(Frontispiece.) SCHOOL OF PRACTICAL SCIENCE, TORONTO.

SCHOOL OF PRACTICAL SCIENCE, TORONTO.

(Frontispiece.)

CALENDAR

OF THE

School of Practical Science

OF THE

Province of Ontario

TORONTO

Affiliated to the University of Toronto

TWENTY-SECOND SESSION, 1899-1900

WARWICK BRO'S & RUTTER
Printers Binders
TORONTO

CONTENTS.

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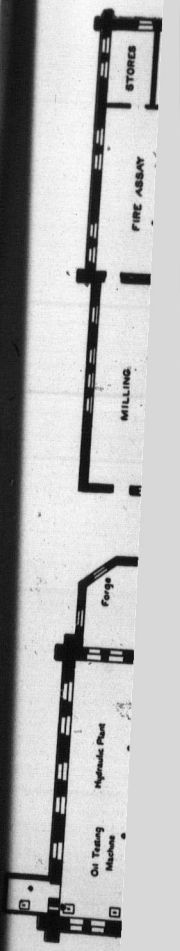
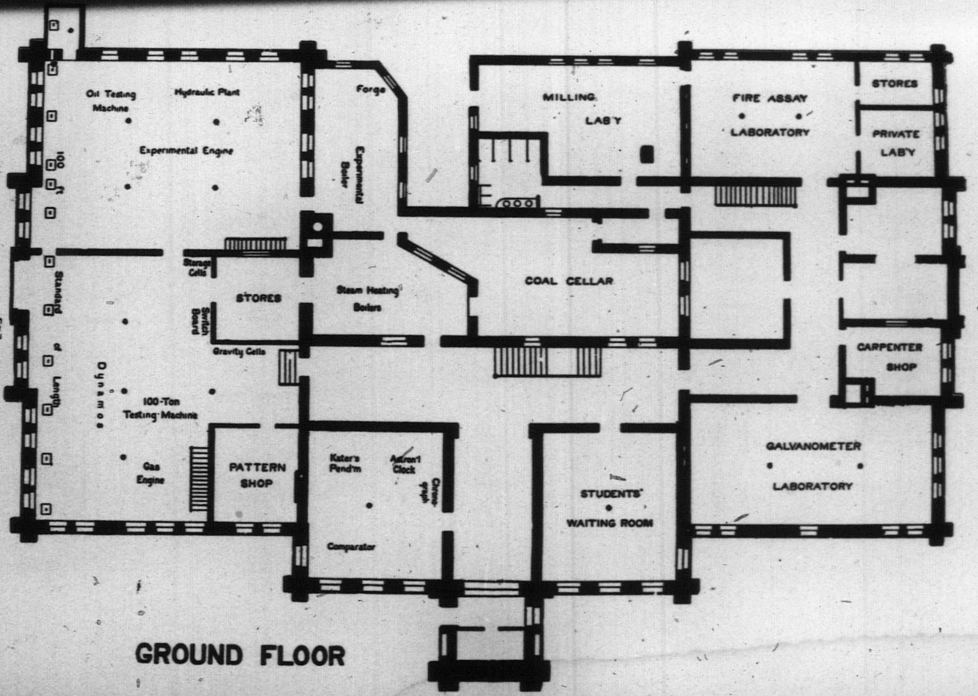
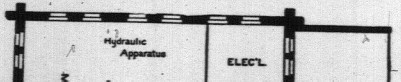
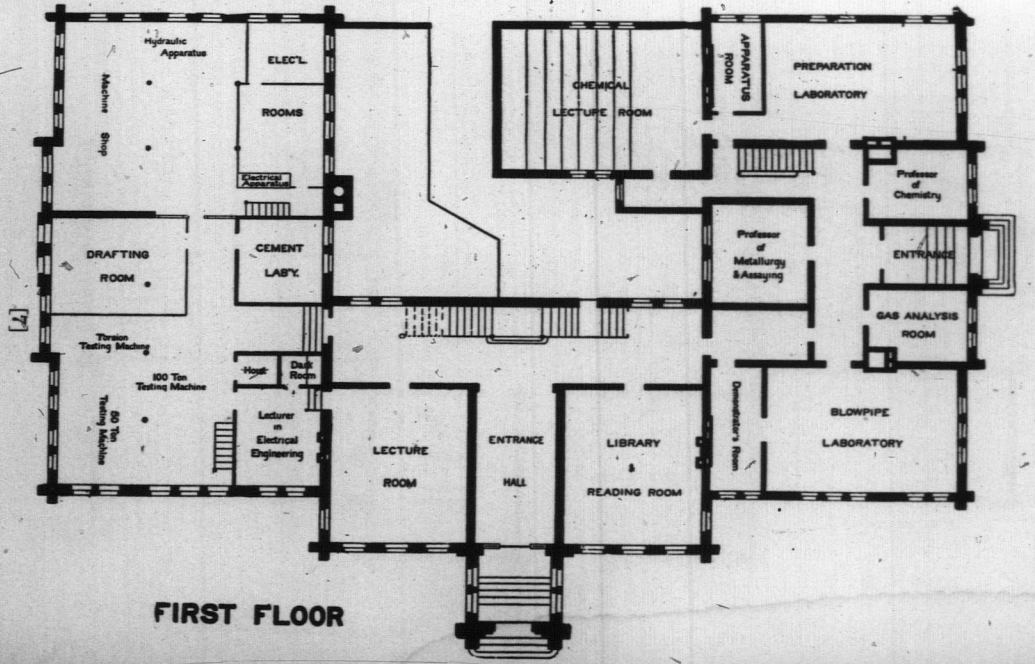




GROUND FLOOR

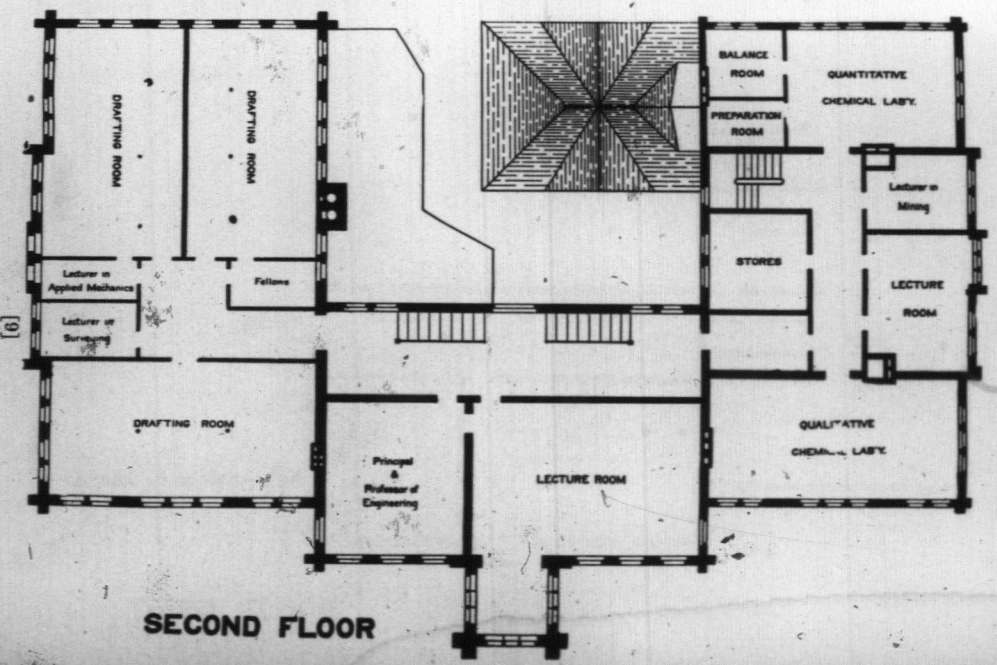

Hydraulic
Apparatus
ELEC'L


PREPARATION


Hydraulic Apparatus
Machine Shop
ELEC'L.
ROOMS
Electrical Apparatus
DRAFTING ROOM
CEMENT LAB'Y.
Torsion Testing Machine
100 Ton Testing Machine
50 Ton Testing Machine
Hoist
Dark Room
Lecturer in Electrical Engineering
LECTURE ROOM
ENTRANCE HALL
LIBRARY & READING ROOM
CHEMICAL LECTURE ROOM
APPARATUS ROOM
PREPARATION LABORATORY
Professor of Chemistry
ENTRANCE
Professor of Metallurgy & Assaying
GAS ANALYSIS ROOM
Demonstrator's Room
BLOWPIPE LABORATORY

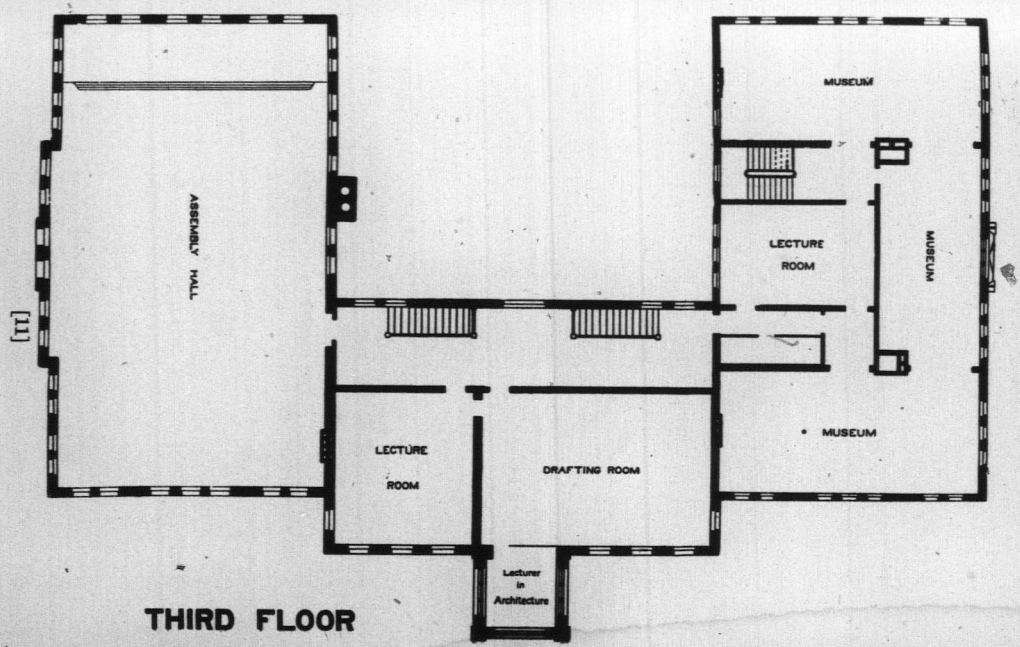
FIRST FLOOR


BALANCE



SECOND FLOOR


MUSEUM



THIRD FLOOR

[11]

School of

Switch-Bo

Dynamo R

Gymnasiu

Emery Te

Hydraulic

Machine S

Clock Roo

Galvanom

Chemical

"

Blowpipe

Mineralog

Experimen

Stamp Mil

Elementar

Architectu

ILLUSTRATIONS.

1899.

SEPTEMBER.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	..	..	..	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
..	..	..	..	..	..	..

25. Meeting of Council.
28. **Entrance Examinations** begin.

OCTOBER.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	..	..	..	..	..
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	..	..	..	..

2. **FIRST TERM** begins.
2. Vacation work to be handed in.
2. Supplemental Examinations begin.
13. Meeting of Council.

NOVEMBER.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	..	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	..	..
..	..	..	..	..	..	..

10. Meeting of Council.

DECEMBER.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	..	..	..	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31	..	..	..	..	..	..

8. Meeting of Council.
21. **FIRST TERM** ends.

1900.

JANUARY.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	..	..	..

8. **SECOND TERM** begins.
12. Meeting of Council.

FEBRUARY.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	..	..	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	..	..	..

9. Meeting of Council.
28. Ash Wednesday. Building closed.

1900

MARCH.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	..	..	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

9. Meeting of Council.

APRIL.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	..	..	..	..	..

7. Lectures and Practical Work close
9. Meeting of Council.
13. Good Friday. Building closed.
14. **Annual Examinations** begin.

MAY.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	..	..

1. **SECOND TERM** ends.
1. Last day for B.A.Sc. Thesis.
4. Examinations for B.A.Sc. begin.
9. Meeting of Council.

JUNE.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	..	..	..	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

JULY.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	..	..	..	..

AUGUST.

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
..	..	..	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	..

TIME TABLE—FIRST YEAR.

SESSION 1899-1900.

	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	
9-10	*Analytical Geometry, 1, 2, 3, 4 Chemical Lab'y, 5	*Euclid.	*Trigonometry.	*Algebra.	*Trigonometry.	9-10
10-11	*Electricity and Magn'm, 3, 5(*a*) Drawing, 1, 2, 4 do 3, 5(*b*)	Drawing. *Heat, (*c*)	Electricity, 3, 5(*b*) Drawing, 1, 2, 4 do 3, 5(*a*)	Drawing. *Heat. (*c*)	*Elect'y & Magn'm, 3, 5(*a*) Electricity, 3, 5(*b*) History of Arch'e, 4 Drawing, 1, 2	10-11
11-12	Drawing, 1, 2, 3, 4 Chemical Lab'y, 5	Chemistry.	Chemistry.	Chemistry.	Pen and Ink. 4 Drawing, 1, 2, 3, 5	11-12
12-1	Statics, 1, 2, 3, 4 do 5(*a*) Chemical Lab'y, 5(*b*)	Dynamics.	Descriptive Geometry.	Surveying, 1, 2, 3, 4 Drawing, 5	Statics, 1, 2, 3, 4 do 5(*a*)	12-1
2-3	Chemical Lab'y, 2, 5 (*b*) Mineralogical Laby, 1, 2, 5 (*a*) Drawing, 3, 4, do 1 (*b*)	*Physical Lab'y, 3, 5(*a*) Field Work, 1, 2, 4(*a*) Chemical Lab'y, 5(*b*) Drawing, 1, 2, 3, 4 (*b*)	Chem'l Lab'y, 5 do 1, 4 (*b*) Electrical Lab'y, 3, 5, Drawing, 2, 3	*Physical Lab'y, 3, 5(*a*) Field Work, 1, 2, 4(*a*) Chemical Lab'y, 3, 5(*b*) Drawing	Chemical Lab'y, 5 do 3 (*b* Electrical Lab'y, 3, 5	2-3

