is also for beginners, but *the rate of progress will be more rapid than in the Junior Class.* The "Manual" Class is for students who have gone through the Shorthand "Teacher." The Intermediate Class will begin with the study of the "Reporter's Companion," and intending members should have *thoroughly* mastered the contents of the "Manual." The Speed Dictation in the Advanced Class on Fridays will range from 50 to 80 words a minute, and on Tuesdays and Thursdays from 60 to 140, the speed from 9-0 to 9-30 on those evenings being at a minimum rate of 100 words a minute, arranged for the benefit of candidates for the first-class Certificate of the Society of Arts. *All members of the Manual, Intermediate, and Advanced Classes will be required to sit at the Examination in connection with the Lancashire and Cheshire Union of Institutes.*

Members of the Intermediate and Advanced Classes have the free use of a Circulating Library, comprising the following periodicals:—The "Reporter's Magazine," "Reporter's Journal," "Shorthand Magazine," McEwan's Magazine," and "Pitman's Shorthand Weekly," and they are strongly recommended to make the fullest use of this opportunity of making themselves familiar with the best outlines.

The Shorthand Classes are open to Ladies.

The Entrance Fee (2/6) for the Examination in connection with the Society of Arts will be paid by the Council of the Institute for all Students who pass the Text Examination.

Correct English is a point upon which the Shorthand Examiners lay great stress. Those whose Grammar is at all uncertain would do well to join one of the Classes in English.

**These Classes meet at the Lancaster Road Branch.*

Vocal Music.

Teacher Mr. JOSEPH SMITH

Elementary Class will meet on Mondays, 7-15 to 8-15 p.m.

Intermediate ,, ,, ,, 8-15 to 9-15 p.m.

Matriculation ,, ,, Thursdays, 7 to 9 p.m.

Three Classes will be opened for the Study of the Theory and Practice of the Tonic Sol-fa Method, and its application to the Staff Notation.

The Course consists of Twenty-four Lessons for each Class, and the instruction will be based on the requirements of the Elementary, the Intermediate, and the Matriculation Certificates of the Tonic Sol-fa College, which include the following:—Musical Theory, Memory of Time and Tune, Modulator Practice, Harmony Analysis, Sight and Ear Tests in Melody and Harmony, Voice Cultivation, Expression, and Pronunciation. Students of the Matriculation Class are also prepared for the First Grade Staff Notation Certificate.

The Matriculation Class is open to any who hold, or are prepared to take, the Intermediate Certificate.

The Elementary and Intermediate Classes will open on Monday, the 30th September, and the Matriculation Class on Thursday, the 3rd October. Twelve lessons will be given to each Class before Christmas, and twelve commencing in January, 1896.

TEXT BOOKS.

Published by J. CURWEN & SONS, 8, Warwick Lane, London, E.C.

Elementary.—"Voices in Song," price 6d.; and "Elementary Studies," price 4d.

Intermediate.—"Intermediate Class Book," price 6d.; and "Intermediate Studies," price 6d.

Matriculation.—"Standard Course," price 3/6; "How to observe Harmony," price 2/-; "The Staff Notation," price 8d.

Fee for Elementary or Intermediate Course, 2/6.

Fee for Matriculation Course, 3/6.

Type-Writing.

Teacher Mr. D. SANDERSON

TUESDAY & FRIDAY, 7 to 8 p.m.. and 8 to 9 p.m.

The Remington and other Type-Writers will be used, and Students will receive instructions from the Teacher for a Course of 12 weeks, commencing on Tuesday, the 1st October, 1895. During the Course, or at its conclusion, each Candidate will be permitted to have 15 practices of one hour in duration.

The instruction given will enable Candidates to sit for the Examination under the Society of Arts, and will include the following :—

To take down a Newspaper Article from Dictation.

Set out Table of Figures.

Set out a Title and Character Page.

Set out Prospectus and Copy Legal Draft.

Set out a Debit and Credit Balance Sheet.

FEE FOR COURSE AND PRIVATE PRACTICE, 10/-.

Wood Carving.

Teacher Mr. J. HARRISON, Birkdale, Southport.

(Teacher under the Ainsdale Technical Instruction Committee).

WEDNESDAYS, 3 to 4-30 p.m.

,, 6 to 7-30 p.m.

Elementary and Advanced Instruction will be given in the art of Chip Carving and Carving in Relief.

Fee for Course, 7/6.

School of Cookery & Domestic Sciences,

CROSS STREET, PRESTON.

PRINCIPAL: MRS. ARNOUX.

ASSISTANTS: (Cookery) MISSES CRICHTON, RILEY, E. PRITT,
E. HUNTLEY, and HESMONDHALGH.

ASSISTANTS: (Dressmaking) MISSES CLARKE, and E. RILEY.

ASSISTANTS: (Laundry) MISSES CRICHTON, HESMONDHALGH,
HUNTLEY, and RILEY.

ASSISTANTS: (Millinery) MISSES CLARKE & HESMONDHALGH.

The following Classes will be held at the above address:—

Cookery.

PRACTICAL CLASSES IN "HOUSEHOLD" AND
"HIGH-CLASS" WORK

"HOUSEHOLD" COURSE (A).

