HARRIS INSTITUTE,

PRESTON.

PROSPECTUS, 1893-4.

PRESTON :
J. CRANE, PRINTER, GLOVER'S COURT.

MDCCCXCIII.

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SCIENCE.

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HARRIS INSTITUTE, PRESTON.

OFFICERS & COMMITTEES, 1893.

PRESIDENT :

Mr. WM. ASCROFT, J.P.

VICE-PRESIDENT :

The Rev. GEO. STEELE, M.A., H.M.I.

TREASURER :

Col. OLIVER, J.P.

Council :

Mr. Wm. Ascroft, J.P.	Rev. R. C. Fletcher, M.A. C.A.	Mr. C. R. Jacson, J.P., D.L.
Mr. R. W. Ascroft, B.C.L.	Mr. E. Greenwood, J.P.	Colonel Oliver, J.P.
Mr. Wm. Atherton.	Mr. J. H. Hammond, M.D., J.P.	Rev. Jonathan Short, M.A.
Mr. Y. W. Booth.	Mr. John Healey, J.P.	Mr. J. J. Sidgreaves, J.P.
Mr. Jas. Burrow, J.P.	Mr. S. A. Hermon, J.P.	Mr. J. Stanning, J.P.
Mr. H. Calvert, J.P.	Mr. Jas. Hibbert.	Rev. Geo. Steele, M.A.
Mr. E. Dickson.	Mr. David Irvin, J.P.	Rev. C. H. Wood, B.C.L.
Mr. R. F. Easterby.	Rev. L. C. Wood, B.A., C.A.	
Mr. J. W. Fair, J.P., C.C.		

General Purposes :

All the Members of the Council are on this Committee.

Chairman :—Mr. Wm. Ascroft. Vice-Chairmen :—Messrs. H. Calvert, and J. H. Hammond.

Finance :

Chairman :—Mr. C. R. Jacson. Vice-Chairman :—Mr. Y. W. Booth.

Mr. R. F. Easterby.	Col. Oliver.	Mr. J. J. Sidgreaves.
Rev. R. C. Fletcher.	Mr. Jas. Burrow.	

Agricultural :

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

Mr. J. W. Fair.	Mr. J. H. Hammond.	Mr. J. Stanning.
Rev. R. C. Fletcher.	Mr. J. J. Sidgreaves.	Mr. R. C. Assheton.
Mr. S. A. Marshall.	Mr. H. P. Hornby.	Mr. W. Lees McClure.

Class :

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

Mr. R. W. Ascroft.	Mr. H. Calvert.	Mr. J. Stanning.
Mr. W. Atherton.	Mr. E. Dickson.	Mr. C. H. Wood.
Mr. Y. W. Booth.	Mr. E. Greenwood.	

The President and Vice-President are *ex-officio* members of all Committees.

T. R. JOLLY, Secretary.

HARRIS INSTITUTE, PRESTON.

SESSION 1893-4.

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.

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, 1894, 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.,

Her Majesty's Inspector of Schools.

SYLLABUS, 1893-4.

The Session commences Monday, Sept. 18th, 1893.

Students can be enrolled on Friday Evening, September 15th, from 7 to 9 p.m., or on any evening during the Session.

All Fees payable in Advance.

Preston, September, 1893.

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. ..	Dr. Geo. Mc.Gowan, Ph.D.,
Do. (Advanced) ..	Thursday, 8-30 to 9-30 p.m.	Do. [F.R.S.E.
Chemistry, Practical	Tuesday, 7 to 10 p.m.	Do.
Do. Alternative stage (Elementary)	Wednesday, 7 to 8 p.m. ..	Do.
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, M.I.M.E
Do. (Advanced) ..	Wednesday, 7-45 to 9-15 p.m	*Assistant*, Mr. F. W. Ascroft
Mathematics, Stage 1	Tuesday, 7-30 to 8-45 p.m.	Mr. H. Howarth, B.A.
Do. Stage 2	Tuesday, 8-30 to 9-45 p.m.	Do
Do. Stages 3 to 6	Monday, 8-15 to 9-45 p.m.	Mr. F. W. Brewer, M.A.
Magnetism and Electricity (Elementary)	Monday, 7-30 to 8-30 p.m.	
Do. (Advanced)..	Monday, 8-45 to 9-45 p.m.	
*Physiography (Elementary) *a*	Wednesday, 7-30 to 8-30 p.m.	
Do. Do. *b*	Wednesday, 8-45 to 9-45 p.m.	Mr. J. Gardner, F.R.G.S.
Do. (Advanced)	Friday, 7-30 to 9 p.m.	
Sound, Light, and Heat (Elementary)	Thursday, 7-30 to 8-30 p.m.	
Heat (Advanced)..	Thursday, 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. [Parker
Steam and Steam Engine (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 also held in Theoretical and Practical Chemistry. For particulars see Special Syllabus.

* See Special Syllabus for classes *a* and *b*, Elementary Physiography.

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. Practical Chemistry, 7s. 6d.

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.

CLASSES.	CLASS HOURS.	FEES.
Day Class	Monday & Thursday, 11a.m. to 1 p.m., & 2-30 to 4-30p.m.	Per Session, 40s. Two Terms, 30s.
Do. (Life)	Wed. & Fri., 11a.m. to 1p.m.	One Term, 17s. 6d.
Evening Class.....	Monday, Wed., Thurs., and Friday, 7-15 to 9-15 p.m.	Session 10s., Two Terms 8s., One Term, 5s.
Modelling (Day Class)	Tuesday, 11 a.m. to 1 p.m., and Friday, 2-30 to 4-30p.m.	Session 30s., Two Terms 25s., One Term, 15s.
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.

TECHNICAL.

SUBJECT.	CLASS HOURS.	TEACHER.
Brickwork and Masonry ..	Thursday, 8-45 to 10 p.m.	Mr. F. J. Pye
Carpentry and Joinery	Wednesday, 7-30 to 9-15p.m.	Mr. F. J. Pye *Assistant*, Mr. J. Nowell
*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 9-15p.m.	Mr. J. T. Taylor *Assistant*—Mr. Z. Mawdsley
* Do. Do. (Practical) at intervals	Friday, 7-15 to 9 p.m.	
* Do. (Honours Grade)	Friday, 7-25 to 9-15 p.m. ..	
Do. (Practical)	Wednesday, 7-15 to 9-15 p.m	
Telegraphy	Tuesday, 8-30 to 10 p.m. ..	Mr. W. J. Stubbs
Fee, 2s. 6d. per Session, and 1s. for each additional Subject.		
Electric Lighting	Friday, 7 30 to 9 p.m.....	Mr. W. R. Bowker
Fee for Session, 7/6.		