12-1	Statics, 1, 2, 3, 4 do 5(*a*) Chemical Lab'y, 5(*b*)	Dynamics.	Descriptive Geometry.	Surveying, 1, 2, 3, 4 Drawing, 5	Statics, 1, 2, 3, 4 do 5(*a*)	
2-3	Chemical Lab'y, 2, 5 (*b*) Mineralogical Laby, 1, 2, 5 (*a*) Drawing, 3, 4, do 1 (*b*)	*Physical Lab'y, 3, 5(*a*) Field Work, 1, 2, 4(*a*) Chemical Lab'y, 5(*b*) Drawing, 1, 2, 3, 4(*b*)	Chem'l Lab'y, 5 do 1, 4 (*b*) Electrical Lab'y, 3, 5, Drawing, 2, 3 do 1. 4 (*a*)	*Physical Lab'y, 3, 5(*a*) Field Work, 1, 2, 4(*a*) Chemical Lab'y, 3, 5(*b*) Drawing, 1, 2, 4 (*b*)	Chemical Lab'y, 5 do 3 (*b* Electrical Lab'y, 3, 5 Field Work, 1, 2, 4(*a*) Drawing, 3, do 1, 2, 4 (*b*)	2-3
3-4	Chemical Lab'y, 2, 5 (*b*) Mineralogical Lab'y, 1, 2, 5 (*a*) Drawing, 3, 4 do 1 (*b*)	*Physical Lab'y, 3, 5(*a*) Field Work, 1, 2, 4(*a*) Chemical Lab'y, 5(*b*) Drawing, 1, 2, 3, 4 (*b*)	Chem'l Lab'y, 5, do 1, 4 (*c*) Electrical Lab'y, 3, 5, Drawing, 2, 3 do 1, 4 (*a*)	*Physical Lab'y, 3, 5(*a*) Field Work, 1, 2, 4(*a*) Chemical Lab'y, 3, 5(*b*) Drawing, 1, 2, 4 (*b*)	Chemical Lab'y, 5, do 3 (*b*) Electrical Lab'y, 3. 5, Field Work, 1, 2, 4(*a*) Drawing, 3, do 1, 2, 4 (*b*)	3-4
4-5	Chemical Lab'y, 2, 5 (*b*) Mineralogical Lab'y,t 1, 2, 5 (*a*) Drawing, 3, 4, do 1 (*b*)	*Physical Lab'y, 3, 5(*a*) Field Work, 1, 2, 4(*a*) Chemical Lab'y, 5(*b*) Drawing, 1, 2, 3, 4 (*b*)	Chem'l Lab'y, 5 do 1, 4 (*b*) Electrical Lab'y, 3, 5 Drawing, 2, 3 do 1, 4 (*a*)	*Physical Lab'y, 3, 5(*a*) Field Work, 1, 2, 4(*a*) Chemical Lab'y, 3, 5(*b*) Drawing, 1, 2, 4 (*b*)	Chemical Lab'y, 5, do 3 (*b*) Electrical Lab'y, 3, 5, Field Work, 1, 2, 4(*a*) Drawing, 4, do 1, 2, 4 (*b*)	4-5

1. Civil Engineering; 2, Mining Engineering; 3, Mechanical and Electrical Engineering; 4, Architecture; 5, Analytical and Applied Chemistry. *University of Toronto. (*a*) First Term. (*b*) Second Term. (*c*) During the month of March. Subjects not numbered are common to all the departments. In the department of Analytical and Applied Chemistry all hours not otherwise allotted are to be spent in the laboratories.

The work in the Physical Laboratory closes on Nov. 11, after which the students in departments 3 and 5 are expected to take drafting during the hours allotted to Physics.

Saturdays from 9-12 will be devoted to field work during the months of October and November, and to drafting during the balance of the Session.

TIME TABLE—SECOND YEAR.

SESSION 1899-1900.

	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	
9-10	Rigid Dynamics, 1, 2, 3 History of Arch'e, 4	Surveying (Lect.) 1, 2, 4 Electricity, 3	*Calculus, 1, 2, 3, 4	*Astronomy, 1 Lithology, 2 (*a*) Electricity, 3 Drawing, 4.—2 (*b*)	*Calculus, 1, 2, 3, 4	9-10
10-11	*Optics (*b*) Spherical Trig'y, 1, 2, 3 (*a*) Drawing, 4 (*a*)	*Hydrostatics, (*b*) Metallurgy, (*a*)	Descriptive Geom'y, 1, 2, 3, 4	*Hydrostatics, (*b*) Metallurgy, (*a*)	*Optics, (*b*) Spherical Trig'y, 1, 2, 3, (*a*) Drawing, 4 (*a*)	10-11
11-12	*Inorganic Chem'y, 5 Mineralogy and Geology, 1, 2, 4, 5 Theory of Mech'ism, 3	Chemical Lab'y. Drawing.	Mineralogy and Geology, 1, 2, 4, 5 Theory of Mechanism, 3	Drawing, 1, 2, 4 Electrical Lab'y. 3	*Inorganic Chem'y. 5 Pen and Ink, 4 Drawing, 1, 2, 3	11-12
12-1	Strength of Materials, 1, 2, 3, 4	Chemical Lab'y. Drawing.	Strength of Materials, 1, 2, 3, 4	Drawing, 1, 2, 4 Electrical Lab'y, 3	Drawing, 1, 2. 3, 4	12-1
2-3	Chemical Lab'y, 2 (*a*) Mineralogical Lab'y, 1, 2 (*b*) Electrical Lab'y, 3 Drawing, 4 do 7 (*a*)	Applied Chemistry.	*Physical Lab'y, 3, 5 (*a*) Orders of Arch'e, 4 Drawing, 1, 2 do 3 (*b*)	Applied Chemistry.	*Physical Lab'y, 3, 5 (*a*) Chemical Lab'y, 2 (*b*) Field Work, 1, 2, 4 (*a*) Drawing, 1, 3, 4 (*b*)	2-3

12-1	Strength of Materials, 1, 2, 3, 4	Chemical Lab'y. Drawing.	Strength of Materials, 1, 2, 3, 4	Drawing, 1, 2, 4 Electrical Lab'y, 3	Drawing, 1, 2, 3, 4	12-1
2-3	Chemical Lab'y, 2 (*a*) Mineralogical Lab'y, 1, 2 (*b*) Electrical Lab'y, 3 Drawing, 4 do 7 (*a*)	Applied Chemistry.	*Physical Lab'y, 3, 5 (*a*) Orders of Arch'e, 4 Drawing, 1, 2 do 3 (*b*)	Applied Chemistry.	*Physical Lab'y, 3, 5 (*a*) Chemical Lab'y, 2 (*b*) Field Work, 1, 2, 4 (*a*) Drawing, 1, 3, 4 (*b*)	2-3
3-4	Chemical Lab'y, 2 (*a*) Mineralogical Lab'y, 1, 2 (*b*) Electrical Lab'y, 3 Drawing, 4 do 7 (*a*)	*Physical Lab'y, 1, 2, 4 (*b*) Mineralogical Lab'y, 5 Field Work, 1, 2, 4 (*a*) Drawing, 3	*Physical Lab'y, 3, 5 (*a*) Drawing, 1, 2, 4 do 3 (*b*)	*Physical Lab'y, 1, 2, 4 (*b*) Mineralogical Lab'y, 5 Field Work, 1, 2, 4 (*a*) Drawing, 3	*Physical Lab'y, 3, 5 (*a*) Chemical Lab'y, 2 (*b*) Field Work, 1, 2, 4 (*a*) Drawing, 1, 3, 4 (*b*)	3-4
4-5	Chemical Lab'y, 2 (*a*) Mineralogical Lab'y, 1, 2 (*b*) Electrical Lab'y, 3 Drawing, 4 do 1 (*a*)	*Physical Lab'y, 1, 2, 4 (*b*) Mineralogical Lab'y, 5 Field Work, 1, 2, 4 (*a*) Drawing, 3	*Physical Lab'y, 3, 5 (*a*) Drawing, 1, 2, 4 do 3 (*b*)	*Physical Lab'y, 1, 2, 4 (*b*) Mineralogical Lab'y, 5 Field Work, 1, 2, 4 (*a*) Drawing, 3	Physical Lab'y, 3, 5 (*a*) Chemical Lab'y, 2 (*b*) Field Work, 1, 2, 4 (*a*) Drawing, 1, 3 (*b*) History of Ornament, 4	4-5

1. Civil Engineering; 2. Mining Engineering; 3. Mechanical and Electrical Engineering; 4. Architecture; 5. Analytical and Applied Chemistry. *University of Toronto. (*a*) First Term. (*b*) Second Term. Subjects not numbered are common to all the departments. In the department of Analytical and Applied Chemistry all hours not otherwise allotted are to be spent in the laboratories.

The work in the Physical laboratory closes for department 3 on November 25, and for departments 1, 2, 4 on February 3, after which the students in these departments are expected to take drafting during the hours allotted to Physics.

Saturdays from 9-12 will be devoted to field work during the months of October and November and to drafting during the balance of the session.

TIME TABLE—THIRD YEAR.

SESSION 1899-1900.

	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	
9-10	*Biology, 5 Thermodynamics, 1, 2, 3 Drawing, 4	Hydraulics, 1, 2, 3, 4	*Biology, 5 Thermodynamics, 1, 2, 3 History of Arch'e, 4	Hydraulics, 1, 2, 3, 4	*Biology, 5 Compound Stress, 1,3,4 Mining and Ore Dressing, 2	9-10
10-11	Drawing, 1, 2, 3, 4	Astronomy and Geodesy, 1 Electricity, 3 Drawing, 4 Ore Deposits, 2 (*a*) Chemical Lab'y, 2 (*b*)	Mineralogical Lab'y, 2, 5 (*a*) Assaying, 2 (*b*) Drawing, 1, 3, 4	Astronomy, 1 Mechanics of Machinery, 3 Principles of Dec'n, 4 Ore Deposits, 2 (*a*) Chemical Lab'y, 2 (*b*)	Drawing, 1, 2, 3, 4	10-11
11-12	Drawing, 1, 2, 3 History of Architecture, 4	Constructive Design, 1, 4 do 2, 3 (*a*) Drawing, 3 (*b*) Chemical Lab'y. 2 (*b*)	Mineralogical Lab'y, 2 5 (*a*) Assaying, 2 (*b*) Drawing, 1, 3, 4	Constructive Design, 1, 4 do 2, 3 (*a*) Drawing, 3 (*b*) Chemical Lab'y, 2 (*b*)	Machine Design, 3 Drawing, 1, 2, 4	11-12
12-1	Applied Chemistry.	Mineralogy and Geology, 1, 2, 4, 5 Drawing, 3	Constructive Design. 1, 2, 3, 4 (*a*) Assaying, 2 (*b*) Machine Design, 3 (*b*) Drawing, 1, 4 (*b*)	Mineralogy and Geology, 1, 2, 4, 5 Drawing, 3	Applied Chemistry.	12-1

2-3	*Physical Lab'y, 3, 5(*a*) Drawing, 1, 2 do 3 (*b*) Plumbing, Heating and Ventilation, 4	Field Work, 1, 2, 4(*a*) Electrical Lab'y, 3(*a*) Metallurgy, 2, 3, 5 (*b*) Drawing, 1, 4 (*b*)	Descriptive Geometry, 1,2,3, 4(*a*) Theory of Least Squares, 1, 2, 3 (*b*) Drawing	*Practical Biology, 5 Field Work, 1, 2, 4(*a*) Electrical Lab'y, 3(*a*) Metallurgy, 2, 3, 5(*b*)	*Physical Lab'y, 3, 5(*a*) do 1, 4 (*b*) Field Work, 1, 2, 4(*a*) Chemical Lab'y	2-3

		Geology, 1, 2, 4, 5 Drawing, 3	Design. 1, 2, 3, 4 (*a*) Assaying, 2 (*b*) Machine Design, 3 (*b*) Drawing, 1, 4 (*b*)	Geology, 1, 2, 4, 5 Drawing, 3		
2-3	*Physical Lab'y, 3, 5(*a*) Drawing, 1, 2 do 3 (*b*) Plumbing, Heating and Ventilation, 4	Field Work, 1, 2, 4(*a*) Electrical Lab'y, 3(*a*) Metallurgy, 2, 3, 5 (*b*) Drawing, 1, 4 (*b*)	Descriptive Geometry, 1, 2, 3, 4(*a*) Theory of Least Squares, 1, 2, 3 (*b*) Drawing, 4 (*b*)	*Practical Biology, 5 Field Work, 1, 2, 4(*a*) Electrical Lab'y, 3(*a*) Metallurgy, 2, 3, 5 (*b*) Drawing, 1, 4 (*b*)	*Physical Lab'y, 3, 5(*a*) do 1, 4 (*b*) Field Work, 1, 2, 4(*a*) Chemical Lab'y. 2 (*b*) Drawing, 3 (*b*)	2-3
3-4	*Physical Lab'y, 3(*a*) *Organic Chemistry, 5 Drawing, 1, 2, 4 do 3 (*b*)	*Organic Chemistry, 5 Field Work, 1, 2, 4(*a*) Electrical Lab'y, 3 Assaying, 2 (*b*) Drawing, 1, 4 (*b*)	Drawing, 1, 3 do 4(*a*) Chem. Lab'y, 2 Pen and Ink, 4 (*b*)	*Practical Biology, 5 Field Work, 1, 2, 4(*a*) Electrical Lab'y, 3 Assaying, 2 (*b*) Drawing, 1, 4 (*b*)	*Physical Lab'y, 3, 5(*a*) do 1, 4 (*b*) Chemical Lab'y, 2 (*b*) Organic Chemistry, 5 Field Work, 1, 2, 4(*b*) Drawing, 3 (*b*)	3-1
4-5	*Physical Lab'y, 3, 5(*a*) Surveying (Lect.), 1, 2, 4(*a*) Drawing, 1, 2, 3, 4 (*b*)	Field Work, 1, 2, 4(*a*) Electrical Lab'y, 3 Assaying, 2 (*b*) Drawing, 1, 4 (*b*)	Drawing, 1, 3, 4 Chem. Lab'y 2	Field Work, 1, 2, 4(*a*) Electrical Lab'y, 3 Assaying, 2 (*b*) Drawing, 1, 4 (*b*)	*Physical Lab'y, 3, 5(*a*) do 1, 4 (*b*) Chemical Lab'y, 2 (*b*) Field Work, 1, 2, 4(*a*) Drawing, 3 (*b*)	4-5

1. Civil Engineering; 2, Mining Engineering; 3, Mechanical and Electrical Engineering; 4, Architecture; 5, Analytical and Applied Chemistry; *University of Toronto. (*a*) First Term. (*b*) Second Term. Subjects not numbered are common to all the departments. In the department of Analytical and Applied Chemistry all hours not otherwise allotted are to be spent in the laboratories.

The work in the Physical laboratory closes for department 3 on November 11, and for department 1 on March 17, after which the students in these departments are expected to take drafting during the hours allotted to Physics.