- 1st.—Stock, Roasting, Boiling, etc.
- 2.—Soups and Sauces.
- 3.—Vegetables.
- 4.—Bread and Cakes.
- 5.—Cold Meat Dishes.
- 6.—Fish.
- 7.—Invalid Cookery.
- 8.—Pastry.
- 9.—Puddings.
- 10.—Melting and Clarifying Fat, Haricot, Curry.

"HIGH-CLASS" COURSE (B).

- 1.—Braizing, Stewing, Grilling.
- 2.—Soups and Garnishes for same.
- 3.—Dressed Fish.
- 4.—Hot Entrées.
- 5.—Cold Entrées.
- 6.—Breakfast Dishes.
- 7.—Hot Sweets and Puddings.
- 8.—Jellies and Creams.
- 9.—Cakes, Biscuits, etc.
- 10.—Ices.

In addition to the above "Practical" Work, Demonstration Classes will be held every Monday and Thursday afternoons, from 2-30 to 4-30.

Monday's Demonstration will consist of "Household" Dishes.
Thursday's of "High-Class."

Syllabus (A) commences TUESDAY, October 1st, 7 to 9.

Syllabus (B) same day 2-30 to 4-30.

Monday's Demonstration, September 30th, 2-30 to 4-30.

Thursday's ,, October 3rd, 2-30 to 4-30.

Ten Lessons in each Course.

If there be too many students for the Tuesday afternoon, a class will be formed on Wednesday morning.

FEE :—SYLLABUS (a) 5/- ; SYLLABUS (b) 10/-

DEMONSTRATION FEE :—MONDAY'S COURSE, 2/6 ;

THURSDAY'S COURSE, 5/-

Anyone not desirous of attending the whole of the Demonstration Lessons may be present at Monday's Class by the payment of 3d., and on Thursday by 6d.

All those attending the "Practical" Classes are admitted to the Demonstrations at Half Fees.

All Materials are included in the above fees, but it is hoped the Students will take home what they cook at the low charge of cost of Articles only. Dishes cooked at the Demonstrations will be for Sale, and orders for Special Dishes may be given beforehand.

Laundry.

Classes in the above subject held every WEDNESDAY AFTERNOON and EVENING, commencing OCTOBER 2nd. Afternoon Class, 2-30 to 4-30, Evening 7 to 9.

SYLLABUS :—

1.—Demonstration. 2.—Practice. 3.—Practice. 4.—
Demonstration. 5.—Practice. 6.—Practice. 7.—Demonstration.
8.—Practice. 9.—Practice. 10.—Practice.

FEE :—AFTERNOON COURSE, 10/- ; EVENING COURSE, 5/-

A Course consists of Ten Lessons.

Dressmaking.

Courses of Lessons in the above subject on the "Tailors Academy" System, will commence on MONDAY, September 30th, for Elementary Pupils, and on WEDNESDAY, Oct. 2nd, for the Advanced.

Afternoon Class, 2-30 to 4-30. Evening Class, 7 to 9.

A Course consists of Ten Lessons.

N.B.—By this System no "Chart" is used.

FEE :—AFTERNOON, 10/- ; EVENING, 5/-

Millinery.

Courses of Ten Lessons in above subject, **TUESDAYS**. 2-30 to 4-30, and 7 to 9, commencing October 1st.

FEE :—AFTERNOON CLASS, 10/- ; EVENING, 5/-

Plain Sewing.

Every **FRIDAY**, from 2-30 to 4-30 and 7 to 9. There will be a class held in the above subject which will include the Cutting Out and Making of Ladies Underclothing, Darning, Patching & Mending of Bed and Table Linen, Swiss Darning, and Re-Soling of Socks and Stockings.

FEE :—AFTERNOON CLASS, 10/- ; EVENING, 5/-

Evening Continuation Classes

Are held every evening in the week, on payment of 3d. per week, from 7-30 to 9-30 p.m., when the Students are taken through a course of Cookery, Laundry, Household Sewing, Dressmaking, Sick Nursing, Domestic Economy, etc.

The first lesson will be on **MONDAY**, September 16th.

Elementary Schools and Evening Continuation Classes.

Managers of Schools are invited to inspect the Premises in Cross Street, and make arrangements with the Lady Principal for the Teaching of their children, either in Day School Work or Evening Continuation Classes in any of the acknowledged Subjects, viz., Cookery, Laundry, Dressmaking, Domestic Economy, and Sick Nursing.

The Artisan Kitchen is fitted with a Cottage Range, and only those utensils provided for the use of the pupils that are to be found in most of our working peoples' homes.

Where Managers prefer it, arrangements can be made for supplying them with a Teacher holding a first-class Diploma, to give a Course of Lessons in any of the Domestic Subjects in their own schools. As early an application as possible is asked for the Artisan Work which Mrs. ARNOUX is desirous of beginning in September, especially the Day Schools. The Evening Continuation Classes will not begin in September. Special Terms are made for the above Work, which can be had by either applying at Cross Street, or the Harris Institute.

Terms for Artisan Work to Children in Elementary Schools and for Evening Continuation Classes to be had on applying to Mrs. ARNOUX.