* *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. Do. (Advanced)	Friday, 8 to 9 p.m.	Do
Latin	Wednesday, 8 to 9-15p.m...	Mr. F. W. Brewer, M.A.
French (Elementary)	Friday, 7-15 to 8-15 p.m...	M. Jules Merchier, B.A.
Do. (Advanced)	Friday, 8-15 to 9-15 p.m...	Do
Do. Conversation Class	Thursday, 2-45 to 4-30 p.m.	Do
Do. Do. Do.	Do. 8 to 9-15 p.m. ..	Do
German (Elementary)	Wednesday, 7-15 to 8-15 p.m.	Mr. 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, 7-10 to 8-30 p.m.	Do
Do. (Advanced)..	Wednesday, 8-15 to 9-30p.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 Classses, Afternoon, 21s.; Evening, 10s. 6d.
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 .. (Madrigal and Matriculation Class).	Thursday, 7 to 9 p.m.	Mr. J. Smith

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.

Type-Writing	Tuesdays and Fridays, 7 to 9 p.m.	Mr. D. Sanderson

Fee for Course, 10s.

‡ SCHOOL OF COOKERY & DOMESTIC SCIENCE.

Cookery ..... Laundry Work ..... Dress-making	(See Special Syllabus).	Mrs. Arnoux, *Principal Assistants*, Misses Dunderdale, Cockshutt, Goodacre, Clarke.

* *These Classes meet at Lancaster Road.*
‡ *These Classes meet at the School in Cross Street.*

SCHOOL OF AGRICULTURE

IN CONNECTION WITH

The County Council of Lancashire.

SCHOOL OF AGRICULTURE

PRINCIPAL: DR. GEO. Mc.GOWAN, F.R.S.E., F.I.C.

The First Term will commence on Tuesday, October 3rd, 1893, and will conclude on December 18th.

The Second Term will commence on Tuesday, January 9th, 1894, and will conclude on March 20th.

The Third Term will commence on Tuesday, April 5th, and will conclude on May 10th.

INSTRUCTION WILL BE GIVEN IN THE

PRINCIPLES of FARMING

Lecturer on Agricultural Chemistry:
GEO. Mc.GOWAN, Ph.D. F.R.S.E., F.I.C.

Lecturer on Agriculture:
A. M. BATES, Gold Medallist, Royal Agricultural College, Cirencester.

Lecturer on Veterinary Surgery: C. BLACKHURST, M.R.C.V.S.

Lecturer on Agricultural Book-keeping and Arithmetic:
J. C. FORRESTER, C.A.

Lecturer on Mechanics and Steam: R. PENDLEBURY
ENGINEER, MESSRS. HORROCKSES, CREWDSON & CO., PRESTON.

The course will consist of three terms of eleven, ten, and five weeks respectively, viz. :--Octr. 3rd to Dec. 18th, Jan. 9th to Mar. 20th, and April 5th to May 10th.

TIME TABLE.

JUNIOR CLASS.

Hour.	*Monday.*	*Tuesday.*	*Wednesday.*	*Thursday.*	*Friday*
a.m. a.m. 9 to 10	MECHANICS	VETERINARY SURGERY	* AGRICULTURE	VETERINARY SURGERY	———
a.m. a.m. 10-15 to 11-15	STEAM	CHEMISTRY	ARITHMETIC	CHEMISTRY	ARITHMETIC
a.m. p.m. 11-30 to 12-30	† CHEMICAL LABORATORY	AGRICULTURE	———	AGRICULTURE	AGRICULTURE
p.m. p.m. 2-30 to 4	AGRICULTURE (General)	———	———	———	———

*NOTE.—The Lectures upon Agriculture will include the Elements of Botany, Geology and Entomology, as applied to Agriculture. Those upon general agricultural subjects, on Monday afternoons, are intended for both junior and senior students together.

†This class in Practical Chemistry to commence at the beginning of the second term, and to be open to those students who have made satisfactory progress in the junior class of Theoretical Chemistry.

SENIOR CLASS.

Hour.	*Monday*	*Tuesday.*	*Wednesday.*	*Thursday.*	*Friday.*
a.m. a.m. 9 to 10	MECHANICS	AGRICULTURE	‡ ARITHMETIC	AGRICULTURE	ARITHMETIC
a.m. a.m. 10-15 to 11-15	STEAM	CHEMICAL LABORATORY	CHEMISTRY (Advanced and Agricultural)	CHEMICAL LABORATORY	CHEMISTRY (Advanced and Agricultural)
a.m. p.m. 11-30 to 12-30	AGRICULTURE	CHEMICAL LABORATORY	VETERINARY SURGERY	CHEMICAL LABORATORY	VETERINARY SURGERY
p.m. p.m. 2-30 to 4	AGRICULTURE (General)	———	———	———	CHEMICAL LABORATORY (Optional)

‡ This will include Elementary Surveying and Mensuration.

Arrangements will be made for Students to visit certain approved Farms, upon Wednesday afternoons, accompanied by Mr. A. M. Bates.

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

The Committee is prepared to recommend Lodgings in which Students can be provided with suitable accommodation at very reasonable rates.

Students are required to attend punctually and regularly the Lectures and Classes for which their names are entered.

[*Written Examinations upon the work of each class will be held at the end of the first and third terms, at which all the Students are expected to sit.*]

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 following valuable Scholarships and Exhibitions offered by the Lancashire County Council:—

20 Scholarships of £20 each, tenable for three years.

25 Exhibitions of £10 each, tenable for one year.

The date of these Examinations, and full particulars of the subjects selected for the candidates to work, and the generous terms offered by the County Council of Lancaster to Agricultural Students, will be found in the annexed appendices.

Appendix A

THE COUNTY COUNCIL FOR THE COUNTY PALATINE OF LANCASTER.

TECHNICAL INSTRUCTION COMMITTEE.

Agricultural Scholarships

The Lancashire County Council offers for Competition

20 SCHOLARSHIPS

IN

Agriculture and Horticulture,

EACH OF VALUE £20 PER YEAR FOR THREE YEARS.

ALSO

25 EXHIBITIONS

IN

Agriculture and Horticulture,

EACH VALUE £10 FOR ONE YEAR.

EXAMINATIONS for above will be held at the HARRIS INSTITUTE, PRESTON, as below:—

Time Table for AGRICULTURAL Scholarships.

TIME.	TUESDAY, 26th SEPTEMBER.	WEDNESDAY, 27th SEPTEMBER.
A.M. 10 to 1.	AGRICULTURE AND HORTICULTURE.	ELEMENTARY CHEMISTRY.
P.M. 2 to 5.	ARITHMETIC AND MENSURATION.	