Saturdays from 9-12 will be devoted to Field Work during the months of October and November and to drafting during the balance of the session.

FOURTH OR POST-GRADUATE YEAR.

There is no regular time table for the work of this year. The time of the students is spent almost wholly in the engineering, chemical and assaying laboratories. The hours are from 9 a.m. to 5 p.m., every working day during the session. Lectures are given at such intervals as suit the laboratory work.

FACULTY OF THE SCHOOL.

PRINCIPAL.

J. GALBRAITH, M.A., M. Can. Soc. C. E.

MEMBERS OF THE COUNCIL.

J. GALBRAITH, M.A., M. Can. Soc. C. E.,
Professor of Engineering (Chairman).

W. HODGSON ELLIS, M.A., M.B.,
Professor of Applied Chemistry.

A. P. COLEMAN, M.A., Ph.D.,
Professor of Assaying and Metallurgy.

L. B. STEWART, O.L.S., D.T.S.,
Lecturer in Surveying (Secretary).

C. H. C. WRIGHT, B.A.Sc.,
Lecturer in Architecture.

T. R. ROSEBRUGH, M.A.,
Lecturer in Electrical Engineering.

J. A. DUFF, B.A., A. M. Can. Soc. C. E,
Lecturer in Applied Mechanics.

G. R. MICKLE, B.A.,
Lecturer in Mining.

ASSISTANT INSTRUCTORS.

A. T. LAING, B.A.Sc.,
Acting Demonstrator in Surveying.

R. W. ANGUS, B.A.Sc.,
Fellow in Mechanical Engineering.

A. H. HARKNESS, B.A.Sc.,
Fellow in Civil Engineering.

T. A. WILKINSON, Grad. S. P. S.,
Fellow in Electrical Engineering.

ASSISTANT INSTRUCTORS.—*Continued.*

J. W. BAIN, B.A.Sc.,
Fellow in Mining Engineering.

H. W. CHARLTON, B.A.Sc.,
Fellow in Chemistry.

MEMBERS OF THE FACULTY of the University of Toronto whose classes are attended by the Regular Students of the School.

JAMES LOUDON, M.A., LL.D.,
President and Professor of Physics.

R. RAMSAY WRIGHT, M.A., B.A.Sc.,
Professor of Biology.

W. H. PIKE, M.A., Ph.D.,
Professor of Chemistry.

ALFRED BAKER, M.A.,
Professor of Mathematics.

A. B. MCCALLUM, B.A., M.B., Ph.D.,
Professor of Physiology.

W. J. LOUDON, B.A.,
Demonstrator in Physics.

C. A. CHANT, B.A.,
Lecturer in Physics.

J. C. MCLENNAN, B.A.,
Assistant Demonstrator in Physics.

ALFRED T. DELURY, B.A.,
Lecturer in Mathematics.

W. L. MILLER, B.A., Ph.D.,
Demonstrator in Chemistry.

F. J. SMALE, B.A., Ph.D.,
Lecturer in Chemistry.

H. J. DAWSON, B.A.
Fellow in Mathematics.

For information further than that contained in the Calendar, application may be made to the Secretary, L. B. STEWART.

SCHOOL OF PRACTICAL SCIENCE

PROVINCE OF ONTARIO.

CALENDAR FOR THE SESSION 1899-1900.

THE Legislative Assembly during the Session of 1877 gave its sanction to the establishment of a School of Practical Science on the basis proposed in the memorandum of the Minister of Education confirmed by the Lieutenant-Governor in Council on the 3rd day of February, 1877.

By the scheme thus approved of, the Government effected an arrangement with the Council of University College whereby the students of the School of Practical Science enjoyed full advantage of the instruction given by its professors and lecturers in all the departments of science which were embraced in the work of the School.

This arrangement was brought to an end in 1889 by the transfer of the departments in science above referred to, from University College to the University of Toronto under the operation of the University Federation Act.

In order that the students of the School might continue to enjoy the advantage of the instruction in the above departments, the Senate of the University of Toronto passed a Statute in October, 1889, affiliating the School to the University, which Statute was confirmed by the Lieutenant-Governor in Council on the 30th day of October, 1889.

By an Order in Council, approved by the Lieutenant-Governor, on the 6th day of November, 1889, a Principal was appointed, and the management of the school was

entrusted to a council composed of the Principal as chairman, and the Professors, Lecturers and Demonstrators appointed on the Teaching Faculty of the School.

There are five regular Departments of Instruction, in each of which Diplomas are granted, viz :—

1. Civil Engineering (including Sanitary Engineering.)
2. Mining Engineering.
3. Mechanical and Electrical Engineering.
4. Architecture.
5. Analytical and Applied Chemistry.

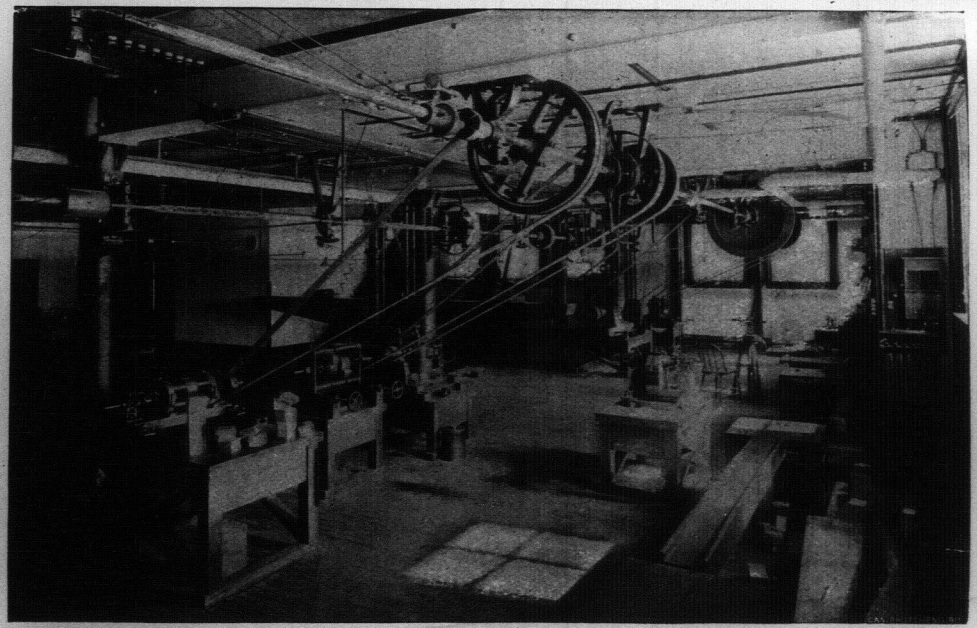
The instruction given in each of these departments is designed to give the student a thorough knowledge of the scientific principles underlying the practice in the several professions, and also such a training as may make him immediately useful when he commences active professional work.

DIPLOMA.

The regular course in each department is of three years' duration and leads to the Diploma of the School. The instruction is given partly in the lecture rooms and partly in the drafting rooms, laboratories and field. A certain amount of the work is laid out for the summer vacation. The course of study in each department is general, and beyond the selection of his department the student has no opportunity to specialize.

THE DEGREE OF B.A.Sc.

After the general course is finished the diploma of the school is granted and the student is at liberty either to enter the active life of his profession or to spend another year in special work. This year is called the fourth or post-graduate year. Graduates electing to proceed with their studies are allowed to select two subjects from an approved list, and are required to confine their whole attention to these subjects during the fourth year. The subjects on this



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list are such as require a large amount of time to be devoted to laboratory and other practical work. The advanced theoretical instruction is given either at the beginning or end of the working-day, in order not to break up the time alloted to practical work. During this year the student is required to prepare a thesis on some subject connected with his work. The practical examinations are held by the School, while the written examinations and the examination of the theses are held by the University. After complying with all requirements, the candidate receives from the University the degree of Bachelor of Applied Science (B. A. Sc.)

PROFESSIONAL DEGREES.

Bachelors of Applied Science may, after three years spent in professional work, present themselves for the degrees of Civil Engineer (C.E.), Mining Engineer (M.E.), Mechanical Engineer (M.E.) or Electrical Engineer (E.E.), as the case may be, subject to the rules and regulations established by the University.

REGULATIONS

RESPECTING THE

School of Practical Science,

Approved by Colonel Sir Casimir Stanislaus Gzowski, K. C. M. G., Administrator of the Government of the Province of Ontario, the 30th day of March, 1897.

1. The internal management and discipline of the School of Practical Science shall be vested in a Council (of which the Principal shall be chairman), consisting of the Professors, Lecturers and Demonstrators appointed by the Lieutenant-Governor in Council on the staff of the school.

2. The Academic Year shall extend from October 1st to May 1st, and consist of two Terms, separated by the Christmas Vacation. The date and length of this vacation shall be determined annually by the Council.

3. A Diploma shall be granted to each student who shall have completed to the satisfaction of the Council the Regular Course in any of the following five departments :

   (1) Civil Engineering (including Sanitary Engineering).
   (2) Mining Engineering.
   (3) Mechanical and Electrical Engineering.
   (4) Architecture.
   (5) Analytical and Applied Chemistry.

4. The Regular Course for the Diploma of the School in each Department shall be three years.

5. Students may enter the Regular Course in any of the above Departments, either (*a*) by presenting certificates of having passed the Matriculation Examination in any University in Her Majesty's Dominions, or in all the subjects of such Matriculation Examination except Greek and Latin, or the High School Leaving Examination of the Province of Ontario, or (*b*) by presenting certificates of having had at least one year's experience in some recognized engineering, architectural or manufacturing work or business, and passing an examination in the following subjects:

Arithmetic.—Fundamental rules, metric system, fractions, decimals, powers, square root, mensuration, percentage, interest.

Algebra.—Elementary rules, easy factoring, highest common measure, lowest common multiple, square foot, fractions, ratio, simple equations of one, two, or three unknown quantities, indices, surds, quadratic equations of one or two unknown quantities.

Euclid.—Books I., II, and III; deductions.

English.—Dictation, composition.

6. The Council shall have the power of dealing with special cases, provided the candidates are sufficiently prepared to take their places in the classes.

7. Occasional students may be permitted to attend such lectures or courses of instruction, or of practical work, as the Council may think proper, and such students shall not be required to pass an Entrance Examination.

8. At the end of the Academic Year examinations shall be held in the different subjects taught. Candidates for Diplomas are required to enter for these.

9. All regular students shall be in attendance at the school during the whole of each term, unless exempted by special permission of the Council. The term will not be allowed to any student who has attended less than three-fourths of the required lectures and practical lessons, or who has been reported to the Council for bad conduct and adjudged guilty thereof.

10. Students of the School shall attend such courses of lectures at the University of Toronto as may be required of them by the Council.

ADMISSION.

The conditions of admission for regular and occasional students are stated in clauses 5, 6 and 7 of the order in Council, pp. 32 and 33.

For information regarding the conditions for Matriculation in the Universities, application must be made to the Registrars of these Institutions.

Information respecting the High School Leaving Examination may be obtained from the Education Department, Toronto, or from any Principal of a High School or Collegiate Institute.

Students intending to write at the High School Leaving Examination for the purpose of entering the School of Practical Science may do so without having previously passed the Primary Examination. Their papers must be endorsed "For admission to School of Practical Science."

The only examination held in the School of Practical Science for the purpose of testing qualifications for admission is that mentioned in clause 5 (*b*) order in Council, p. 33

This examination will begin at 9 a.m. Thursday, September 28th, 1899.

Candidates are required to give the Secretary at least two weeks' notice in writing of their intention to take this examination.

The School of Practical Science,

PROVINCE OF ONTARIO.

ESTABLISHED 1878.

This is to Certify that

_____

of the _____ *in the* _____

_____ *has completed the Regular Course*

of this School for the Diploma in the _____

_____

extending over a period of three years, and comprising theoretical and practical instruction in the following subjects, Viz:

_____

_____

_____

Wherefore the said _____

becomes duly entitled to receive this Diploma, having fulfilled to the satisfaction of the Faculty of the School, all the requirements thereunto relating.

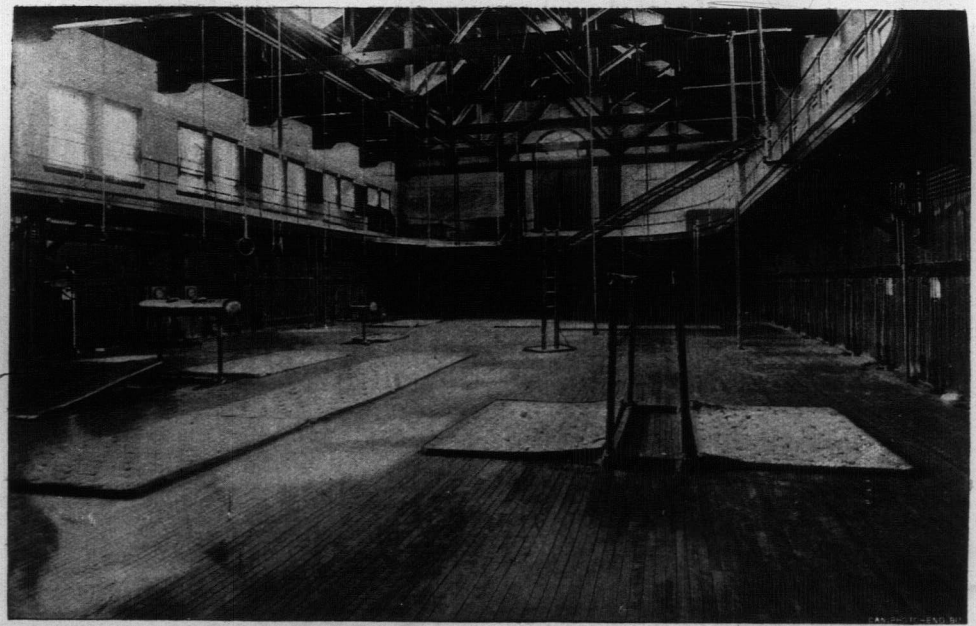
In witness whereof we have signed this Diploma, at Toronto, in the Province of Ontario, this _____ *day of* _____ *One thousand eight hundred and* _____ *and have caused the Seal of this School to be hereunto affixed.*

_____

Chairman.

_____

Secretary



GYMNASIUM (UNIVERSITY OF TORONTO).

REGULAR COURSES FOR THE DIPLOMA.

See regulations pp. 32 and 33.

The following are the Departments in which the Diploma is granted:—

(1) Civil Engineering (including Sanitary Engineering).
(2) Mining Engineering.
(3) Mechanical and Electrical Engineering.
(4) Architecture.
(5) Analytical and Applied Chemistry.