Outside Classes will be formed as required, and arrangements made for Courses of Lessons in Elementary Schools, Hospitals, Training Homes, Workhouses, Public Institutions, and Technical Educational Classes. There is a Special Prospectus for any lady who desires to be trained as a teacher of these Subjects, which can be obtained by applying at the "School" or the Harris Institute. The School in Cross Street re-opens MONDAY, September 9th, for the training of Teachers.

It would considerably facilitate matters if intending Students for the Technical Classes could conveniently send in their names to the "School" in Cross Street, in the week commencing September 9th, for Lessons in any of the Subjects. At the end of the Session, Examinations will be held in all Subjects, open to all Students, and Prizes and Certificates of proficiency given.

ALL FEES MUST BE PAID IN ADVANCE.

The Council is prepared to supply Teachers in the above subjects (who hold first-class full Diplomas from the National Union), to any Committee acting under the County Council of Lancaster.



School of Cookery & Domestic Sciences,

CROSS STREET, PRESTON.

For Technical Training in Domestic Work.

Classes held from September until July.

THIRD SESSION, 1895-96.

PRESIDENT : W. ASCROFT, Esq., J.P.

VICE-PRESIDENT : THE REV. GEO. STEELE, M.A.

CHAIRMAN : J. H. HAMMOND, Esq., M.D., J.P.

HON. SECRETARY : MISS ASCROFT.

SECRETARY : MR. T. R. JOLLY.

PRINCIPAL : MRS. ARNOUX.

STAFF TEACHERS :

MISS CRICHTON, MISS CLARKE, MISS HESMONDHALGH,

MISS E. HUNTLEY, MISS E. PRITT, MISS H. RILEY.

Students are received for any number of selected Lessons or Courses.

Special Curriculum for "Housewife's Diploma." Teachers trained in Cookery, Laundry, Needlework, Dressmaking, & Domestic Millinery; Lady Housekeepers and Cooks trained. Afternoon and Evening Technical Classes for Ladies. Evening Continuation Classes for Women and Girls of the working classes.

SUBJECTS AND FEES.

	Course.	Single Lesson.
Cookery, Practical (Afternoon Class)	10/-	2/-
Do. do. (Evening Class)	5/-	1/-
Cookery, Demonstration (Monday Afternoon)	2/6	-/3.
Do. do. (Thursday Afternoon)	5/-	-/6.

	Course.	Single Lesson.
Laundry (Afternoon Class)	10/-	2/-
Do. (Evening Class)	5/-	1/-
Dressmaking (Afternoon Class)	10/-	2/-
Do. (Evening Class)	5/-	1/-
Millinery (Afternoon Class)	10/-	2/-
Do. (Evening Class)	5/-	1/-
Plain Sewing (Afternoon Class)	10/-	2/-
Do. (Evening Class)	5/-	1/-

Cookery.

Monday, 2-30 to 4-30.	Household Demonstration.
Tuesday, 2-30 to 4-30.	Household Practice.
Tuesday, 7 to 9.	Household Practice.
Wednesday, 10-30 to 12-30.	High-Class Practice.
Thursday, 2-30 to 4-30.	High-Class Demonstration.

Laundry.

"Course" Lessons on Wednesdays from 2-30 to 4-30 & 7 to 9.
Private Lessons, Wednesday Mornings 10-30 to 12-30.

Dressmaking.

Monday, 2-30 to 4-30.	Elementary.
Monday, 7 to 9.	Elementary.
Wednesday, 2-30 to 4-30.	Advanced.
Wednesday, 7 to 9.	Advanced.

Plain Sewing.

Fridays from 2-30 to 4-30, and 7 to 9.

Millinery.

Tuesdays from 2-30 to 4-30, and 7 to 9.

Lectures on Physiology and Hygiene given every Tuesday evening at the Harris Institute, by Dr. SERGEANT. For particulars see Special Prospectus.

The Students for Cookery are required to bring an apron, a pair of sleeves, and a kitchen towel (marked), when they come for their lessons, they are also expected to wash up the pots and pans they use, and leave their place clean and tidy for the next Student to commence her work.

SPECIAL TRAINING FOR HOUSEWIFE'S DIPLOMA, Fee £2 10s. a term. This curriculum is primarily intended for young ladies as a part of their ordinary education.

SUBJECTS INCLUDED IN SPECIAL TRAINING, Artisan, Household and High-class Cookery.

Lessons on Cleaning Silver, Plate, Copper and Brass Pans, Glass, etc.

Lessons in Practical Laundry, Dressmeasuring, Fitting and Cutting, Dressmaking, and Domestic Millinery.

Lessons in Cutting Out and Making of Underclothing, Patching, Mending of Bed and Table Linen, Darning, Embroidery, and other fancy work as desired.

One Course of Lectures on Home Sick Nursing and Domestic Hygiene.

To Students taking all the Subjects prescribed, and passing satisfactorily, there will be awarded a "Housewife's Diploma."

The above Training must be taken within the period of two years, the Student attending the school two days a week, it can be done in one year, if desired, by the student attending 4 days a week.

Fees for Private Classes in Ladies own Houses or Ladies Schools. To maximum of Ten Students if for Practical Cookery, Fifty Students if for Demonstration Cookery Lesson, Ten Students if for Laundry, Twelve Students if for Dressmaking, Needlework or Millinery.