Time Table for AGRICULTURAL Exhibitions.

TIME.	THURSDAY, 28th SEPTEMBER.	FRIDAY, 29th SEPTEMBER.
A.M. 10 to 11-30	ENGLISH.	AGRICULTURE AND HORTICULTURE.
A.M. P.M. 11-35 to 1-5	ARITHMETIC.	MENSURATION.

For the **Agricultural Scholarships**, papers of three hours each will be set in the following Subjects :—

Agriculture and Horticulture. | Arithmetic and Mensuration.
Elementary Chemistry.

Candidates for the **Agricultural and Horticultural Exhibitions** will be required to take papers of 1½ hours in each of the following subjects :—

English (Grammar and Composition)	Mensuration
Arithmetic	Agriculture and Horticulture

No credit will be given for any subject unless a certain fixed number of marks be obtained in that subject.

Candidates for these Scholarships are required to send in their full names and addresses on the form provided for that purpose, stating whether they intend to sit for a Scholarship or Exhibition, or both. These forms duly filled up, together with a certificate from their former schoolmasters or instructors, stating that they are qualified to sit for the Examination, are to be sent to the Director of Technical Instruction, County Offices, Preston, on or before Saturday, the 16th day of September, 1893. The forms may be obtained from the Director of Technical Instruction.

Each Candidate will receive, a few days before the date of the Examination, an **Admission Card**, which must be given to the Superintendent of the Examination.

Students who, at the date of the Examination, are in attendance at a College or Institution at which County Scholarships may be held, are not eligible to compete unless they are in their first term. An exception will be made in the case of those persons who are holding Exhibitions given by the Lancashire County Council during the present academical year, and also in the case of Agricultural Students attending the Harris Institute, Preston.

Full particulars and conditions may be obtained from

J. A. BENNION, M.A.,

Director of Technical Instruction for the County Palatine of Lancaster

County Offices, Preston,
August, 1893.

THE COUNTY COUNCIL FOR THE COUNTY PALATINE OF LANCASTER.

TECHNICAL INSTRUCTION COMMITTEE.

Free Classes in Agricultural Subjects.

The Technical Instruction Committee of the Lancashire County Council is prepared to allow a sum **not exceeding Ten Shillings** a week to each Student who attends a Course in Agricultural Subjects approved by the Technical Instruction Committee at the Harris Institute, Preston, during the Session commencing 2nd October, 1893, and ending 10th May, 1894. There will be an interval of about three weeks at Christmas, and two weeks at Easter, during which no Classes will be held.

The sum allowed may be spent on board and lodgings in Preston or on travelling expenses from home to and from Preston.

The Council of the Harris Institute is prepared to recommend lodgings at a reasonable rate, and in addition to allow each Student so approved to attend the Lectures on Agricultural Chemistry with Laboratory Practice; Lectures on Agriculture; Veterinary Surgery; Agricultural Book-keeping and Arithmetic; and Mechanics; as well as Evening Classes in such subjects as may be required at the Harris Institute, **free of all charge**, provided such Students make the required number of attendances and sit at the Examinations

Students must be resident in the Administrative County of Lancaster, which includes all places within the area of the County of Lancaster, excluding the County Boroughs and Stalybridge and Todmorden. The County Boroughs are Barrow-in-Furness, Blackburn, Bolton, Bootle, Burnley, Bury, Liverpool, Manchester, Oldham, Preston, Rochdale, St. Helens, Salford, Stockport, and Wigan.

The payment of the allowance will be made after the close of the Session in May, 1894, on a claim in writing, accompanied by a satisfactory report from the Secretary of the Harris Institute being submitted to and approved by the Technical Instruction Committee. Where travelling expenses only are claimed, a statement of the cost of each journey must be sent in with the application form, and such expenditure must be approved by the Technical Instruction Committee.

Application to attend these Classes must be made to the Director of Technical Instruction, County Offices, Preston.

J. A. BENNION, M.A.,

Director of Technical Instruction for the County Palatine of Lancaster.

County Offices, Preston,
August, 1893.

Central Classes for Pupil Teachers.

Lecturers - Mr. J. H. Brittain, (*Lond. Univ.*)
Mr. W. D. Smith.

These Classes are held as follows :—

Monday	(2 to 5)	for First Year Pupil Teachers
Tuesday	(,,)	Second ,, ,,
Thursday	(,,)	Third ,, ,,
Friday	(,,)	Scholarship Candidates
Saturday	(9-30 to 12-30)	for Pupil Teachers of all Years.

The Subjects taken are :—Mathematics, English History, Grammar and Literature, Geography, School Management, Theory of Music, and Domestic Economy.

For Fees, &c., see special Prospectus, issued about a month before each session commences.

Law School.

SYLLABUS

OF A COURSE OF

LECTURES AND CLASSES

CONDUCTED BY

Mr. ERNEST C. C. FIRTH, M.A., B.C.L.,

BARRISTER-AT-LAW.

FOUR LECTURES ON

Subject :—

A. History of the English Courts of Justice, and an account of the Law Reports.

B. Changes made by the Judicature Acts.

C. Proceedings in a Common Law Action from the issue of a writ until judgment.

D. Criminal Procedure.

FOUR LECTURES ON

SUBJECT:—THE LAW OF ~~Costs~~ Torts

A. Principles of Liability.

B. Libel and Slander.

C. Negligence.

D. Nuisance.

FOUR CLASSES ON

SUBJECTS:—

The Vendor and Purchaser Act.

The Conveyancing Acts 1881 and 1882.

The Settled Land Acts 1882 to 1890.

FOUR CLASSES ON

SUBJECTS:—

Doctrine of Notice, illustrated from

A. Priorities.

B. Covenants.

Maxims of Equity

A. Æquitas sequitur legem.

B. Where there is equal equity the law must prevail

C. Qui prior est tempore potior est jure

D. He who comes to equity must do equity

E. Vigilantibus non dormientibus œquitas subvenit.

F. Equity regards that as done which ought to be done.

The Lectures will be given at the Institute at 7-30 p.m., on MONDAY Evenings, commencing on the 6th November, and concluding on the 18th December, 1893.

The Classes will be held at 5 o'clock in the afternoons of the same days.

Fee for Course of 8 Lectures 7s. 6d.
Do. do. Classes 7s. 6d.

Tickets for admission may be obtained at the Institute, and it is requested that applications for them may be made before the 1st October.

SCIENCE.

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.

Convertion 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 Tensil 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. Link-work 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 will be found invaluable to 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 ; one exercise book, good quality, unruled ; one exercise book, common, for rough notes.