SESSIONAL FEES, DUES AND DEPOSITS.

These are payable in two instalments, one in each term.

A discount of two dollars will be made on each instalment if paid before the end of the first calendar month of the term in which it is due.

Year	Description of Payment	1. Civil Engineering.	2. Mining Engineering.	3. Mechanical and Electrical Engineering	4. Architecture.	5. Analytical and Applied Chemistry.
		$ c.	$ c.	$ c.	$ c.	$ c.
I.	Payable in First Term—					
	Sessional Fees	34 00	34 00	34 00	34 00	34 00
	Dues—					
	Physical Laboratory	.....	.....	1 00	.....	1 00
	Library	1 00	1 00	1 00	1 00	1 00
	Deposits—					
	General	2 00	2 00	2 00	2 00	2 00
	Chemical Laboratory	3 00	3 00	3 00	3 00	3 00
	Mineralogical Laboratory	.....	.....	.....	.....	.....
		40 00	40 00	41 00	40 00	41 00
	Payable in Second Term—					
	Sessional Fees	35 00	35 00	35 00	35 00	35 00
	Total	75 00	75 00	76 00	75 00	76 00

Year	Description of Payment	1. Civil Engineering.	2. Mining Engineering	3. Mechanical and Electrical Engineering.	4. Architecture.	5. Analytical and Applied Chemistry.
		$ c.	$ c.	$ c.	$ c.	$ c.
II.	Payable in First Term—					
	Sessional Fees	39 00	39 00	39 00	39 00	39 00
	Dues—					
	Physical Laboratory	1 50	1 50	1 50	1 00	1 50
	Library	1 00	1 00	1 00	1 00	1 00
	Deposits—					
	General	2 00	2 00	2 00	2 00	2 00
	Chemical Laboratory	3 00	3 00	3 00	3 00	3 00
	Mineralogical Laboratory	3 00	3 00	.....	.....	3 00
		49 50	49 50	46 50	46 00	49 50
	Payable in Second Term—					
	Sessional Fees	40 00	40 00	40 00	40 00	40 00
	Total	89 50	89 50	86 50	86 00	89 50
	Payable in First Term—					
III.	Sessional Fees	44 00	44 00	44 00	44 00	44 00
	Dues—					
	Physical Laboratory	1 00	.....	3 00	2 00	3 00
	Library	1 00	1 00	1 00	1 00	1 00
	Deposits—					
	General	2 00	2 00	2 00	2 00	2 00
	Chemical Laboratory	.....	3 00	.....	.....	3 00
	Mineralogical Laboratory	.....	3 00	.....	.....	3 00
		48 00	53 00	50 00	49 00	56 00
	Payable in Second Term—					
	Sessional Fees	45 00	45 00	45 00	45 00	45 00
	Total	93 00	98 00	95 00	94 00	101 00

The total expense of a regular three years' course in any department is about $360, which amount includes books, instruments and materials as well as the fees, etc., stated in above table.

Information as to the text-books, instruments and materials to be purchased by the students will be given on registration at the beginning of the session.

FOURTH OR POST-GRADUATE YEAR.—The fees, etc., in this year are as follows :

Payable in First Term—	
Sessional Fees	$35 00
Dues, Library	1 00
Deposits, General	2 00
Payable in Second Term—	
Sessional Fees	34 00
University Fees	20 00
Total	$92 00

Fourth year students must also pay the deposits of the laboratories in which they work.

OCCASIONAL STUDENTS.—The fees payable by occasional students depend upon the nature and the amount of work taken ; they must be paid within one month from registration. All occasional students are required to pay the library fee, $1, and the general deposit, $2. Those taking laboratory work are required to pay a deposit of $6.

CERTIFICATES.—Certificates will be granted to occasional students only in cases in which application has been made to the Council at the beginning of the session and the conditions of award arranged.

FELLOWSHIPS.

The following fellowships have been established : Civil Engineering, Mechanical Engineering, Electrical Engineering, Surveying, Metallurgy and Assaying, Analytical and Applied Chemistry.

Each fellowship is of the value of $500 per annum.

The Fellows are required to take such portions of the work of instruction as may be assigned to them by the Council.

Applications for these fellowships are to be made annually to the Secretary on or before the 20th day of September

REGULATIONS RESPECTING EXAMINATIONS.

Candidates are required to send to the Secretary at least three weeks before the commencement of the Annual Examinations in April, and the Supplemental Examinations in October, notice in writing of their intention to take such examinations.

This regulation applies to all regular students and to such occasional students as may be candidates for certificates.

No candidate will be allowed to write at the Annual Examinations who has not paid all fees and dues for which he is liable.

The minimum percentage of marks required to pass in the written examinations will be fixed from time to time by the Council.

The minimum percentage of marks required to pass in the practical work connected with any subject, shall be one and one-half times the minimum required in the case of a written examination.

In order to pass in subjects wherein both written and practical examinations are held, the candidate must pass in each examination.

In order to pass the practical examinations in the subjects of applied mechanics, descriptive geometry, surveying and architecture, the drawings set in the lectures on these subjects must be made.

Drawings prescribed for the first term of the session will not be counted unless finished in that term.

To pass in Drawing the drawings already referred to must be made, together with as many others as may he prescribed.

The number of practice sheets to be made by each student will depend upon his progress.

The minimum number of drawings shall be twenty-five and the maximum number thirty-five, except in the

Department of Analytical and Applied Chemistry, in which the numbers shall be fifteen and twenty-five respectively.

The minimum percentage of marks prescribed for practical work must be obtained in drawing.

The drawings must be made on paper 15 x 22 inches, unless otherwise prescribed.

The Council reserve the right of disposing of the drawings as they may think proper. No drawing may be removed from the school without permission.

To pass in Surveying the minimum percentage required for practical work must be obtained in the field work.

No drawings will be counted which have not been made in the drafting rooms, and during the hours allotted to such work.

No field notes will be counted which have not been taken in the field, and during the hours allotted to such work.

Vacation Work.

Vacation work must be handed in on or before October 2nd, 1898, otherwise it will not be counted.

Vacation notes must be on construction only, and contain not fewer than twenty, nor more than thirty pages of sketches. These sketches must be free-hand pencil drawings with figured dimensions.

No notes, whether taken during the session or the vacation, will be counted unless made in the standard note books of the School.

Theses must be written on ordinary foolscap, and consist of not fewer than twenty, nor more than thirty pages.

Theses must be accompanied by carefully made drawings and illustrations separated from the text, and be bound between flat covers.

The sketches for the theses in the Architectural Course are to be made on one side of the sheet of a sketch book and mounted on cardboard or paper.

The Architectural students are advised to spend the vacation in architects' offices.

The minimum percentage of marks required for practical work must be made in the case of vacation notes and theses.

Supplemental Examinations, Etc.

A candidate below the standing of the third year, who has failed in one or two subjects, will be required to take supplemental examinations in such subjects.

In case a candidate has failed in both the written examinations and the practical work in a subject, it will be necessary for him to obtain the minimum percentage required for practical work in the written examinations, and do such extra practical work during the ensuing session as may be prescribed.

Should his failure have been in only the practical work of a subject, he will be required to take a supplemental written examination, and to do such extra practical work during the ensuing session as may be prescribed. If his failure has been in the written examination only, he will be required to take a written supplemental examination. In each of these cases the minimum percentage required for a written examination will be exacted.

The supplemental written examinations in subjects taught by the staff of the school will begin on the first day of the session. In other subjects they will be held at the time of the annual examinations.

In the case where a candidate fails to pass a supplemental examination it will count as one of the two supplemental examinations which may be allowed him after the next annual examination.

Candidates of the standing of the third year will not be allowed the privilege of a supplemental examination.

Candidates who fail in being promoted to a higher year or in graduating will be required to take again the whole

course of instruction, both theoretical and practical, of the year in which they failed, before presenting themselves a second time for examination.

No candidate will be allowed his examination if his written answers or theses indicate ignorance of the ordinary rules of spelling and composition.

The fees to be paid by a student repeating a year will be the regular fees for such year.

Students are required to spend the hours of every working day between 9 a.m. and 5 p.m. at the work laid down in the time table.

EXEMPTIONS.

No exemption from any of the regulations of the School will be granted, unless under such exceptional circumstances as may be deemed sufficient by the Council, which must be fully set forth in a formal petition.

PRIZE.

The following prize has been established :

Civil Engineering, 3rd Year, $10 in books. Donor—Mr. T. Kennard Thomson, C.E., New York.

HONORS.

Honors will be granted in each department to the students who pass in all the subjects and obtain at least 66 per cent. of the total number of marks alloted to the department at the annual examinations.

Papers read before the Engineering Society will be considered in granting Honors.

The Honor list will be arranged alphabetically.

REGULAR EXAMINATIONS,

(Approximate List.)

I Year.

Examinations held at the end of the Session.

Algebra.
Euclid.
Plane Trigonometry.
Analytical Geometry. 1, 2, 3, 4.
History of Architecture . . 4.
Magnetism and Electricity . . . . . 3, 5.
Statics.
Dynamics.
Descriptive Geometry.
Surveying . . . . . 1, 2, 3, 4.
Chemistry, Elementary.
Electricity 3, 5
Heat.

Examinations held during the Session.

Drawing.
Field Notes . . . . . 1, 2, 4.
Construction Notes . . 1, 2, 3, 4.
Architectural Sketches . . . . 4.
Experimental Physics . . . 3, 5.
Electricity, Practical . . . . 3, 5.
Practical Chemistry.
Practical Mineralogy . . 1, 2, 5.
French and German. . . . . 5.

II Year.

Examinations held at the end of the Session.

Calculus . . . . 1, 2, 3, 4.
Astronomy . . . . . 1.
Optics.
Hydrostatics.
History of Architecture . . 4.
Orders of Architecture . . . 4.
Strength of Materials. 1, 2, 3, 4
Rigid Dynamics. . . . 1, 2, 3.
Theory of Mechanism . . . 3.
Descriptive Geometry . . . . . 1, 2, 3, 4.
Surveying . . . . . 1, 2, 4.

1. Civil Engineering.
2. Mining Engineering.
3. Mechanical and Electrical Engineering.
4. Architecture.
5. Analytical and Applied Chemistry.

History of Ornament. ....4.
Chemistry, Inorganic and Physical ..... .5.
Chemistry, Applied.
Electricity..... .....3, 5.
Spherical Trigonometry.... ..... 1, 2, 3.
Mineralogy and Geology... .....1, 2, 4, 5.
Lithology.. ....2.
Metallurgy.

EXAMINATIONS HELD DURING THE SESSION.

Drawing.....1, 2, 3, 4.
Field Notes.....1, 2.
Construction Notes.....1, 2, 3, 4.
Architectural Sketches .....4.
Experimental Physics.
Electricity, Practical.....3.
Thesis (at beginning of session.)
Chemistry, Practical.
Mineralogy, Practical.....1, 2, 5.
French and German.....5.

III Year.

EXAMINATIONS HELD AT THE END OF THE SESSION.

Magnetism and Electricity. 3.
History of Architecture...4.
History of Ornament.....4.
Principles of Decoration..4.
Method of Least Squares.... .... 1, 2, 3.
Chemistry, Inorganic and Organic .....5.
Chemistry, Applied
Mineralogy and Geology ..... 1, 2, 4, 5.
Theory of Construction .... 1, 2, 3, 4.
Mechanics of Machinery..3.
Machine Design.....3.
Hydraulics .....1, 2, 3, 4.
Thermodynamics ...1, 2, 3.
Descriptive Geometry.... ..... 1, 2, 3, 4.
Practical Astronomy and Geodesy .....1.
Surveying and Levelling 1, 2.

1. Civil Engineering. 3. Mechanical and Electrical Engineering.
2. Mining Engineering. 4. Architecture.
5. Analytical and Applied Chemistry.

Sanitary Plumbing, Heating and Ventilation..4.
Theory of Compound Stress .....1, 3. 4.
Metallurgy.....2, 3, 5.
Mining and Ore Dressing. 2.
Ore Deposits..... 2.
Assaying ..... 2.

EXAMINATIONS HELD DURING THE SESSION.

Drawing.....1, 2, 3, 4.
Field Notes.....1, 2.
Construction Notes.....1, 2, 3, 4.
Architectural Sketches.....4.
Experimental Physics ..1, 3, 4, 5.
Electricity, Practical.....3.
Thesis (at beginning of session).
Chemistry, Practical.....2, 5.
Mineralogy, Determinative..2, 5.
Assaying .....2, 5.

DEPARTMENT OF CIVIL ENGINEERING.

(INCLUDING SANITARY ENGINEERING.)

This Department is intended to afford the necessary preliminary preparation to students intending to become Civil Engineers (including under this term Sanitary Engineers).

I Year.

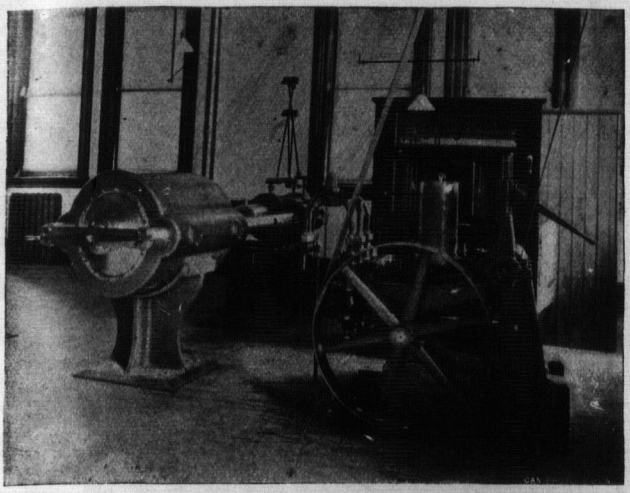
MATHEMATICS.

Euclid, algebra, plane trigonometry.
Analytical plane geometry.

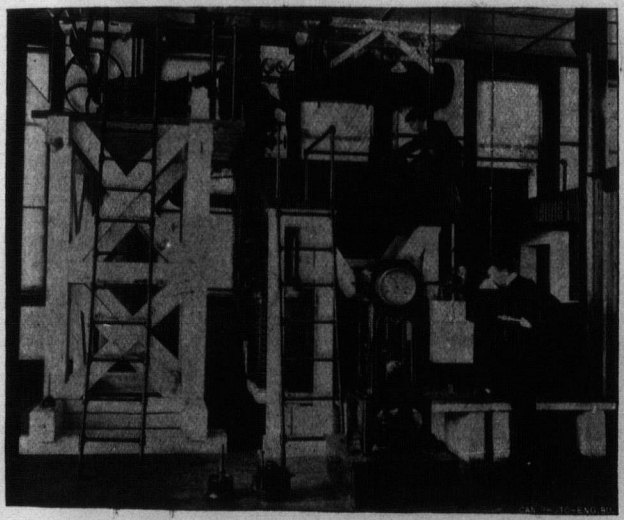
DRAWING.