	Per Lesson.	Per Course, (10 lessons)
Plain Cookery	7s. 6d.	£3 10 0
High-class Cookery	10s. 6d.	5 0 0
Laundry	7s. 6d.	3 10 0
Dressmaking	7s. 6d.	3 10 0
Needlework (Underclothing)	7s. 6d.	3 10 0
Millinery	7s. 6d.	3 10 0

The Committee are prepared to undertake Classes in all the above Subjects, at the Technical Schools round the Country (see special paper of information), particulars of which can be obtained by applying to the Principal.

A Hot Luncheon is served every day at 1 o'clock, on the payment of 6d., for the benefit of the Students.

A limited number of Orders received for Cooked Dishes.

Training of Teachers

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A candidate for training must not be less than eighteen years of age.

Students in training as Teachers are required to attend regularly every day in the week excepting Saturday.

1. **COOKERY** :—Fee £15 15s., for teachers of all branches of Cookery; time, nine to twelve months. £8 8s. for Teachers of Artisan Cookery; time, six months.

For the above training there are three Theoretical Examinations fee 2/6 each, and three Demonstration Tests before an Examiner, fee 10/- each, all materials being provided by the School. For further particulars of books required and syllabus of work see special prospectus.

2. **LAUNDRY WORK** :—Fee £5 5s. Students are required to bring the various articles required for washing and ironing. One Theoretical Examination, fee 2/6; one Demonstration Test, fee 10/-

3. **DRESSMAKING with HOUSEHOLD SEWING** :—Fee £7 7s. All class materials to be provided by the Candidate. Two systems of Dress-cutting are taught—"The Tailor's Academy," fee for Exam. 10/6, and the "Grenfell," fee for Theoretical Exam. 2/6, and one Test Demonstration, fee 10/-; time, from six to nine months.

4. **DOMESTIC MILLINERY** :—Fee £2 2s.; time, 2 months.

The Cookery Fees are paid in three instalments: £5 5s. on entering, £5 5s. after the first Examination, and £5 5s. after the second one.

Laundry, Dressmaking and Millinery Fees are paid in two instalments, half on entering, and the other half preceding the Theoretical Examination.

The Committee are not responsible for finding any paid employment for the Teachers.

CONTINUATION CLASSES.

Classes are arranged as below and are open gratuitously to all *boys* who are leaving, or within two years have left, any Elementary School within seven miles of the Preston Town Hall, and have passed at least the 4th Standard, and, at the time of admission, are not less than 13 years of Age.

NAME OF SUBJECT.	St. Mary's School (Wesleyan) St. Mary's Street.	CHRIST CHURCH, ROW LANE.	MOOR PARK, GARSTANG ROAD.
Elements of Physics.....	Thursday, 7 to 8	Friday, 7 to 8	Wednesday, 7 to 8
Elements of Mathematics }	Do. 7-30 to 8-30	Do. 7-30 to 8-30	Do. 7-30 to 8-30
Elements of Chemistry ...	Friday, 7 to 8	Wednesday, 7 to 8	Thursday, 7 to 8
Elements of Mathematics }	Do. 7-30 to 8-30	Do. 7-30 to 8-30	Do. 7-30 to 8-30
Elements of Mechanics ...	Tuesday, 7 to 8	Monday, 7 to 8	Friday, 7 to 8
Elements of Mathematics }	Do. 7-30 to 8-30	Do. 7-30 to 8-30	Do. 7-30 to 8-30
Elements of Science.....	At ST. MICHAEL'S SCHOOL, ASHTON-ON-RIBBLE, on Tuesday Evenings, From 7-30 to 9.		
Elements of Mathematics }			

Teachers—Messrs. G. Lynch, Rd. Pendlebury, and W. Clitheroe.

Nominations to attend the above classes may be made by Clergymen, Managers or Teachers of Schools, or *Parents of Children*, and such Nominations must be forwarded to the Secretary of the Institute, on or before the 24th September, 1895.

Managers and Teachers of Schools may also nominate boys, twelve years of age or over, for the Elementary Drawing Class. The boys will be subjected to a test examination in drawing prior to being admitted.

They may also nominate *Girls* of the same age who, subject to passing a test examination in Composition and Arithmetic, will be allowed to attend a course of lessons on the Elements of Physiography, to be given by Mr. J. Stacey, at the Institute.

C O N D I T I O N S

ON WHICH

Scholarships and Prizes

WILL BE AWARDED.

Two Scholarships of £45 a Year each

Will be offered on the following conditions :—

ONE SCHOLARSHIP, tenable for One Year, at the Owens College, Manchester, or School of Science, London, to be competed for at an Examination, to be held for the purpose, open to all Students who may obtain a First-class Certificate in any subject of SCIENCE at the May Examination, 1888, and who have attended the classes at the Harris Institute for two years preceding that Examination.

ONE SCHOLARSHIP tenable for One Year, at the National Art Training School, South Kensington, to be competed for at an Examination held during the fortnight preceding the Summer Vacation, 1888, open to all Art Students who have sat for the Government Examinations connected with the Art Class Teachers Certificate. Credit will be given for successes gained in these, and the Government 3rd Grade Examinations generally.

School of Science.