TEXT BOOK :—Botany, J. W. Oliver, (Blackie & Son), 2/-.

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

ADVANCED TEXT BOOK :—Prantl-Vines Text Book of Botany, (New Edition). Expected Xmas, 1893.

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 offsett. 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, lintles, 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, rabbitting, plough-grooving, chamfering, housing.

Mouldings and beading 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 strutts, ties, and beams. Joints for iron trusses, &c.

The nature, application, and characteristic pecularities 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, ashphalt, timber of different kinds, Cast and wrought iron. Lead.

Constructive details as follows:—Timbering excavations, foundations, sewers, use of piles, hoop-iron bound in brickwork, diagonal and hewing 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.

Day Chemistry Classes.

Lecturer - - - Dr. GEORGE Mc.GOWAN, F.R.S.E., F.I.C.

THEORETICAL CHEMISTRY.

1.—A course of about 50 lectures on Elementary Inorganic Chemistry, on TUESDAY and THURSDAY MORNINGS, at 10-15 a.m. This course will begin upon TUESDAY, OCTOBER 3rd, 1893, and end on May 8th, 1894.

FEE FOR THE COURSE £1 1s.

Book recommended:—Roscoe's Elementary Chemistry.

2.—A course of about 50 lectures on Elementary Organic and Agricultural Chemistry, on WEDNESDAY and FRIDAY MORNINGS at 10-15 a.m. (This year a certain number of the lectures in the above course will be upon Inorganic Chemistry). Although the course is intended for Agricultural Students primarily, it will be found to be of interest and use to students of the various branches of Chemistry. The first lecture will be given upon THURSDAY, OCTOBER 5th, 1893, and the course will conclude on May 10th, 1894.

FEE FOR THE COURSE £1 1s.

Books recommended (to be chosen from):—Roscoe's Elementary Chemistry; Bloxam's Chemistry (edited by J. M. Thomson); Watts' Inorganic Chemistry (edited by Tilden); Kolbe's Inorganic Chemistry (latest edition, edited by Lloyd Snape); Bernthsen's Organic Chemistry (translated from the German by Mc.Gowan); Warington's Chemistry of the Farm.

PRACTICAL CHEMISTRY.

The Chemical Laboratory of the Institute is open daily (under the superintendence of Dr. Mc.GOWAN), MONDAY TO FRIDAY inclusive, from 10 a.m. to 4 p.m., for the instruction of students in Qualitative & Quantitative Chemical Analysis, and in the applications of Chemistry to Pharmacy, Medicine and the various Chemical Industries.

The Session is divided into three terms, viz., from :—

(1)—OCTOBER 3rd TO CHRISTMAS, 1893.
(2)—JANUARY 9th TO MARCH 20th, 1894.
(3)—APRIL 5th TO JUNE 29th, 1894.

FEE, PER TERM :—

(a)—6 hours per week	-	-	£1 1s.
(b)—12 ,, ,,	-	-	£2 2s.
(c)—18 ,, ,,	-	-	£3 3s.
(d)—24 ,, ,,	-	-	£4 4s.

Students in the Laboratory are supplied with all the ordinary apparatus and reagents, an additional fee of 5/- per term in the cases of (a) and (b), and of 10/- per term in those of (c) and (d) being charged to cover wear and tear. Breakages to be charged for at cost price.

Books recommended (to be chosen from) :—Jones' Practical Chemistry; Valentin's Qualitative Analysis; Fresenius' Qualitative Analysis; Hartley's Quantitative Analysis; Clowes and Coleman's Quantitative Analysis; Fresenius' Quantitative Analysis; etc., etc.

Evening Chemistry Classes.

Lecturer - - - Dr. GEORGE Mc.GOWAN, F.R.S.E., F.I.C.

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 :—ROSCOE'S ELEMENTARY CHEMISTRY.

ELEMENTARY STAGE (ALTERNATIVE) WEDNESDAY, 7 to 8 p.m.

Intended for students who only require a knowledge of Chemistry as a foundation for their studies in other subjects.

Lectures, illustrated by experiments, will be given upon solution and solvents; the chemistry of air and water; carbon, sulphur and chlorine; acids and alkalies; ammonia; lime and clay; the metals lead, iron, copper, mercury and sodium; acetic and tartaric acids; fats and oils, and glycerine; starch, sugar, gluten, spirit, etc.

Book recommended :—ROSCOE'S ELEMENTARY 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) :—ROSCOE'S ELEMENTARY 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"; RAMSAY'S INORGANIC CHEMISTRY would be of great value here.

PRACTICAL INORGANIC CHEMISTRY.

ELEMENTARY & ADVANCED STAGES. TUESDAY, 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 :—JONES' PRACTICAL CHEMISTRY; VALENTIN'S 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 full 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 in 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 (to be chosen from) :—FRESENIUS' QUALITATIVE ANALYSIS; HARTLEY'S QUANTITATIVE ANALYSIS; CLOWES and COLEMAN'S QUANTITATIVE ANALYSIS; FRESENIUS' QUANTITATIVE ANALYSIS; etc.

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.

Geology.

Teacher - - Mr. GEO. SUTCLIFFE.

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 & 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 & Physiology, as no Student can pass in Hygiene who fails to satisfy the Examiners in Elementary Human Physiology.

TEXT BOOKS,—Newsholme's Hygiene.

Machine Construction and Mechanical Drawing.

Teacher - - - Mr. J. T. BUCKLEY, M.I.M.E.

Assistant - - - Mr. F. W. ASCROFT.

MONDAY & 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 and 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. Arrangements of key and cotter fastenings, taper of keys and cotters, knuckle joint, modes of fixing cottars.

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

Pedestals and Plummer Blocks. Forms 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 Pullies. Flat and round belt pullies, speed cones, shapes of arms, velocity ratios of pullies, use of guide pullies, joints of belting.

Canks and Levers. Cast, wrot. 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 pistons to piston rods.

Stuffing Boxes. Use of packing, mode of tightening gland, 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, & 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 8-45 P.M.

,, STAGE II.—8-30 TO 9-45 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) 6d. nett. 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.—Chamber's Standard Algebra, part III, 6d.; Barclay's Geometry, Books 1—3 (Oliver and Boyd), 1/3; Oxford and Cambridge Logarithms (Gill & Sons), 1/-.

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.
Walmsley's Trigonometry (Hodgson), 2/6.

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 & Integral Calculas (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 organized 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 (*a*)—WEDNESDAY, 7-30 TO 8-30.
‡ ELEMENTARY (*b*)—WEDNESDAY, 8-45 TO 9-45.
ADVANCED—FRIDAY, 7-30 TO 9.