Copying from the flat, lettering, topography.
Graphics.

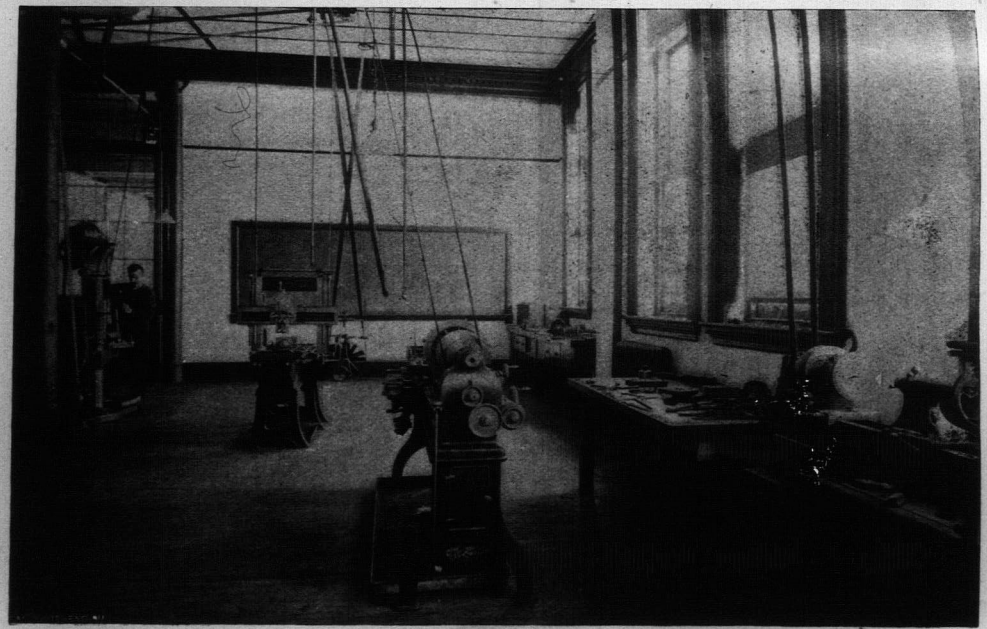
1. Civil Engineering. 3. Mechanical and Electrical Engineering.
2. Mining Engineering. 4. Architecture.
5. Analytical and Applied Chemistry.



EMERY TESTING MACHINE.



HYDRAULIC PLANT.



MACHINE SHOP.

Descriptive geometry in its application to plane-sided solids, orthographic (including isometric) and oblique projection.

Original surveys.

CHEMISTRY.

General principles of chemistry.

Chemistry of the non-metals.

Laboratory practice.

MINERALOGY,

Introductory course.

PHYSICS,

Heat.

MECHANICS.

Statics and dynamics (with special reference to structures and machines.

SURVEYING.

Field and office work, chain and compass surveys, topography, preliminary instruction in the use of the transit-theodolite, plotting, mensuration.

II Year.

MATHEMATICS.

Differential and integral calculus.

Spherical trigonometry.

Plane astronomy.

DRAWING.

Subjects of first year continued.

Coloring and shading applied in both topographical and construction drawing.

Descriptive geometry in its application to solids bounded by curved surfaces. The various projections of the sphere and principles of map construction.

Machines and structures. (Drawings made from both copies and original notes.)

CHEMISTRY.

Chemistry of the metals.
Thermo-chemistry,
Combustion.
Fuels.
Chemical manufacture.
Laboratory practice.

ENGINEERING AND SURVEYING.

Statics and dynamics (pure and applied.)
Strength and elasticity of materials.
Experimental work in engineering laboratory.
Transit-theodolite surveying.
Levelling.
Railway location curves, etc.
Hydrographic surveying.

MINERALOGY AND GEOLOGY.

Elements of these sciences.
Blowpipe practice.
Determination of minerals.

METALLURGY.

Iron and steel.

PHYSICS.

Hydrostatics.
Optics.

EXPERIMENTAL PHYSICS.

Introductory course.

VACATION WORK.

See pages 43 and 101.

III. Year.

DRAWING.

Subjects of previous years continued.
Descriptive geometry—shades and shadows, stone cutting. perspective projection.
Original designs—bridges, roofs, floors, arches, etc.

CHEMISTRY (Applied).
- Explosives.
- Artificial lighting.
- Photography.
- Industrial chemistry
- Sanitary Chemistry.

ENGINEERING AND SURVEYING.
- Statics and dynamics (pure and applied).
- Strength and elasticity of materials.
- Theory of construction
- Practical designs—bridges, roofs, floors, arches, retaining walls, foundations, etc.
- Thermodynamics and theory of the steam engine.
- Hydraulics, sewerage, water supply.
- Experimental work in engineering laboratory.
- Levelling.
- Profiles, cross sections, field work and plotting.
- Computation of quantities.
- Mathematical theory of surveying instruments.
- Trigonometrical and barometrical levelling.
- Geodesy (considering the earth a sphere.)
- Practical astronomy (treated in the manner required for the O.L.S. and D.L.S. examinations).
- Least squares.

MINERALOGY AND GEOLOGY.
- Economic geology.

EXPERIMENTAL PHYSICS.
- Heat.

VACATION WORK.
- See pages 43 and 101.

II. DEPARTMENT OF MINING ENGINEERING.

This department is designed to afford the necessary preliminary training to students intending to become mining engineers.

I. Year.

MATHEMATICS.

Euclid, algebra, plane trigonometry.
Analytical plane geometry.

DRAWING.

Copying from the flat, lettering, topography.
Graphics.
Descriptive geometry in its application to plane-sided solids, orthographic (including isometric) and oblique projection,
Original surveys.

CHEMISTRY.

General principles of chemistry.
Chemistry of the non-metals
Laboratory practice.

MINERALOGY,

Introductory course.

PHYSICS,

Heat.

MECHANICS.

Statics and dynamics, (with special reference to structures and machines).

SURVEYING.

Field and office work, chain and compass surveys, topography, preliminary instruction in the use of the transit theodolite, plotting, mensuration.

II. Year

MATHEMATICS.

Differential and integral calculus.
Spherical trigonometry.

DRAWING.

Subjects of first year continued.
Coloring and shading applied to both topographical and construction drawing.

Descriptive Geometry in its application to solids bounded by curved surfaces. The various projections of the sphere, and principles of map construction.

Machines and structures from both copies and original notes.

CHEMISTRY.

Chemistry of the metals.
Thermo-chemistry.
Fuels.
Chemical manufacture.
Laboratory practice.

ENGINEERING AND SURVEYING.

Statics and dynamics (pure and applied).
Strength and elasticity of materials.
Experimental work in engineering laboratory.
Transit-theodolite surveying.
Levelling.
Railway location, curves, etc.
Mining surveying.

MINERALOGY AND GEOLOGY.

Elements of these sciences.
Blowpipe practice.
Determination of minerals.
Lithology.

METALLURGY.

Iron and steel.

PHYSICS.

Hydrostatics
Optics.

EXPERIMENTAL PHYSICS.

Introductory course.

VACATION WORK.

See pages 43 and 101

III. Year.

DRAWING.

Subject of previous years continued.
Descriptive geometry.
Shades and shadows, stone cutting, perspective projection.
Original designs—bridges, roofs, floors, etc.

CHEMISTRY (APPLIED).

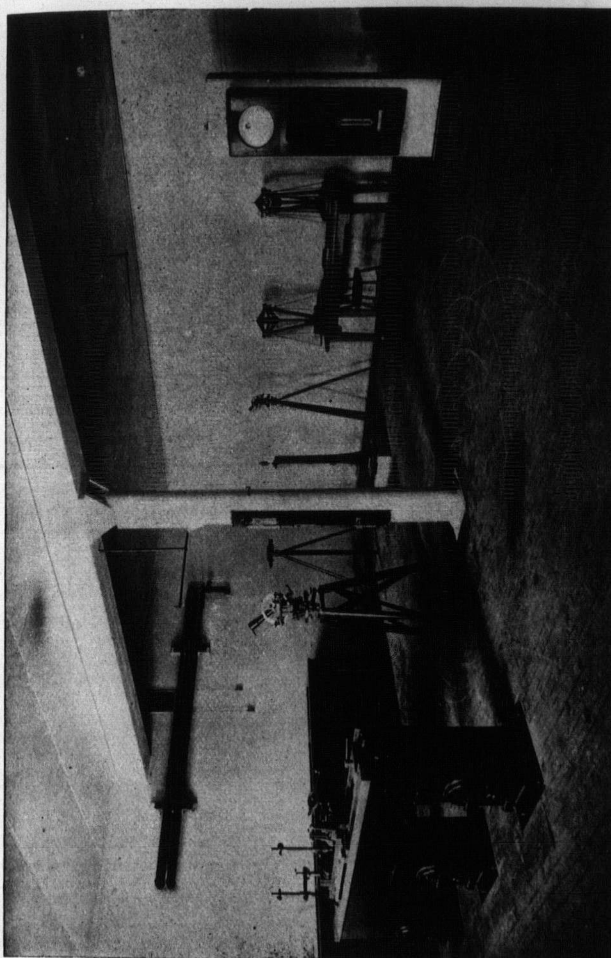
Explosives.
Artificial lighting.
Photography.
Industrial chemistry.
Sanitary chemistry.
Laboratory practice.
Wet assays.

ENGINEERING AND SURVEYING.

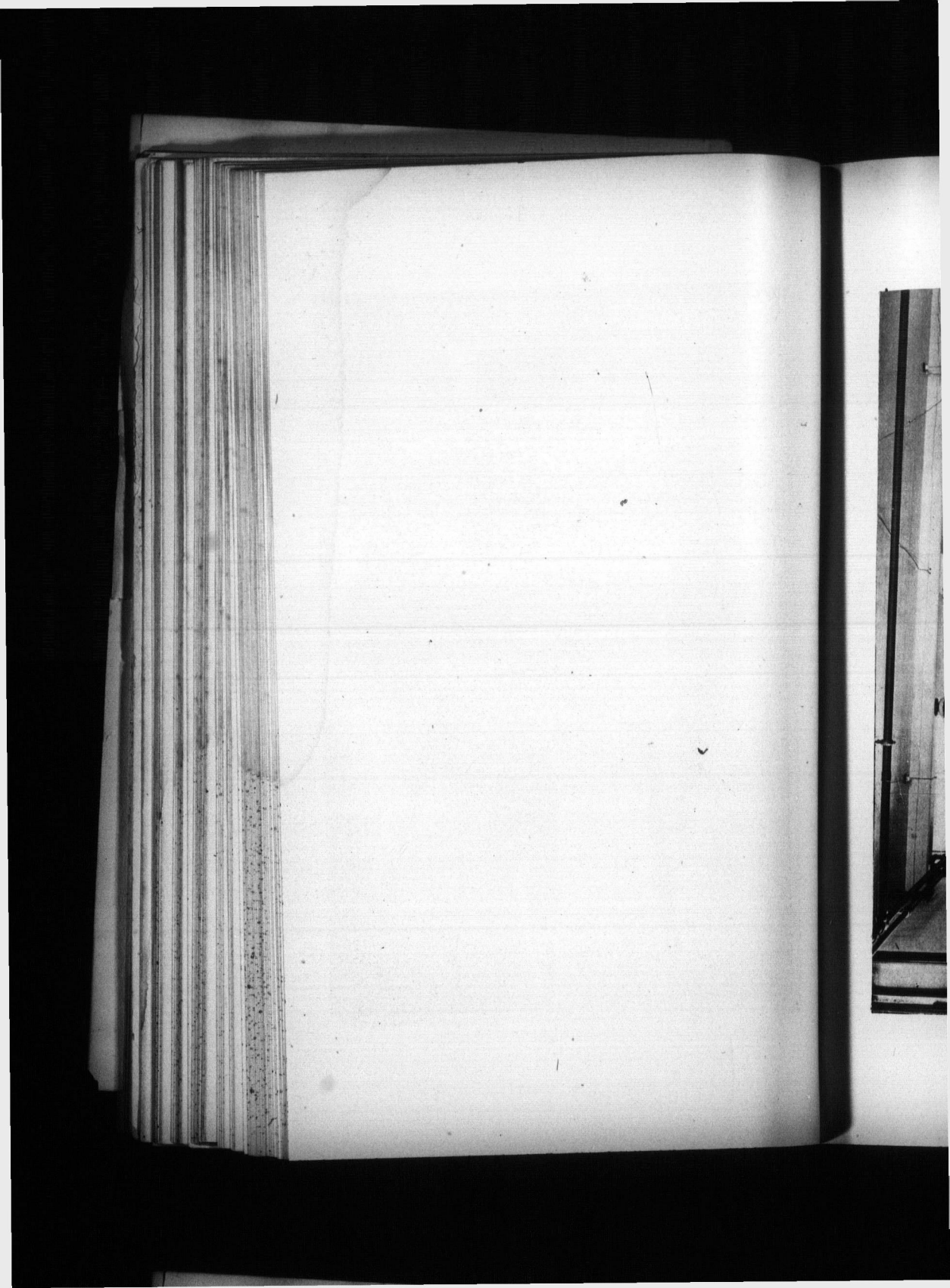
Statics and dynamics (pure and applied).
Strength and elasticity of materials.
Theory of construction.
Thermodynamics and theory of steam engine.
Hydraulics.
Experimental work in engineering laboratory.
Levelling.
Profiles, cross-sections, field work and plotting.
Computation of quantities.
Mathematical theory of surveying instruments.
Trigonometrical and barometrical levelling.
Least Squares.