A SCHOLARSHIP, and Prize value 3s. 6d., will be awarded to each Student who passes first-class Elementary.

A SCHOLARSHIP, and Prize value 5s., will be awarded to each Student who passes first-class Advanced.

HONOURS.—A SCHOLARSHIP, and Prize value 15s., to each Student passing in Honours.

MATHEMATICS : STAGE I.—A SCHOLARSHIP, and Prize value 3s. 6d., will be awarded to each Student who passes first-class.

MATHEMATICS : STAGE II.—A SCHOLARSHIP, and Prize value 5s., will be awarded to each Student who passes first-class.

MATHEMATICS : STAGE III. and IV.—A SCHOLARSHIP and Prize value 7s. 6d., will be awarded to each Student who passes first-class.

All Students must compete for Scholarships and Prizes in the Stage Corresponding to the class they have been attending during the current session, have made at least 20 attendances, & must not have previously obtained a prize in the same Class or Stage

Scholarships for Students attending Elementary Schools.

SCIENCE SCHOLARSHIPS are offered to Scholars who are about leaving, or have left Elementary Schools within seven miles of the Town Hall. A Test Examination will be held in Arithmetic and Composition. These Scholarships cannot be competed for by anyone who is, or has been a Student of the Institute.

Technical.

A SCHOLARSHIP, and Prize value 3s. 6d., to each Student who passes first Class in Ordinary.

A SCHOLARSHIP, and Prize value 5s., to each Student who passes second class in Honours.

A SCHOLARSHIP, and Prize value 10s., to each Student who passes first-class in Honours at the May Examination, conducted by the City and Guilds of London Institute.

Conditions of Competition similar to those of Science Subjects.

Local Examinations will be held in Weaving and Spinning, and a Scholarship and Prize value 3s. 6d., awarded to all Students who obtain a first-class Certificate.

School of Art.

Scholarships and Prizes for Students attending the School of Art.

These Scholarships, entitling the holder to free admission to the Evening Classes during the Session, extending from October to July, will be awarded for success in the 2nd Grade Examinations, to be held in May, as follows:—

A SCHOLARSHIP, and Prize value 3s. 6d., will be given to each Student who shall obtain an "Excellent," or two First-class Certificates.

Special Art Prizes are also awarded. See List in Class Room.

Scholarships for Students attending Elementary Schools.

ART SCHOLARSHIPS are offered to Scholars who attend Elementary Schools within seven miles of the Town Hall, and who hold the full First Grade Certificate in Drawing, and preference will be given to those who are about to leave School. A Test Examination will be held in Freehand Drawing. These Scholarships cannot be competed for by anyone who is or has been a Student at the Institute.

French, Latin, German, English, Book-keeping, Music, Arithmetic, and Shorthand.

The Examination Fee (2s. 6d.) will be paid for all Students who, with the sanction of the Council, compete for the Certificate of the *Society of Arts* at the Examination held in April

The following Scholarships and Prizes will be awarded to Students attending these Classes:—

Students obtaining First-class Certificates in above Examinations SCHOLARSHIP, and Prize value 5s.

Students obtaining Second-class Certificate, SCHOLARSHIP, and Prize value 3s. 6d.

Local Examinations will also be held at the close of the Session, at which Students in the Elementary Stages only will compete, and in connection with these Examinations the following will be offered:—First-class Certificate, SCHOLARSHIP, and Prize value 3s. 6d.

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A SCHOLARSHIP, and Prize value 5s. will be awarded to Students who obtain the Matriculation Certificate at the Examination held at the Institute.

A SCHOLARSHIP, and Prize value 3s. 6d., will be awarded to Students who obtain the Advanced Certificate at the Examination held at the Institute.

A SCHOLARSHIP will be awarded to Students who take the Elementary Certificate at an Examination to be held at the Institute.

All Scholarships obtained by Students attending the Science (including Machine and Building Construction) or Technical Classes, entitle the holder to free admission the following Session, in the same subject, on the same terms as a Student who pays his Fees.

Scholarships and Prizes will be awarded only to Students who have attended the Science (including Machine and Building Construction) and Technical Classes at least 20 times during the Session, or the Art School at least 35 times during the Session, or in the case of other Classes, at least two-thirds of the aggregate number of class nights during the Session, and who have not previously taken a prize in the same Class or Stage of Work.

The Council reserve the right of withholding any of the Scholarships or Prizes if the Drawings or Work submitted do not, in the opinion of the Examiners, possess sufficient merit.

All Prizes have been calculated for, and must be taken, in either Books at Published Prices, or in Materials.

The Prizes to Science, Technical, and Evening Art Classes are provided out of the Thornley Bequest.

The Scholarship and remaining Prizes are provided from the Funds of the Harris Institute.

Time Table of Art Examinations, 1896.