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. The remarkable success of the students of this subject at the last examination is doubtless largely due to the fact that many of them were in the class for Light and Heat.

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.

* This Class is for students who are taking Physiography for the first time.

‡ This Class is for students who have been through the course before, but who have failed to obtain a pass.

Practical, Plane and Solid Geometry.

TEACHER - - - - Mr. F. J. PYE.

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 HEAT, THURSDAY, 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 1st or 2nd 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 the technical subjects for "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, vaporization, 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 truck 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 & Sons) 4/6.

ELEMENTARY STAGE (Solids) South Kensington Mechanics of Solids by Ben Jonson, (Gill's) 2/-.

(Fluids) South Kensington Mechanics of Fluids by Ben Jonson, (Gill's) 2/-.

Art.

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. WHITTAKER and MISS BENTHAM.

The School provides instruction in the principles and practice of Art, as they are applied in the form of design to Manufactures, 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. & 2-30 to 4-30 p.m.	Session, 40s.
Day Class for Modelling in Clay	Tuesday, 11 a.m. to 1 p.m.	Two Terms, 30s.
Day Class for Design	Tuesday, 2-30 p.m. to 4-30 p.m., and Friday, 2-30 to 4-30 p.m.	One Term, 17s. 6d.
Day Class Study of Living Model	Friday, 11 a.m. to 1 p.m.	
Evening Classes for General Study	Monday, Wednesday, Thursday, and Friday, 7-15 to 9-15 p.m.	Session, 10s.
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)	Two Terms, 8s.
Special Evening Class for Drawing from Living Model	Tuesday, 7-15 to 9-15 p.m.	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.

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

TECHNOLOGICAL.

Brickwork & Masonry.

Teacher - - - - - *Mr. F. J. PYE.*

Medallist, 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, heights 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, Basses, &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.*

Assistant - - - - *Mr. JAS. NOWELL.*

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 and 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 strengths of materials used.

Mouldings, their forms and names, intersection of moulds, straight and circular, enlarging and dimishing 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. Circular work, window and door heads, solid and built up.

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 floors, 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, proportion of winders and diminished fliers, general construction and method of support.

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 raw material 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 cottons 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 doubling of single and compound yarns, gassing yarn and kindred purposes. 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, Shirtings, for India and China; Longcloths, Mediums, Matelasses, Muslins, Sheetings, Sateens, Drills, & Croydens, most of which are woven in Preston, also Weft Yarns for the above fabrics.

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

A Local Examination adapted to the requirements of the Preston Cotton Trade, and one under the Union of Lancashire & Cheshire Institutes, will be held during the Session.

The Lectures are illustrated by samples of Cottons and Yarns analagous 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.*)

Friday, 7-30 to 9 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 & 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, May 2nd, 7 to 10, and the Ordinary Grade Examination will be held on Monday, May 7th, 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 parellel 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.

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

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

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

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

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

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

16. 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

17. Condensers. Work stored in a condenser.

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

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

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

21. The winding of field-magnets and armatures.

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

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

24. The electrical and mechanical efficiency of dynamos and motors.

25. The construction of alternators and transformers.

26. The transmission of power by direct currents over moderate distances.

27. Practical methods of arranging lamps and circuits.

28. Glow lamps and Arc lamps, watts per candle.

29. Secondary batteries (accumulators), construction, use and theory.

30. Distribution of electrical energy from central stations, direct and transformer systems, continuous and alternating currents, two-wire and multiple-wire mains.

Fee, 7/6 for Session.

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.—Manufactures 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.

Technical Telegraphy.

Teacher - - - Mr. W. J. STUBBS.

TUESDAY, 8-30 TO 10 P.M.

This class will embrace Lectures on the Batteries and apparatus used in the Postal Telegraphs. Testing Instruments, together with their practical uses, Submarine Cable Working, and complete Telephony will also be dealt with.

TEXT BOOK:—Preece and Sivewright's "Handbook of Telegraphy," 6/-.

FOR REFERENCE:—"Elementary Lessons in Electricity," by T. P. Thompson.

Culley's "Handbook of Telegraphy."

Langdon's "Application of Electricity to Railway Working."

Prof. Ayrton's "Practical Electricity."

Connolly's "Telegraphy."

CURRENT ELECTRICAL PERIODICALS:—"Electrical Review"; "The Electrician."

Cotton Weaving & Designing.

Teacher - Mr. John T. Taylor,

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

Assistant Demonstrator, - Mr. Z. Mawdesley.

SYLLABUS.

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

1.—The Loom: its parts and appliances, the principles governing each, with the relation and timing of each to the other.

2.—Tappets, with their under or over motions; Springs, Rollers, Pulleys, &c.

3.—The various Picking Motions.

4.—The various minor motions: Take-up, Weft Fork, Stop Rod, &c.

5.—Analysis of Cloth to determine Design, Draft, and Pegging Plan; and Reed, Pick, and Counts of Yarn.

6.—Dobbies: double and single lift; Positive and Non-positive, Handkerchief Motions, &c.

7.—Comparative merits of Hand and Power Looms

8.—Preparation of Yarn: Winding, Warping, Sizing, &c

9.—The principles of Pattern Designing, including Twills, Satins, Checks, Stripes, Crimps, Oatmeals, Dhootys, Leno and Gauze Fabrics, Double Cloths, Velvets, Velveteens, and other fancy woven cloths.

10.—Leno and Gauze Weaving by Tappet, Dobby, and Jacquard; Splits, &c.

11.—Drop and Circular Box Looms: Diggle's, Wright Shaw's, Whitesmith's, and other motions.

12.—Calculations for Warp, Weft, &c., and method of costing goods.

13.—The Structure and Mounting of Jacquards, for weaving Figured goods, Brocades, Damasks, Handkerchiefs, &c.

Text Book: "Cotton Weaving and Designing," by John T. Taylor.

ADVANCED CLASS—FRIDAY, 7-25 to 9-15 p.m.
WEDNESDAY, 7-15 to 9-15 p.m. Practical.

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

14.—Card Cutting, &c., on Piano Machine.

15.—Harness Building for Handkerchiefs and other bordered goods centre patterns, &c.

16.—The Jacquard as applied to weaving figured Leno fabrics.

17.—The Split Harness; the Compound or Pressure Harness for increasing the width of pattern; the Twilling Harness, &c.

18.—The principles of Designing and Card Cutting for Jacquard Weaving, including the following amongst other fabrics: Brocades, Damasks, Coloured Checks, Stripes, Zephyrs, and Fancy Dress fabrics; Figured Lenos, Velvets, &c, &c.

19.—Principles of Cloth Structure; diameter of Yarns, &c.

Text Book: "Cotton Weaving and Designing," by John T. Taylor.