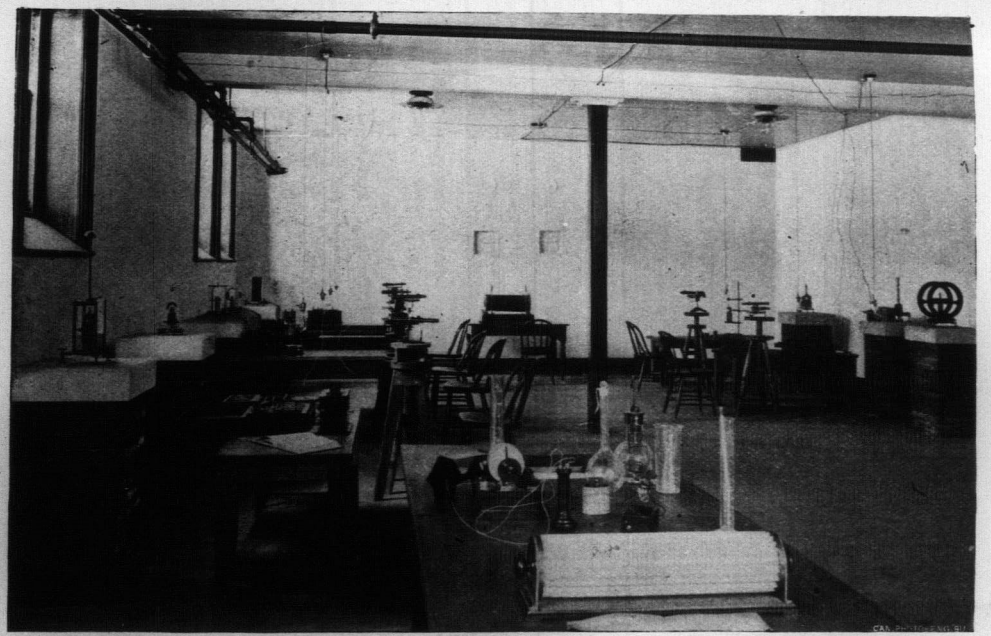
MINERALOGY AND GEOLOGY.

Economic geology.
Palæontology.
Ore deposits.
Blowpipe analysis and determinative mineralogy.
Metallurgy of gold, silver, nickel, copper, etc.
Mining and ore dressing.
Assaying.



CLOCK ROOM.





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VACATION WORK.

See pages 43 and 101.

III. DEPARTMENT OF MECHANICAL AND ELECTRICAL ENGINEERING.

This department is intended to afford the necessary preliminary preparation to students intending to become Mechanical and Electrical Engineers.

I. Year.

MATHEMATICS.

Euclid, algebra, plane trigonometry.
Analytical plane geometry.

DRAWING.

Copying from the flat, lettering, graphics.
Descriptive geometry in its application to plane-sided solids, orthographical (including isometrical) and oblique projection.

CHEMISTRY.

General principles of chemistry.
Chemistry of the non-metals.
Laboratory practice.

MECHANICS.

Statics and dynamics (with special reference to structures and machines).

SURVEYING.

(Lectures only). Application of trigonometry and principles of measurement.

PHYSICS.

Heat.
Magnetism and electricity (introductory course).
Electricity (applications of the laws of Ohm, Kirchhoff and Joule).

PRACTICAL ELECTRICITY.

Introductory course.

EXPERIMENTAL PHYSICS.

Introductory course.

II. Year.

MATHEMATICS.

Differential and integral calculus.

Spherical trigonometry.

DRAWING.

Subjects of first year continued.

Coloring and shading applied in construction drawing.

Descriptive geometry in its application to solids bounded by curved surfaces. The various projections of the sphere.

Machines and structures. (Drawings made from both copies and original notes).

CHEMISTRY.

Chemistry of the metals

Thermo-chemistry.

Combustion.

Fuels.

Chemical manufacture.

Laboratory practice.

ENGINEERING.

Statics and dynamics (pure and applied).

Theory of mechanism.

Strength and elasticity of materials.

Materials and construction.

Methods and processes.

Experimental work in engineering laboratory.

METALLURGY.

Iron and steel.

PHYSICS.

Hydrostatics.

Optics.

Electrica measurements.

EXPERIMENTAL PHYSICS.

ELECTRICAL LABORATORY.

VACATION WORK.

See pages 43 and 101.

III. Year.

DRAWING.

Subjects of previous year continued.
Descriptive geometry.
Shades and shadows, stone cutting, perspective projection.

CHEMISTRY (APPLIED).

Explosives.
Artificial lighting.
Photography.
Industrial chemistry.
Sanitary chemistry.

ENGINEERING.

Subjects of previous years continued.
Applied Mechanics:
Mechanics of machinery, machine design, thermodynamics and theory of the steam engine, hydraulics.
Electricity.
Dynamos and motors.
Application of principles to practical problems connected with the design, construction and testing of various prime motors and machines.
Experimental work in engineering laboratory.
Least squares.

METALLURGY.

Gold, silver, nickel, copper, lead.

EXPERIMENTAL PHYSICS.

Terrestrial magnetism.

ELECTRICAL LABORATORY.

ORIGINAL DESIGNS.

Engine and machine design.

VACATION WORK.

See pages 43 and 101.

In addition to taking the course of instruction in the school and passing the requisite examinations, a candidate for the diploma in Mechanical and Electrical Engineering will be required to present satisfactory evidence of having had at least one year's good practical experience in one of the principal trades connected with mechanical work, such as machinist, pattern-maker, moulder, steam engineer, etc. There is no restriction as to the place where the candidate may have gained such practical experience.

IV. DEPARTMENT OF ARCHITECTURE.

This department is designed to afford the necessary preliminary training to students intending to become Architects.

I. Year.

MATHEMATICS.

Euclid, algebra, plane trigonometry.
Analytical plane geometry.

DRAWING.

Copying from the flat, lettering, topography, graphics.
Descriptive geometry in its application to plane sided solids, orthographic (including isometric) and oblique projection.
Rendering in pencil and pen and ink.

CHEMISTRY.

General principles of chemistry.
Chemistry of the non-metals.
Laboratory practice.

PHYSICS,

Heat.

MECHANICS.

Statics (with reference to structures).
Dynamics (preliminary to the study of hydraulics).

SURVEYING.

Principles, chain surveying, mensuration.

HISTORY OF ARCHITECTURE.

General introduction.
Ancient architecture.
Egyptian, Assyrian and Persian.

II. Year.

MATHEMATICS.

Differential and integral calculus.

DRAWING.

Instrumental drawing, drawing from the cast, sketching and water color, pen and ink.
Descriptive geometry (curved surfaces).

CHEMISTRY.

Chemistry of the metals.
Thermochemistry.
Combustion.
Fuels.
Chemical manufacture.
Laboratory practice.

MECHANICS.

Statics (pure and applied).
Strength and elasticity of materials.
Materials of construction.
Experimental work in engineering laboratory.

SURVEYING.

Use of transit and level.
Mensuration.

MINERALOGY AND GEOLOGY.

Elements.

METALLURGY.

Iron and steel.

PHYSICS.

Hydrostatics.
Optics.

EXPERIMENTAL PHYSICS.

Introductory course.

HISTORY OF ARCHITECTURE.

Greek and Roman.
Romanesque and Byzantine.

ORDERS AND ELEMENTS OF ARCHITECTURE

HISTORY OF ORNAMENT.

Ancient.
Classic—Greek, Roman.

VACATION WORK.

See pages 43 and 102.

III. Year.

DRAWING.

Descriptive geometry.
Shades and shadows, stone cutting, perspective projection.
Water color sketching.
Original designs—floors, trusses, arches, etc.

CHEMISTRY (APPLIED).

Explosives.
Artificial lighting.

Photography.
Industrial chemistry.
Sanitary chemistry.

THEORY OF CONSTRUCTION.

Experimental work in engineering laboratory.

HYDRAULICS.

SANITARY SCIENCE.

House drainage and plumbing.
Ventilation and heating.

SURVEYING.

Levelling, setting out excavation, mensuration.

MINERALOGY AND GEOLOGY.

Economic geology.

EXPERIMENTAL PHYSICS.

Heat, acoustics.

HISTORY OF ARCHITECTURE.

Gothic and Renaissance, with special reference to England.

HISTORY OF ORNAMENT.

Early Christian; Gothic and Renaissance.

PRINCIPLES OF DECORATION.

VACATION WORK.

See pages 43 and 102.

V. DEPARTMENT OF ANALYTICAL AND APPLIED CHEMISTRY.

This Department is designed to afford the necessary preliminary training to students who intend to become chemists by profession, either as analytical chemists or industrial chemists.

I. Year.

MATHEMATICS.

Euclid, algebra, plane trigonometry.

DRAWING.

Copying from the flat, lettering.
Descriptive geometry in its application to plane sided solids.
Orthographic (including isometric) and oblique projection.
Model drawing.

CHEMISTRY.

General principles of chemistry.
Chemistry of the non-metals.
Laboratory practice.

MINERALOGY,

Introductory course.

MECHANICS.

Statics and dynamics.

PHYSICS.

Heat.
Magnetism and electricity.

EXPERIMENTAL PHYSICS.

Introductory course.

PRACTICAL ELECTRICITY.

Introductory course.

MODERN LANGUAGES.

French.
German.

II. Year.

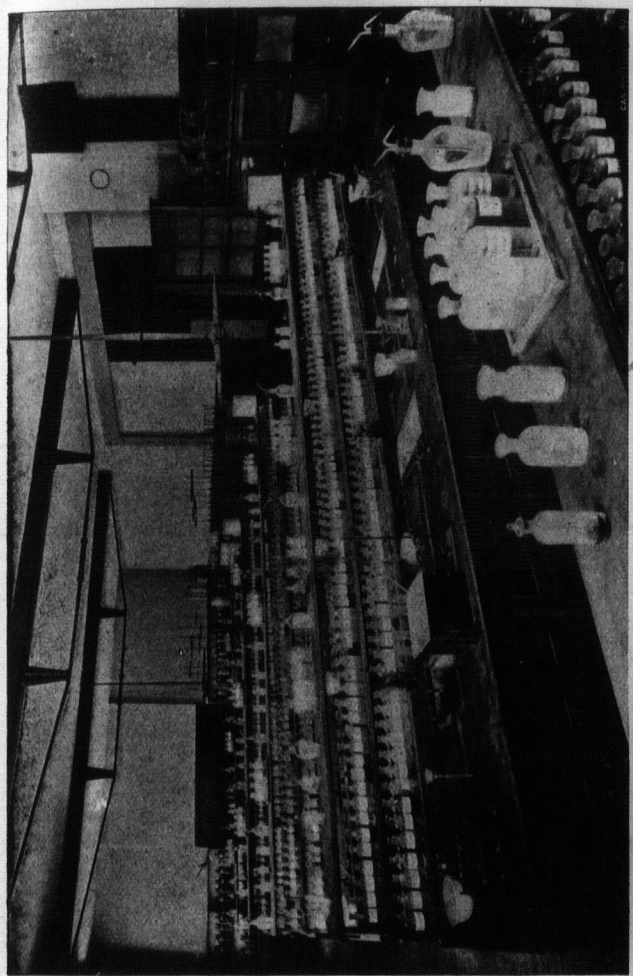
CHEMISTRY.

Inorganic and physical chemistry.
Applied chemistry.
Laboratory work in quantitative and qualitative analysis.

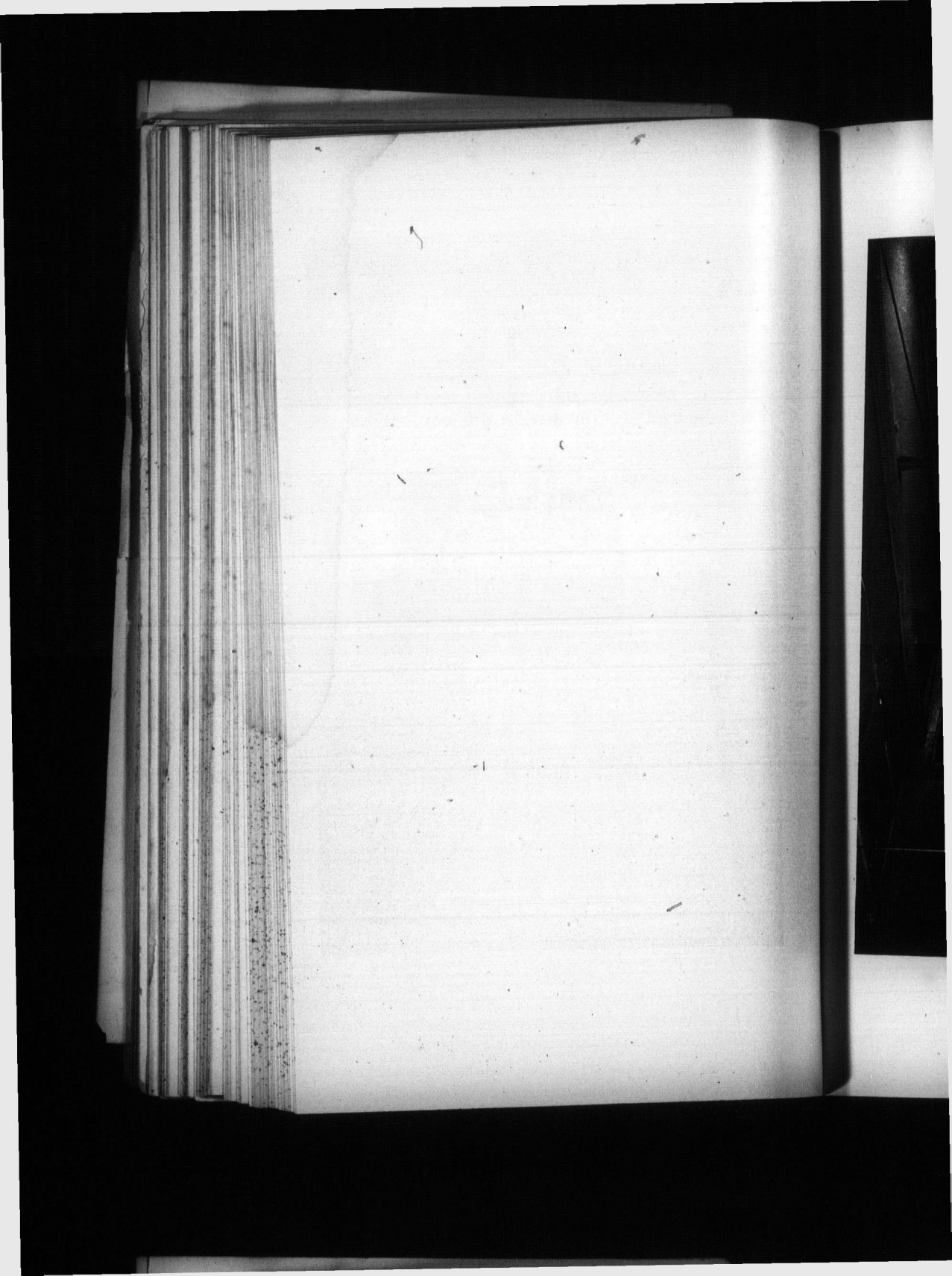
MINERALOGY AND GEOLOGY.

Elementary mineralogy and blowpipe practice.
*Physical geography, palæontology and geology.

* An option is permitted between the above subject and Inorganic Chemistry in the University of Toronto.



CHEMICAL LABORATORY—QUALITATIVE ANALYSIS.