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April 25th, Saturday, 7 to 10 p.m.—Geometrical Drawing (Art)

„ 27th, Monday, $\begin{cases} 7 \text{ to } 10 \text{ p.m.} \text{---Drawing in Light and Shade, Subject 5B,} \\ \text{(Elementary Stage)} \\ 7 \text{ to } 10 \text{ p.m.} \text{---Anatomy, Subject 9} \end{cases}$

„ 28th, Tuesday, { 7 to 8 p.m.—Model Drawing, Subject 3A (Elementary Stage)
 { 8-30 to 10 p.m.—Freehand Drawing of Ornament, Subject 2B (Elementary Stage)

„ 29th, Wednesday, { 7 to 9-30 p.m.—Freehand Drawing of Ornament,
Subject 3B (Advanced Stage)

., 30th, Thursday, { 6 to 10 p.m.—Drawing in Light and Shade, Subject t 5B
(Advanced Stage)

May 1st, Friday, { 6 to 10 p.m.—Perspective, Subjects 1c and 1E .
(Elementary & Advanced Stagges)

„ 2nd, Saturday,—6 to 10 p.m.—Drawing from the Life, Subject 8C₂

„ 4th, Monday, { 6 to 10 p.m.—Design, Subjects 23C and 23D, (Elementary
and Advanced Stages, and Honours)

„ 5th, Tuesday, { 10 a.m. to 4 p.m.—Painting from Still Life, Subject 155
7 to 9-30 p.m.—Model Drawing, Subject 5a
(Advanced Stage)

„ 6th, Wednesday, 6 to 10 p.m.—Drawing from the Antique, Subject 8B² 2

7th, Thursday, { 6 to 10 p.m.—Painting Ornament in Monochrome,
Subject 111A

„ 8th, Friday, { 7 to 10 p.m.—Principles of Ornament, Subject 22,
(Elementary & Advanced Stagges)

„ 9th, Saturday, { 6 to 10 p.m.—Architecture, Subject 1d
 { 7 to 10 p.m.—Historic Ornament, Subject 22d

., 11th, Monday, { 7 to 8 p.m.—Drawing the Antique from Memory
Subject t 8F

„ 11th to 13th,
Monday to Wednesday, { 4 to 10 p.m.—Architectural Design, Subject 23B

„ 14th and 15th, { 6-30 to 10 p.m.—Modelling Design, Subject 23E
Thursday & Friday, { (Elementary & Advanced Stagges)

„ 16th, Saturday, { Eight hours between 10 a.m. & 10 p.m.—For Candidates
to cast their Clay Models, Subject 23E

„ 18th to 21st, { 6-30 to 10 p.m.—Modelling from the Antique,
Monday to Thursday, { Subject 199B¹

„ 22nd, Friday, { Eight hours between 10 a.m. & 10 p.m.—For Candidates to
cast their Clay Models, Subject 19B1

June 1st to 5th, { 6-30 to 10 p.m.—Modelling from the Life, Subject 19H I
Monday to Friday,

„ 6th, Saturday, { Eight hours between 10 a.m. & 10 p.m.—For Candidates
to cast their Clay Models, Subject 19H

„ 8th to 11th, { 6-30 to 10 p.m.—Modelling Design, Subject 23F
Monday to Thursday, { (Honours)

„ 13th, Saturday, { Eight hours between 10 a.m. & 10 p.m.—For Candidates
to cast their Clay Models, Subject 23F

Time Table of Science Examinations, 1896.

April 25th, Saturday, 6 to 10 p.m.—I—Practical Plane & Solid Geometry	
May 2nd, Saturday, 6 to 10 p.m.—	{ II—Machine Construction and Drawing
	{ III—Building Construction
	{ IV—Naval Architecture
„ 4th, Monday, 7 to 10 p.m.—XXIII—Physiography	
„ 5th, Tuesday, 7 to 10 p.m.—	{ XVIII—Principles of Mining
	{ V—Mathematics, Stages 6 and 7
„ 6th, Wednesday, 7 to 10-30 p.m.—	{ XXIV—Principles of Agriculture
„ 7th, Thursday, 7 to 10-30 p.m.—	{ V—Mathematics, Stages 1, 2, 3
„ 8th, Friday, 7 to 10 p.m.—	{ IX—Magnetism and Electricity, including Alternative Elementary Physics
	{ VIII—Sound, Light, and Heat, (Elementary Stage)
„ 9th, Saturday, 2-30 to 10-30 p.m.—	{ VIII A—Sound, (Advanced Stage & Honours)
	{ XI P—Practical Organic Chemistry Elementary Stage, 6 to 9-30 p.m.
	{ Advanced Stage, 6 to 10-30 p.m. Honours, 2-30 to 10-30 p.m.
„ 11th, Monday, 7 to 10 p.m.—	VIA—Theoretical Mechanics, Solids
„ 12th, Tuesday, 7 to 10 p.m.—	{ X—Inorganic Chemistry, including Alternative Elementary Chemistry
„ 13th, Wednesday, 7 to 10 p.m.—	VIB—Theoretical Mechanics, Fluids
„ 14th, Thursday, 7 to 10 p.m.—	XIV—Human Physiology
„ 15th, Friday, 7 to 10 p.m.—	{ XI—Organic Chemistry
	{ XXII—Steam
„ 16th, Saturday, 2-30 to 10-30 p.m.—	{ XP—Practical Inorganic Chemistry Advanced Stage, 6 to 10-30 p.m.
	{ Honours, 2-30 to 10-30 p.m.
„ 18th, Monday, 7 to 10 p.m.—	{ V—Mathematics, Stages 4 and 5
	{ XXV—Hygiene
„ 19th, Tuesday, 7 to 10 p.m.—	{ XX—Navigation
	{ XII—Geology
„ 20th, Wednesday, 7 to 10 p.m.—	VIII B—Light, Advanced Stage & Honours
„ 21st, Thursday, 7 to 10 p.m.—	{ XV—General Biology
	{ XIX—Metallurgy
„ 22nd, Friday, 7 to 10 p.m.—	VIII C—Heat, Advanced Stage and Honours
June 1st, Monday, 7 to 10 p.m.—	{ XIX P—Practical Metallurgy, (Elementary Stage)
„ 2nd, Tuesday, 2 to 10 p.m.—	{ XIX P—Practical Metallurgy, Advanced Stage, 6 to 10 p.m.
	{ Honours, 2 to 10 p.m.
„ 3rd, Wednesday, 7 to 10 p.m.—	{ VII—Applied Mechanics
	{ XVI—Zoology
„ 4th, Thursday, 7 to 10 p.m.—	XVII—Botany
„ 5th, Friday, 6 to 9 p.m.—	{ XIII—Mineralogy
	{ XXI—Nautical Astronomy
„ 6th, Saturday, 6 to 9-30 p.m.—	{ XP—Practical Inorganic Chemistry, (Elementary Stage)