The Council have provided at the Lancaster Road School a number of Dobbie 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 on the Power Loom at the Hanover Street Works, where a number of Power Looms are in motion.

The Council of the Institute have decided that the teaching of this subject shall in future be directed mainly to the local requirements, and that in addition to the Annual Examination conducted by the City and Guilds of London Institute, a LOCAL EXAMINATION shall be held, having reference more directly to the trade of this district, and that Prizes and Certificates shall be awarded on the results of such Examination.

MISCELLANEOUS.

Arithmetic.

Teacher - - - Mr. John Renwick.

* Tuesday and Wednesday } 7-0 to 8-0, Elementary.
* Tuesday, 8-0 to 9-0, Intermediate.
* Wednesday, 8-0 to 9-0, 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.

Book-keeping.

Teacher - - Mr. John C. Forrester, C.A.

(Chartered Accountant, Bolton.)

Elementary Class, Wednesday Evening, 7 to 8-15.
Intermediate Class, Thursday Evening, 7-10 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

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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

French.

Teacher - - Monsieur Jules Merchier, B.A.,

Of the University of France.

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

ELEMENTARY CLASS—FRIDAY, 7-15 TO 8-15.
ADVANCED ,, ,, 8-15 TO 9-15.

The number of lessons during the Session will be twenty-four, twelve before Christmas, commencing on September 22nd, 1893, and twelve after Christmas, commencing on January 5th, 1894.

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 French Grammar, and easy sentences for translation into English and French.

TEXT BOOKS FOR THE ADVANCED CLASS :—

Henri Bué's Conversation Grammar, 1st & 2nd Course ; 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 French Verbs, and a knowledge of the Rules of Syntax and French Composition ; it is also intended to make a thorough study of above mentioned reading book.

Classes for French conversation will also be held on Thursday Afternoons and Evenings.

Thursday Afternoons, from 2-45 to 4-30.
FEE :—ONE GUINEA FOR THE SESSION.

Thursday Evenings, from 8 to 9-15.
FEE—10/6 FOR THE SESSION.

It is hoped that the Conversational Classes will be well attended, and that a great number will avail themselves of the opportunity offered to them. Now that travelling abroad is of so frequent occurence, it should be the aim of those who study a foreign language, to learn how to speak it ; this will make travelling both pleasanter and cheaper. Anyone wishing to join the Conversational Classes should have a fair knowledge of the four French conjugations, also of the irregular verbs, chiefly of the few which are often used in conversation.

TEXT BOOKS FOR THE CONVERSATIONAL CLASSES :

Syllabaire Régimbeau—Guide to French Conversation—Les deux Sourds.

It is very important that all the Students intending to join any of the French Classes should do so as early as possible.

The Conversational Classes commence on the 6th October, and will consist of two terms of ten weeks each.

German.

Teacher - - - - Mr. 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 Geschichlen (Norgate) 2/6 Macmillan's German Course, 2nd year 3/6.

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).

Latin.

Teacher - - - Mr. F. W. Brewer, M.A.

A Course of 24 Lessons will be given in the above Language (12 Lessons before Christmas, commencing on September 27th, 1893, and 12 after Christmas, commencing on January 10th. 1894).

The Class will meet on Wednesdays from 8 to 9-15 p.m.

TEXT BOOKS:—Macmillan's Shorter Latin Course, by A. M. Cook, M.A., (1s. 6d.)

It is proposed to break up the Class into two Divisions in the event of its being attended by Pupils who are not absolutely beginners in the language.

Music :

Theory, Harmony, Counterpoint, &c.

Teacher - - MR JAMES TOMLINSON.

(*Organist to the Corporation of Preston.*)

ELEMENTARY, FRIDAY, 7 TO 8 P.M.
ADVANCED, ,, 8 TO 9 P.M.

Two 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—

1. The Elementary Rudiments.
2. Harmony.
3. Counterpoint.
4. Musical History and Biography.

The Senior Class will study Nos. 2, 3, and 4.

The Junior Class will study Nos. 1 and 2.

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

Shorthand.

Teacher - - - Mr. H. Cartmell.

Classes in this subject have been arranged 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.
„ (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.

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

The Junior Elementary Class is for students under the age of 15 years, and for 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," "Mc.Ewan'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 Test 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 2nd October, 1893, and the Matriculation Class on Thursday, the 5th Oct. Twelve lessons will be given to each Class before Christmas, and twelve commencing in January, 1894.

TEXT BOOKS.

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

Elementary.—"Voices in Song," price 6d.
Intermediate.—"Intermediate Class Book," price 6d.
Matriculation.—"Standard Course," price 3/6; "How to observe Harmony," price 2/-; "The Staff Notation," price 8d.

Type-Writing.

Teacher - - - - Mr. D. SANDERSON.

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

The Remington Type-Writer will be used, and Students will receive instructions from the Teacher for a Course of 12 weeks, commencing on Tuesday, the 3rd October, 1893. 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.

School of Cookery & Domestic Sciences.

CROSS STREET, PRESTON.

PRESIDENT : WM. ASCROFT, ESQ., J.P.
VICE-PRESIDENT : THE REV. GEO. STEELE, M.A., H.M.I. SCHOOLS.
PRINCIPAL : MRS. ARNOUX.
ASSISTANTS : (Cookery) MISSES DUNDERDALE, COCKSHUTT, GOODACRE.
ASSISTANT : (Dresscutting) MISS CLARKE.
ASSISTANT : (Laundry) MISS GOODACRE.

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 10th, 7 to 9.
Syllabus (B) same day 2-30 to 4-30.
Monday's Demonstration, October 9th, 2-30 to 4-30.
Thursday's ,, October 12th, 2-30 to 4-30.

Ten Lessons in each Course.

FEE :—Syllabus (A) 5/- ; Syllabus (B) 10/-

Demonstration Fee,—

Monday's Course 5/- ; Thursday's Course 10/-

Anyone not desirous of attending the whole of the Demonstration Lessons may be present at Monday's Class by the payment of 6d., and on Thursday by 1/-.

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 FRIDAY AFTERNOON and EVENING, commencing OCTOBER 13th. 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.

Dress-making.

Courses of Lessons in the above subject on the "Tailors Academy" System, will commence on WEDNESDAY, 11th.

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

FEE :—Afternoons, 10/- ; Evening, 5/-.

A Course consists of Ten Lessons.

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

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

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 WEDNESDAY, SEPTEMBER 6th, for the Training of Teachers.

ELEMENTARY SCHOOLS AND EVENING CONTINUATION SCHOOLS.