CHEMICAL LABORATORY—QUANTITATIVE ANALYSIS.

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Chemistry i

METALLURGY.

Iron and steel.

PHYSICS.

Hydrostatics.
Optics.
Electricity.

EXPERIMENTAL PHYSICS,

ELECTRICAL LABORATORY.

MODERN LANGUAGES.

Students in this and the following years are expected to be able to read chemical books in French and German.

VACATION WORK.

See pages 43 and 102.

III. Year.

CHEMISTRY.

Organic chemistry and chemical physics.
Applied chemistry.
Laboratory work.

MINERALOGY AND GEOLOGY.

†Economic geology.
Blowpipe analysis and determinative mineralogy.

METALLURGY.

Gold, silver, nickel. copper, lead.

EXPERIMENTAL PHYSICS.

BIOLOGY.

Terrestrial magnetism.

VACATION WORK.

See pages 43 and 102.

† An option is permitted between above subject and Physical Chemistry in the University of Toronto.

THE FOURTH YEAR.

After the completion of the general three years' course in any department, students are recommended to take up the special work of the fourth year, leading to the degree of Bachelor of Applied Science in the University of Toronto. It is only by so doing that full advantage can be taken of the laboratory equipment of the school. The fourth year enables students to continue under certain restrictions the study of subjects in which they take special interest and is the means adopted in the School of Practical Science of affording them the advantage of optional and special studies.

To be admitted to the fourth year a candidate must be a graduate of the School of Practical Science or an undergraduate of the standing of the fourth year in the University of Toronto in the honor Department of Chemistry and Mineralogy.

The subjects of study in the fourth year are arranged in the following groups and sub-divisions :

A. { Astronomy.
Goedesy and Metrology.

B. { Architecture.
Strength and Elasticity of Materials.
Hydraulics.
Thermodynamics and Theory of Heat Engines.
Electricity and Magnetism.

C. { Industrial Chemistry.
Sanitary and Forensic Chemistry.
Inorganic and Organic Chemistry.

D. { Mineralogy and Geology.
Metallurgy and Assaying.

Each student will be required to confine his studies during the session to one of the above groups. He will not be allowed to take fewer than two nor more than three of the subdivisions in any group.

The subdivision "Inorganic and Organic Chemistry" will be obligatory on all students who select group C.

A student is liable to be called on to assist in any of the experimental and practical work in the group which he has selected, although it may not belong to his special subjects.

Candidates are required to notify the Secretary in writing of their intention to take the fourth year work at least one week before the opening of the session, and to inform him at the same time of the subjects which they propose to take. These subjects will be submitted to the Council for approval at the beginning of the session, and no student will be permitted to take any subject not so approved.

Undergraduates of the University of Toronto of the standing of the fourth year in the Honor Department of Chemistry and Mineralogy may be admitted as students in the fourth year in the groups C and D.

Candidates will be required to show a good working acquaintance with translation from either French or German. This will be tested by their ability to translate extracts from scientific works or periodicals not previously specified.

Pass and Honors.

Total marks assigned to fourth year..... 900
Subdivided as follows:—
Work (reckoned in hours)..... 540 marks
Records (notes, drawings, etc.)..... 360 marks

FOR PASS.

The minimum percentages are:
Work, 75 per cent..... 405 marks
Records, 50 per cent..... 180 "
And two-thirds of the total marks assigned. 600 "

FOR HONORS:

In deciding the allotment of honors the whole academic record of the candidate will be taken into consideration,

but no honors will be granted unless the candidate shall have received a special recommendation from the member or members of Council under whose supervision his fourth year work has been done.

Honors granted will be mentioned in the certificate required under clause 2 of the statutes of the Univerity of Toronto respecting the degree of B. A. Sc.

The above certificate will not be granted to students who have been absent without leave of the Council from more than ten per cent. of the lectures and practical work of either term of the session.

Courses of reading will be indicated in connection with subjects of study.

The above regulations have been approved by the Senate of the University of Toronto in so far as they effect the degree of B. A. Sc.

DEGREE OF B. A. Sc.

Candidates who have fulfilled the requirements of the Fourth Year in the School of Practical Science are eligible for the degree of Bachelor of Applied Science in the University of Toronto in accordance with a statute passed by the Senate in 1892, which, with the amendments since made, is as follows :

By the Senate of the University of Toronto.

Be it enacted :

That the Degree of Bachelor of Applied Science (B.A.Sc.) be hereby established to be granted subject to the following conditions and regulations :

1. Candidates for the said degree shall hold the diploma of the School of Practical Science in any one of the regular courses of the said School, or shall be of the standing of the fourth year in the Honor Department of Chemistry and Mineralogy in the University of Toronto.

2. They shall have fulfilled the conditions relating to the Fourth or Post-Graduate year in the School of Practical Science, and shall present certificates of having done so to the Registrar of the University. Honors may be granted with such certificates by the Faculty of the School.

3. Each candidate shall prepare a thesis based on the results of his Fourth Year work in the said School of Practical Science for the approval of the University examiners. This thesis is to be accompanied by all necessary drawings, specifications, tables and estimates. To pass in the thesis a candidate must obtain fifty per cent., and to take honors seventy-five per cent., of the marks assigned.

4. Candidates will be required to select two sub-divisions in any one of the following groups, and to pass such written and oral examinations on the subjects selected as may be prescribed by the University examiners.

A. { Astronomy.
Geodesy and Metrology.

B { Architecture.
Strength and Elasticity of Materials.
Hydraulics.
Thermodynamics and Theory of Heat Engines.
Electricity and Magnetism.

C { Industrial Chemistry.
Sanitary and Forensic Chemistry.
Inorganic and Organic Chemistry.

B { Mineralogy and Geology.
Metallurgy and Assaying.

The subdivison "Inorganic and Organic Chemistry" will be obligatory on all candidates who select group C.

To pass in each subject thirty-three per cent., and to take honors sixty-six per cent. of the marks assigned, will be required.

The degree with honors will be conferred on candidates who obtain three out of the four honors possible.

Viz.—Certificate with honors..... (cl. 2.)
Thesis with honors..... (cl. 3.)
Honors in each subject of examination. (cl. 4.)

6. Candidates are required to send to the Registrar of the University at least three weeks before the commencement of the annual examinations an application for examination according to a printed form to be obtained from the Registrar, and such application must be accompanied by a fee of ten dollars.
7. The examination for the degree shall be held in May.
8. The fee for the degree shall be ten dollars and shall be paid to the Registrar not later than the first day of May.
9. The ordinary time for conferring the degree shall be at the University commencement in June. The degree may be conferred at any meeting of the Senate.
10. The thesis drawings, and other papers accompanying them, shall be the property of the University.
11. In case any change be made in the conditions referred to in the second clause, such change shall be submitted to the Senate and shall have no force so far as the said clause is concerned unless approved by resolution of the Senate.

SUBSEQUENT PROFESSIONAL DEGREES.

The attention of graduates is directed to the following statute, passed by the Senate of the University of Toronto in 1896:

By the Senate of the University of Toronto.

Be it enacted:

I. That all previous Statutes of the University relating to degrees or diplomas in Engineering be repealed.

II. That the following degrees be hereby established, viz., Civil Engineer (C.E.), Mining Engineer (M.E.), Mechanical Engineer (M.E.), Electrical Engineer (E.E).

III. That the following be the conditions and regulations governing the conferring of the said degrees.

1. A candidate for one of the said degrees shall hold the diploma of the School of Practical Science and the degree of Bachelor of Applied Science of the University of Toronto, except in the case provided for in clause 11 hereunder.

2. He shall have spent at least three years after receiving the degree of Bachelor of Applied Science in the actual practise of the branch of Engineering wherein he is a candidate for a degree.

3. Intervals of non-employment or of employment in other branches of engineering shall not be included in the above three years. It shall not be necessary that the several periods requisite to make up the said three years be consecutive.

4. Satisfactory evidence shall be submitted to the University Examiners as to the nature and length of the candidate's professional experience for the purposes of clauses 2 and 3.

The Examiners shall satisfy themselves by oral or written examinations in regard to the candidate's experience and competence.

5. The candidate shall prepare an original thesis on some engineering subject in the branch in which he wishes a degree; the said thesis to be accompanied by all necessary descriptions, details, drawings, bills of quantities, specifications and estimates.

The candidate may be required at the option of the Examiners to undergo an examination in the subject of this thesis.

6. Notice in writing shall be sent to the Registrar not not later than the first day of February, informing him of the degree to which the candidate wishes to proceed and of the title of his proposed thesis, for the approval of the Senate.

7. The evidence under clause 4, and the thesis, with accompanying papers, described in clause 5, shall be sent to the Registrar not later than the first day of May.

8. The candidate shall be required to present himself for examination in the month of May at such time as may be arranged by the Registrar.

9. The fee for any one of the said degrees shall be twenty dollars, and shall be paid to the Registrar not later than the first day of May.

10. The thesis, drawings and other papers submitted under clause 7 shall become the property of the University.

11. Candidates who graduated from the School of Practical Science before June, 1895, shall not be required to hold the degree of Bachelor of Applied Science.

For further particulars apply to the Registrar of the University of Toronto.

DOMINION AND ONTARIO LAND SURVEYORS.

Courses of instruction will be given in accordance with the requirements of the Statutes relating to the Dominion and Ontario Land Surveyors, which will enable the graduates to present themselves for final examination before the proper boards, at an earlier period in their apprenticeship than would otherwise be permitted.

Extract from the Provincial Act respecting Land Surveyors and Survey of Lands. (R.S.O.)

"10.—(2) Any person serving as an apprentice as hereinafter provided, may, with the permission of the Board of Examiners, attend the Ontario School of Practical Science, or any school, college or university, the course of study in which is in the opinion of the Board sufficiently similar to that in the Ontario School of Practical Science, for the purpose of taking any course of study which includes any subject required for the final examination for admission to practice as a land surveyor, but the total period of such apprenticeship and of such course of study shall not exceed the period of four years from the date of the articles of apprenticeship as above mentioned, and not less than three years of the said period of four years shall be passed in the actual service of a practising Ontario Land Surveyor."

"14. The privilege of a shorter term of apprenticeship shall also be accorded to any graduate of the Royal Military College at Kingston and of the Ontario School of Practical Science in civil or mining engineering, or of the McGill College, Montreal, in civil or mining engineering, and such persons shall not be required to pass the preliminary examination hereinbefore required for admission to apprenticeship with a land surveyor, but shall only be required to serve under articles with a practising land surveyor duly filed as required by section 17 of this Act, during twelve successive months of actual practice, after which, on complying with all the other requirements, he may undergo the examination by the Act prescribed."

"(2) Such person at any time during his apprenticeship may with the permission of the Board of Examiners, attend the Ontario School of Practical Science, or any school, college or university, the course of study of which is, in the opinion of the Board, sufficiently similar to that in the Ontario School of Practical Science, for the purpose

of taking any course of study which includes any subject required for the final examination for admission to practice as a land surveyor, but the total period of such apprenticeship, and of such coarse of study, shall not exceed the period of two years from the date of the articles of apprenticeship as above mentioned, and not less than twelve months of the said period of two years shall be passed in the actual service of a practising Ontario Land Surveyor."

Extract from the Dominion Lands Act.

"Every graduate in surveying of the Royal Military College of Canada, and every person who has followed a regular course of study in all branches of education required by this Act for admission as a Domjnion Land Surveyor, through the regular sessions, for at least two years in any College or University where a complete course of theoretical and practical instruction in surveying is organized, and who has thereupon received from such College or University a Diploma as Civil Engineer, shall be exempt from serving three years as aforesaid, and shall be entitled to examination after one years' service under articles with a Dominion Land Surveyor, at least six months of which service has been in the field, on producing the affidavit required by the next preceding clause as to such service; but it shall rest with the Board to decide whether the course of instruction in such College or University is that required by this clause."

The attention of the Candidates for the Diploma of D. T. S., given by the Dominion Board of Examiners, is directed to the facilities afforded for preparation in the School.

Extract from the Ontario Architects' Act.

"Any student who has matriculated in Arts in any University in Her Majesty's dominions, or in the Ontario School of Practical Science, shall not be required to pass the preliminary examinations.

"23. Any person who applies for admission to registration as an architect after the coming into force of this Act, shall be not less than twenty-one years of age, shall have served as a student not less than five years with a principal or principals entitled to register under this Act, or with any other principal or principals approved by the council, and have passed such qualifying examinations as may be required by this Act.

"24.—(3) Any person who has graduated from the Ontario School of Practical Science shall be required to serve only three years as a student, one of which three years may be served during the vacation of such school.

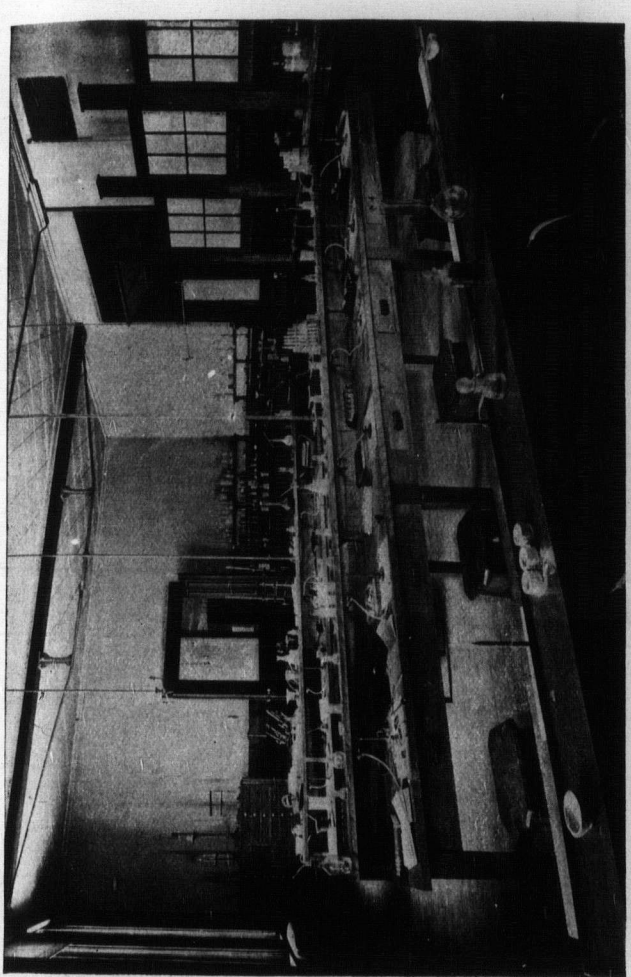
"(4) Upon and after the passing of this Act, students shall serve such term as is required to be served by the provisions of this Act, under indenture, to a registered architect, which indenture and any assignment thereof with affidavit of execution thereto attached shall be filed with the Register upon payment of such fees as the council may, by regulation, direct."