Time Table.

City & Guilds of London Institute.

Technological Examinations,

SESSION 1895-6.

EXAMINATIONS WILL BE HELD IN ANY OF THE
FOLLOWING SUBJECTS :—

Silk Manufacture
Alkali Manufacture
Soap Manufacture
Bread-baking
Brewing
Spirit Manufacture
Coal-Tar Products
Sugar Manufacture
Painters' Colours, Oils, and Varnishes
Oils and Fats, including Candle Manufacture
Gas Manufacture
Iron and Steel Manufacture
Paper Manufacture
Photography
Pottery and Porcelain
Glass-making
Dressing of Skins
Leather Tanning
Boot and Shoe Manufacture
Silk Dyeing
Wool Dyeing
Cotton Dyeing
Cotton and Linen Bleaching
Calico and Linen Printing
Wool and Worsted Spinning
Cloth Weaving
Cotton Spinning
Cotton Weaving
Flax Spinning
Linen Weaving
Silk Throwing and Spinning
Silk (including Ribbon) Weaving

Jute Spinning
Jute Weaving
Lace Manufacture
Framework Knitting and Hosiery
Hat Manufacture
Telegraphy and Telephony
Electric Lighting and Power Distribution
Electric-Metallurgy
Metal-Plate Work
Plumbers' Work
Silversmiths' Work and Plated Wares
Goldsmiths' Work & Manufacture of Personal Ornaments
Watch and Clock Making
Mechanical Engineering
Road Carriage Building
Rail Carriage Building
Typography
Lithography
Raising and Preparation of Ores
Mine Surveying
Milling (Flour Manufacture)
Carpentry and Joinery
Ship Carpentry
Ship Joinery
Brickwork and Masonry
Plasterers' Work
Dressmaking
Cabinet Making
Bookbinding
Painters and Decorators' Work

Manual Training (for Teachers in Public Elementary Schools).
Woodwork Metalwork.

Saturday, April 18th—Last day for Honours Candidates in **Weaving** to forward to the Institute Specimens of Practical Work.

Saturday, April 25th—Written Examinations in **Cloth Weaving**, in **Cotton Weaving**, in **Linen Weaving**, in **Silk Weaving** and in **Jute Weaving**, 2-30 to 6-30 p.m.

Wednesday, April 29th—Last day for Honours Candidates in **Metal Plate Work**, **Silversmiths' Work**, **Goldsmiths' Work**, **Carpentry and Joinery**, **Ship Carpentry**, **Ship Joinery**, **Plasterers' Work**, and **Cabinet Making** to send in Specimens of Practical Work.

Monday, May 4th—Written Examinations in **Breadmaking**, **Lithography**, **Mechanical Engineering**, Ordinary Grade, Part I., **Mine Surveying** Ordinary Grade, and the **Preliminary Examinations** in **Electric Lighting**, **Plumbers' Work** and **Typography**.

Tuesday, May 5th—Written Examinations for the Ordinary and Honours Grades in all **Technological Subjects** (including **Mechanical Engineering**, Ordinary Grade, Part II), *except* in those in which the Examinations are held on April 25th and May 4th (*see above*), and on May 6th (*see below*).

Wednesday, May 6th—Written Examinations in **Carpentry and Joinery** from 6 to 10 p.m.; in the **Raising and Preparation of Ores** from 6 to 9 p.m.

Wednesday, May 6th, and Thursday, May 7th—Practical Examinations in **Goldsmiths' Work** and **Bookbinding**, 6 to 10 p.m.

Saturday, May 9th—Practical Examinations in **Breadmaking**, **Photography** and **Watch and Clock Making** (Honours); in **Plumbing**, **Typography** and **Dressmaking**, from 2-30 to 7 p.m.

Wednesday, June 3rd—Examinations in **Drawing** for **First Year's** and for **Final Certificate** in **Manual Training** (**Wood Work**), and for **Final Certificate** in **Manual Training** (**Metal Work**), 7 to 10 p.m.