Practical Cookery and Laundry stand thus in the Code :—"It is a recognised subject, with a Grant of 4s. a head for any Girl in the Fourth Standard and upwards who has had *Forty* hours instruction, *Twenty* of which at least have been spent in Cooking with her own hands in a class of not more than twenty-four Scholars, on condition that the Inspector reports that special and appropriate provision is made for Practical Teaching of Cookery by a Teacher who has been Trained in one of the Training Schools of Cookery."

The Course consists of 20 Lessons, 2 hours each, *i.e.*, the 40 hours required by Government. Teachers are authorised to give two lessons a day for five days a week, and can be sent to any part of the country with all the plans and cost arranged.

LAUNDRY :—"Where the Inspector reports that special and appropriate provision has been made for the practical teaching of Laundry-Work by a teacher recognised by the Department as qualified to teach that subject, a Grant of 2s. is made on account of any girl presented for examination in elementary subjects in Standard IV., or any higher Standard, who has attended not less than 20 hours during the school year at a Laundry Class of not more than 14 scholars. But this Grant is not made on account of any girl who is presented for examination in more than one specific subject, if a grant is also claimed on her account for Cookery."

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, Dress-making, and Domestic Economy.

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 before October. Special Terms are made for the above Work, which can be had by either applying at Cross Street, or the Harris Institute. On Monday Evenings from 7 to 9, a Special Course of Instructions will be given to the young girls or women of our working classes by Mrs. ARNOUX, on the "Making of the Home."

Fee for this Course, 2/6.

First Lecture, Monday, October 9th. The Course consists of Ten Lessons.

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

ALL FEES MUST BE PAID IN ADVANCE.

The Council is prepared to supply Teachers in the above subjects (who hold 1st class full Diplomas from the National Union), to any Committee acting under the County Council of Lancaster.

CONDITIONS

ON WHICH

Scholarships and Prizes

WILL BE AWARDED.

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, and 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 Examinations, conducted by the City and Guilds of London Institute.

Conditions of Competition similar to 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.

36 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 Free-hand 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 Certificate 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.

Tonic Sol-fa.

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 abtain 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 & 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 Scholarships and remaining Prizes are provided from the Funds of the Harris Institute.

Time Table of Art Examinations, 1894.

April 30th, Monday, 7 to 10 p.m.—Principles of Ornament, Subject 22, (Elementary & Advanced)

May 1st, 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)

„ 2nd, Wednesday,
- 7 to 10 p.m.—Drawing in Light and Shade, Subject 5B, (Elementary Stage)
- 7 to 10 p.m.—Anatomy, Subject 9

„ 3rd, Thursday, 6 to 10 p.m.—Perspective, Subjects 1C and 1E (Elementary & Advanced Stages)

„ 4th, Friday, 7 to 9-30 p.m.—Freehand Drawing of Ornament, Subject 3B (Advanced Stage)

„ 5th, Saturday, 6 to 10 p.m.—Drawing in Light and Shade, Subject 5B (Advanced Stage)

„ 7th, Monday, 7 to 9-30 p.m.—Model Drawing, Subject 5A, (Advanced Stage)

„ 8th, Tuesday, 6 to 10 p.m.—Design, Subjects 23C and 23D, (Elementary and Advanced Stages) and Honours

„ 9th, Wednesday, 6 to 10 p m.—Drawing from the Antique, Subject $8B_2$

„ 10th, Thursday, 6 to 10 p m.—Drawing from the Life, Subject $8C^2$

„ 11th, Friday,
- 10 a.m. to 4 p.m.—Painting from Still Life, Subject 15
- 6 to 10 p.m.—Painting Ornament in Monochrome, Subject 11A

„ 21st to 23rd, Monday to Wednesday, 4 to 10 p.m.—Architectural Design, Subject 23B

„ 21st to 23rd, Monday to Wednesday, 4 to 10 p.m.—Modelling from the Life, Subject 19L

„ 24th, Thursday, eight hours, between 10 a.m. & 10 p.m.—For Candidates to cast their Clay Models, Subject 19L

„ 25th, Friday, 4 to 10 p.m.—Modelling Design, Subjects 23E & 23F, (Elementary & Advanced Stages and Honours)

„ 26th, Saturday, eight hours, between 10 a.m. & 10 p.m.—For Candidates to cast their Clay Models, Subjects 23E & 23F

„ 28th and 29th, Monday & Tuesday, 4 to 10 p.m.—Modelling from the Antique, Subject 19I

„ 30th, Wednesday, eight hours, between 10 a.m. & 10 p.m.—For Candidates to cast their Clay Models, Subject 19I

„ 31st, Thursday, 6 to 7 p.m.—Drawing the Antique from Memory, Subject 8F

June 1st, Friday,
- 6 to 10 p.m.—Architecture, Subject 1D
- 7 to 10 p.m.—Historic Ornament, Subject 22D

Time Table of Science Examinations, 1894.

April 28th, Saturday, 6 to 10 p.m.—I—Practical Plane and Solid Geometry

„ 30th, Monday, 7 to 10 p.m.—VIA—Theoretical Mechanics, Solids

May 3rd, Thursday, 7 to 10 p.m.— { VII—Applied Mechanics / XVI—Zoology

„ 4th, Friday, 7 to 10 p.m.—VIB—Theoretical Mechanics, Fluids

„ 5th, Saturday, 6 to 10 p.m.— { II—Machine Construction and Drawing / III—Building Construction / IV—Naval Architecture

„ 7th, Monday, 7 to 10 p m —XXIII—Physiography

„ 8th, Tuesday, 7 to 10 p.m.— { XVIII—Principles of Mining / V—Mathematics, 6 and 7 / XXIV—Principles of Agriculture

„ 9th, Wednesday, 7 to 10-30 p.m.—V—Mathematics 1, 2, 3

„ 10th, Thursday, 7 to 10 p.m.— { IX—Magnetism and Electricity, including Alternative Elementary Physics

„ 11th, Friday, 7 to 10 p.m.— { VIII—Sound, Light and Heat, (Elementary Stage) / VIIIA—Sound, (Advanced Stage & Honours)

„ 21st, Monday, 7 to 10 p.m.— { X—Inorganic Chemistry, including Alternative Elementary Chemistry.

„ 22nd, Tuesday, 7 to 10 p.m.—XIV—Human Physiology

„ 23rd,—Wednesday, 7 to 10 p.m.— { V—Mathematics, Stages 4 and 5 / XXV—Hygiene

„ 24th, Thursday, 7 to 10 p.m.— { XX—Navigation / XII—Geology

„ 25th, Friday, 7 to 10 p.m.— { XI—Organic Chemistry / XXII—Steam

„ 26th, Saturday, 6 to 9-30 p.m.— { XP—Practical Inorganic Chemistry, (Elementary Stage)

„ 28th, Monday, 7 to 10 p.m.—VIIIB—Light, (Advanced Stage & Honours)

„ 29th, Tuesday, 7 to 10 p.m.— { XV—General Biology / XIX—Metallurgy

„ 30th, Wednesday, 7 to 10 p.m.—VIIIC—Heat (Advanced Stage & Honours)

„ 31st, Thursday, 7 to 10 p.m.—XVII—Botany

June 1st, Friday, 7 to 10 p.m.— { XIII—Mineralogy / XXI—Nautical Astronomy

„ 2nd, 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.

„ 4th, Monday, 2-30 to 10-30 p.m.— { XIP—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.

„ 5th, Tuesday, 7 to 10 p.m.— { XIXP—Practical Metallurgy, (Elementary Stage)

6th,—Wednesday, 2 to 10 p.m. { XIXP—Practical Metallurgy, Advanced Stage 6 to 10 p.m., Honours 2 to 10 p.m.

TIME TABLE.

CITY & GUILDS of LONDON INSTITUTE.

TECHNOLOGICAL EXAMINATIONS.

Session 1893-94.

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

Salt Manufacture
Alkali Manufacture
Soap Manufacture
Bread-making
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
Electro-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

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

Certificates (First and Second Class) **will be awarded on the Results of the Examinations.**

Prizes consisting of SILVER AND BRONZE MEDALS will be given, provided the Candidates show sufficient merit.

MONEY PRIZES are offered on like conditions in nearly all Subjects by the separate Livery Companies.

The EXAMINATIONS FOR THE YEAR 1894 WILL BE HELD AS FOLLOWS :—

The Written Examination in most subjects on **Wednesday. May 2nd,** from 7 to 10 p.m.

The Written Examinations in the Weaving of Cloth, Cotton, Linen, Silk, and Jute, on **Saturday, April 28th,** from 2 to 6.

The Written Examinations in Mechanical Engineering, Part II., Ordinary Grade; in Electric Lighting and Typography, Ordinary and Honours, on **Monday, May 7th,** from 7 to 10.

The Practical Examinations in Breadmaking, Plumbing, Typography, Photography, Watch and Clock Making, and Dressmaking, on **Saturday, May 5th,** from 1-30 to 6.

The Practical Examination in Goldsmiths' Work, on **Wednesday, May 9th,** at 6 p.m.

The Practical Honours Examination in Mine surveying on **May 25th and 26th.**

The Practical Examination in Boot and Shoe Manufacture will be held early in June, at a date to be subsequently fixed.

Persons desiring to be examined should apply, not later than **March 20th,** to the Secretary of the Harris Institute, Preston.

Manual Training. The Examinations in **Woodwork** for **Teachers in Public Elementary Schools,** will be held on **Saturday, June 2nd,** and on **Saturday, June 9th;** on **Wednesday, June 6th,** and on **Thursday, June 7th, 1894;** and in **METAL-WORK** on **Friday, May 25th,** and on **Saturday May 26th, 1894.**

UNION OF
Lancashire & Cheshire Institutes,
1894.

SUBJECTS AND DATES OF EXAMINATIONS.

Feby. 20th, Tuesday,	7 to 9 p m.—Arithmetic (Elementary Grade)	
	7 to 9-30 p m do. (Advanced & Commercial Grades)	
,, 21st, Wednesday,	7 to 9 p.m.—History and Geography, (Elementary Grades, joint paper.)	
	7 to 9-30 p.m.—Geography (Commercial Grade)	
	7 to 9-30 p.m.—History (Advanced Grade)	
,, 22nd, Thursday,	7 to 9 p.m.—English (Elementary Grade)	
	7 to 9-30 p.m.—English (Commercial Grade)	
,, 23rd, Friday,	7 to 9-30 p.m.—English Literature	
	7 to 9 p.m.—Theory of Music (Elementary)	
	7 to 9-30 p.m.—Theory of Music (Advanced)	
	7 to 9 p.m.—Domestic Economy	
,, 26th, Monday,	7 to 9 p.m.—	Gospel History Cookery
,, 27th, Tuesday,	7 to 9 p.m.—Laundry Work	
,, 28th, Wednesday,	7 to 9 p.m.—Sick Nursing	
Mar. 1st, Thursday,	7 to 10 p.m.	Needlework (Elementary & Intermediate Grades) Dressmaking
,, 2nd, Friday,	7 to 8 p.m.—Handwriting	
	8-30 to 9-30 p.m.—Shorthand	
,, 5th, Monday,	7 to 9-30 p.m.—	Representative Government Industrial and Social Life and Duties Portuguese (Elementary & Advanced)
,, 6th, Tuesday,	7 to 9-30 p.m.—	Latin Italian (Elementary and Advanced) Agriculture
,, 7th, Wednesday,	7 to 9-30 p.m.—	Social and Political Economy Machine Calculations Chemistry
,, 8th, Thursday,	7 to 9-30 p.m.—	French (Elementary and Advanced) Physiography
,, 9th, Friday,	7 to 9-30 p.m.—	Elementary Physics Hygiene Navigation
,, 16th, Friday,	7 to 9-30 p.m —	German (Elementary and Advanced) Mechanics
,, 19th, Monday,	7 to 9-30 p.m.—	Bookkeeping Sound, Light and Heat
,, 20th, Tuesday,	7 to 9-30 p.m.—	Spanish (Elementary and Advanced) Magnetism and Electricity Cotton Spinning
,, 21st, Wednesday,	7-30 to 8-15 p.m—Typewriting	
,, 21st, Wednesday,	7 to 9-30 p.m.—	Human Physiology Cotton Weaving

Society of Arts.

TIME TABLE FOR 1894.

Monday, Mar. 12th. (7 to 10 p.m.)	Tuesday, Mar. 13th (7 to 10 p.m.)	Wed. Mar. 14th. (7 to 10 p.m.)	Thurs. Mar. 15th. (7-30 to 10 p.m.)
Arithmetic	Book-keeping	English	Shorthand
German	Italian	French	
Portuguese	Spanish	Commercial Geography	
Russian	Domestic Economy	Rudiments of Music (from 7 to 9 p.m.)	
Danish	Harmony and Counterpoint		
Chinese		Type-writing (from 7-30 to 10 p.m.	
Japanese			

Local Examinations will be held as below :—

LATIN	16th March, 1894,	7 to 9-30 p.m.
FRENCH	Do.	Do.
GERMAN	21st March, 1894,	Do.
BOOK-KEEPING	Do.	Do.
SHORTHAND Elementary	8th May, 1894,	Do.