Thursday, June 4th—Written Examinations for **Final Certificate** in **Manual Training** (**Wood Work** and **Metal Work**), 7 to 10 p.m.

Friday, June 5th, and Saturday, June 6th—Honours Examination in **Mine Surveying**.

Friday, June 5th, and Saturday, June 6th—Practical Examination for **First Years' and Final Certificate** in **Manual Training** (**Metal Work**), 10 to 2; or 2 to 6 p.m. each day.

Saturday, June 6th—Practical Examination for **First Year's Certificate** in **Manual Training** (**Wood Work**), 10 to 2; or 2 to 6 p.m.

Saturday, June 13th—Practical Examination for **Final Certificate** in **Manual Training** (**Wood Work**), 10 to 2; or 2 to 6 p.m.

Practical Examinations in **Boot and Shoe Manufacture** will be held at dates to be subsequently fixed.

Union of Lancashire & Cheshire Institutes, 1896.

SUBJECTS AND DATES OF EXAMINATIONS.

March 2nd, Monday,	7 to 9 p.m.	Arithmetic (Elementary Grade)
„ 3rd, Tuesday,	7 to 9 p.m.	English (Elementary Grade)
„ 4th, Wednesday,	7 to 9 p.m.	Geography (Elementary Grade)
„ 5th, Thursday,	7 to 9 p.m.	{ History (Elementary Grade) Domestic Economy
„ 6th, Friday,	{ 7 to 9 p.m. 7 to 9-30 p.m.	{ Theory of Music (Elementary) Do. (Advanced)
„ 9th, Monday,	7 to 9 p.m.	Laundry Work
„ 10th, Tuesday,	7 to 9-30 p.m.	Woodwork (Elementary & Advanced)
„ 11th, Wednesday,	{ 7 to 9 p.m. 7 to 9-30 p.m.	{ Cookery Life and Duties of the Citizen
„ 12th, Thursday,	7 to 9-30 p.m.	{ Chemistry Cardboard Work (Advanced Grade)
„ 13th, Friday,	{ 7 to 9 p.m. 7 to 9-30 p.m.	{ Sick Nursing English (Commercial Grade)
„ 16th, Monday,	7 to 9-30 p.m.	{ Magnetism and Electricity Latin (Elementary and Advanced) Arithmetic (Commercial Grade)
„ 17th, Tuesday,	7 to 9-30 p.m.	{ Hygiene Navigation English Literature
„ 18th, Wednesday,	7 to 9-30 p.m.	{ Arithmetic (Technical) and Mensuration Human Physiology
„ 19th, Thursday,	{ 7 to 10 p.m. 7 to 10 p.m. 7 to 9-30 p.m.	{ Book-keeping Advanced Book-keeping & Accounts Physiography Sound, Light, and Heat Agriculture
„ 20th, Friday,	{ 7 to 8 p.m. 8-15 to 9-30 p.m.	{ Handwriting Shorthand
„ 21st, Saturday,	3 to 6 p.m.	{ Needlework (Elementary & Advanced) Dressmaking
„ 24th, Tuesday,	6-30 p.m.	Violin (Theory and Practice)
„ 27th, Friday,	7-30 to 8-15 p.m.	Typewriting
„ 30th, Monday,	7 to 9-30 p.m.	{ Spanish (Elementary and Advanced) Geography (Commercial Grade) History (Advanced Grade)
„ 31st, Tuesday,	{ 7 to 9-30 p.m. 7 to 9-30 p.m. 7 to 9-30 p.m. 7 to 10 p.m.	{ German (Elementary and Advanced) Portuguese (Elementary & Advanced) Italian (Elementary and Advanced) Machine Calculations, viz. :—Cotton Spinning, Weaving, Electrical and Mechanical
April 1st, Wednesday,	7 to 9-30 p.m.	{ French (Elementary and Advanced) Mechanics

Society for the Encouragement of Arts,
Manufactures, and Commerce.

EXAMINATION, 1896.

TIME TABLE.

Monday, Mar. 23. (7 to 10 p.m.)	Tuesday, Mar. 24 (7 to 10 p.m.)	Wed., Mar. 25. (7 to 10 p.m.)	Thurs., Mar. 26. (7 to 10 p.m.)
Arithmetic.	Book-keeping.	English.	Shorthand.
German.	Italian.	French.	
Portuguese.	Spanish.	Commercial Geography.	
Russian.	Domestic Economy	Rudiments of Music.	
Danish.	Harmony	(from 7 to 9 p.m.)	
Chinese.		Type-writing.	
Japanese.		from 7-30 to 10 p.m.	

Local Examinations, 1896.

LATIN	23rd March, 1896,	7 to 9-30 p.m.
BOOK-KEEPING	23rd March, 1896,	do.
ARITHMETIC, Elementary	25th March, 1896,	do.
FRENCH	27th March, 1896,	do.
SHORTHAND, Elementary	6th May, 1896,	do.
ELEMENTS OF PHYSICS— MECHANICS & SCIENCE	} 29th March, 1896,	2-30 to 4 p.m.
ELEMENTS OF PHYSIOGRAPHY (Girls)	} 1st April, 1896,	7 to 8-30 p.m.