SYNOPSIS OF THE COURSES OF LECTURES AND PRACTICAL INSTRUCTION.

Text-books for the first year marked *(a)*; second year *(b)*; third year (*c*) and for fourth or post graduate year (*d*).

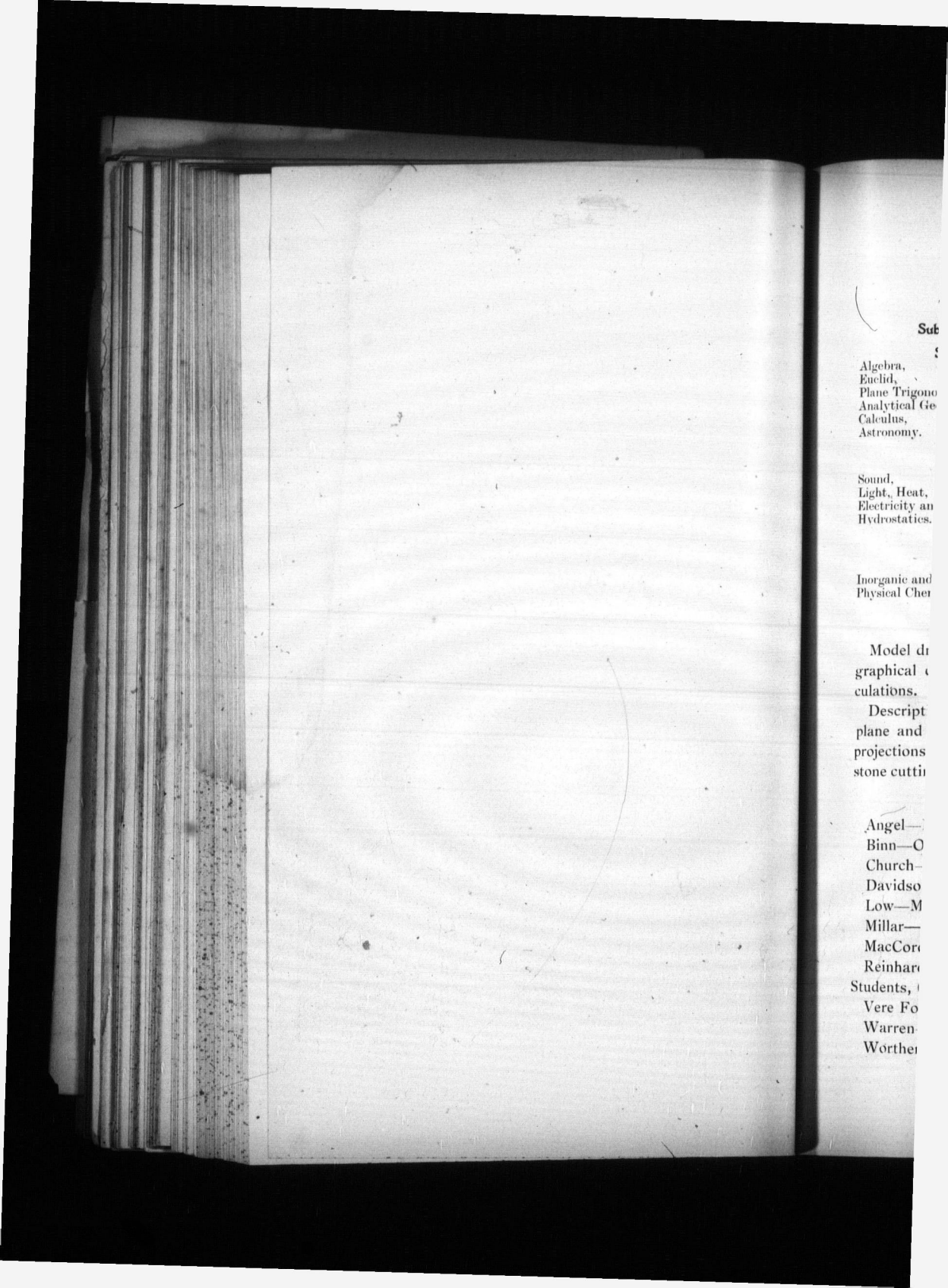
SUBJECTS TAUGHT BY THE FACULTY OF THE SCHOOL.

Subjects.	Instructors.
Organic and Inorganic Chemistry,	W. H. Ellis, M.A., M.B., Professor.
Applied Chemistry,	H. W. Charlton, B.A.Sc., Fellow.
Mineralogy and Geology,	
Petrography,	A. P. Coleman, M.A., Ph., D.,
Metallurgy and Assaying,	Professor.
Mining and Ore-dressing,	G. R. Mickle, B.A., Lecturer.
Milling,	J. W. Bain, B.A.Sc., Fellow,
German,	
Statics,	
Dynamics,	
Strength of Materials,	
Theory of Construction,	J. Galbraith, M.A., Professor.
Machine Design,	J. A. Duff, B.A., Lecturer.
Compound Stress,	R. W. Angus, B.A.Sc., Fellow.
Hydraulics,	
Thermodynamics and Theory of the Steam Engine,	
French,	
Drawing,	
Architecture,	C. H. C. Wright, B.A.Sc.,
Plumbing, Heating and Ventilation	Lecturer.
Mortars and Cements,	A. H. Harkness, B.A.Sc., Fellow
Brick and Stone Masonery,	
Surveying,	
Geodesy and Astronomy,	L. B. Stewart, D.T.S., Lecturer.
Spherical Trigonometry,	A. T. Laing, B.A.Sc, Acting
Least Squares,	Demonstrator.
Descriptive Geometry,	
Electricity,	
Magnetism,	T. R. Rosebrugh, M.A., Lecturer.
Dynamo-Electric Machinery,	T. A. Wilkinson, Grad. S.P.S.,
Theory of Mechanism,	Fellow.
Mechanics of Machinery,	
Rigid Dynamics,	



BLOWPIPE LABORATORY.

MINERALOGICAL COLLECTION,



Subjects Taught by the Faculty of the University.

Subjects.	Instructors.
Algebra, Euclid, Plane Trigonometry, Analytical Geometry, Calculus, Astronomy.	Alfred Baker, M.A., Professor. A. T. DeLury, B.A., Lecturer. H. J. Dawson, B.A., Fellow.
Sound, Light, Heat, Electricity and Magnetism, Hydrostatics.	Jas. Loudon, M.A., LL.D., Professor. W. J. Loudon, B.A., Demonstrator. C. A. Chant, B.A., Lecturer. J. C. McLennan, B.A., Assistant Demonstrator.
Inorganic and Organic Chemistry, Physical Chemistry.	W. H. Pike, M.A., Ph.D., Professor. W. L. Miller, B.A., Ph.D., Demonstrator. F. J. Smale, B.A., Ph.D., Lecturer.

DRAWING.

Model drawing, machines and structures, map and topographical drawing, designs and estimates, graphical calculations.

Descriptive geometry, including practical geometry plane and solid); orthographic, oblique and perspective projections; intersections of surfaces, shades and shadows, stone cutting, theory of mechanism, theory of mapping, etc.

Text-Books and Books of Reference.

Angel—Plane and Solid Geometry.

Binn—Orthographic Projection.

Church—Descriptive Geometry (*a*) (*b*).

Davidson—Projections.

Low—Machine Drawing and Design.

Millar—Descriptive Geometry.

MacCord—Lessons in Mechanical Drawing.

Reinhardt—Lettering for Draftsmen, Engineers and Students, (*b*), (*c*).

Vere Foster—Copy Book No. 10, (*a*).

Warren—Stone Cutting (*c*).

Worthen—Topographical Drawing.

SURVEYING AND LEVELLING.

LAND SURVEYING.

Chain surveys.
Compass and theodolite surveys.
Method of keeping field notes.
Determination of heights and distances.
Plotting.

LEVELLING.

Longitudinal and cross sections.
Plotting.

SETTING OUT.

Setting out straight lines and curves
Setting out levels.

MENSURATION.

Lines, surfaces and solids.
Timber, masonry, iron and earthwork.
Capacity of reservoirs, etc.

Lectures are also given on the distinctive features of Mining and Hydrographic Surveying.

Text-Books.

Brough—Mine Surveying (*b*), (*c*).
Gillespie—Higher Surveying (*b*), (*c*), (*d*).
Henck or Searle—Railway Curves (*b*), (*c*).
Johnson—Theory and Practice of Surveying.
Murray—Manual of Land Surveying (*a*).

PRACTICAL ASTRONOMY AND GEODESY.

ORDINARY COURSE.

The work included in this course is sufficient to fulfil the requirements of the final examination for Ontario and Dominion land surveyors.

In astronomy the principal subjects are the determination of time, latitude and azimuth, and the general principles of the method of

determining longitude. Practical instruction is given in the methods of taking observations.

In geodesy all surveys, computations and methods of map constructions are based upon the supposition that the earth is a sphere.

ADVANCE COURSE (FOURTH YEAR).

The work in this course is intended to fulfil the requirements of the final examinations for Dominion Topographical Surveyers. It is distinguished from the work of the ordinary course not so much by the subjects as by the degrees of refinement to which the investigations are carried.

In geodesy the earth is considered as a spheroid.

Text-Books.

Chauvenet—Spherical and Practical Astronomy.
Doolittle—Practical Astronomy.
Gillespie—Higher surveying (*b*), (*c*), (*d*).
Gore—Elements of Geodesy (*c*), (*d*).
Green—Spherical and Practical Astronomy (*c*). (*d*).
Helmert—Hohere Geodesie.
Nautical Almanac, 1900 (*c*), (*d*).

APPLIED MECHANICS.

STATICS.

The calculation of the stresses in framed structures, solid and riveted beams, arches, etc. Both graphical and analytical methods used.

THEORY OF THE STRENGTH AND ELASTICITY OF MATERIALS.

THEORY OF COMPOUND STRESS.

DESIGNING OF STRUCTURES in timber, iron and masonry—arches, retaining walls, roofs, bridges, etc.

DYNAMICS.

Representation and measurement of forces and motions.
Principles of work and energy.
Efficiency of machines. Friction.
Transmission of energy—belts, shafts, crank and connecting rod, etc.
Fly-wheels, governors.
Balancing of machinery, etc., etc.

STRENGTH OF THE PARTS OF MACHINES.

MACHINE DESIGN—

HYDRAULICS.

Discharge of water through orifices, notches, etc. Flow in pipes, and open channels. Sewerage, water-works, water-power, water-wheels, turbines, pumps, etc.

THERMODYNAMICS AND THEORY OF THE STEAM ENGINE.

Text-Books and Books of Reference.

Baker—Masonry Construction (*d*).
Billings—Heating and Ventilation.
Bodmer—Hydraulic Motors, Turbines, etc., (*d*).
Carnegie—Pocket Companion,
Carpenter—Heating and Ventilation of Buildings (*c*)
" Experimental Engineering (*d*).
Du Bois—Graphic Statics.
" Strains in framed Structures.
Gerhard—House Drainage and Sanitary Plumbing (*c*).
Greene—Trusses and Arches.
Innes—Centrifugal pumps, Turbines and Water Motors (*d*).
Johnson—Modern Framed Structures (*c*), (*d*).
" Materials of Construction (*d*).
Kennedy—Mechanics of Machinery (*b*), (*c*).

Kidder—Building Construction and Superintendence.
" Architect and Builders' Pocket Book.
Lanza—Applied Mechanics.
Low and Bevis—Machine Drawing and Design (*b*), (*c*).
Low—Machine Drawing (*a*), (*b*), (*c*).
Merriman and Jacoby—Roofs and Bridges.
Merriman—Mechanics of Materials (*b*, (*c*), (*d*).
" Hydraulics (*c*), (*d*).
Patton—Foundations (*d*).
Peabody—Thermodynamics (*d*).
" Steam Tables (d).
Rafter and Baker—Sewage Disposal in the United States.
Rankine—Applied Mechanics (*c*), (*d*).
Reuleaux—The Constructor.
Santo Crimp—Sewage Disposal Works.
Shann—Elementary Treatise on Heat (*c*), (*d*).
Trautwine – Engineer's Pocket Book.
Unwin—Elements of Machine Design (*c*).
" Testing of Materials of Construction.
Von Ott—Graphic Statics (*a*).
Williamson—Elasticity (*d*).

THEORY OF MECHANISM.

Principles of the transmission of motion without reference to force.

Pitch surfaces, spur wheels, bevel wheels, skew-bevel, wheels, trains of wheelwork, teeth of wheels, cams, cranks, eccentrics, links. bands and pulleys, hydraulic connections, frictional gearing, link motion for slide valves, etc.

Test-Books and Books of Reference.

Auchincloss—Valve and Link motions (*c*).
Goodeve—Elements of Mechanism (*b*).
Halsey—Side Valve Gears.

Kennedy—Mechanics of Machinery (*b*). (*c*).
Rankine—Machinery and Millwork.
Reuleaux—Kinematics of Machinery.

ELECTRICITY.

Instruction is given in this subject by laboratory work in the laboratories both of the School and of the University of Toronto, as well as by courses of lectures partly in the School and partly in the University.

The work comprises—

ELEMENTARY ELECTRICITY AND MAGNETISM.

MEASURING INSTRUMENTS—

Theory and uses in determining current, electromotive force, resistance of metallic and electrolytic conductors, capacity, magnetic flux, inductance, coefficient of mutual induction, etc., etc.

MATHEMATICAL THEORY OF ELECTRICITY.

APPLICATIONS OF ELECTRICITY—

Laboratory wotk and lectures on telegraph, telephone, dynamos, electric lighting; arc and incandescent systems, storage batteries, transmission of power by electricity, etc.

THEORY OF ALTERNATING CURRENT GENERATORS AND TRANSFORMERS.

Text-Books and Books of Reference.

Bedell & Crehore—Alternating Currents.
Carhart & Patterson—Electrical Measurements (*b*), (*d*).
Bedell—Principles of the Transformer (*d*).
Fleming—Alternate Current Transformers, Vol. I and II. (*d*).
Jackson—Electromagnetism and the Construction of Dynamos (*c*).

Kempe—Electrical Testing (*b*).
Loudon & McLennan—Practical Physics (*b*).
Stewart & Gee—Practical Physics.
Thompson, S.P.—Elementary Electricity and Magnetism.
" Dynamo Electric Machinery.
" Polyphase Currents.
Wiene—Dynamo Electric Machines.

ARCHITECTURE.

HISTORY OF ARCHITECTURE—
Egyptian, Assyrian and Persian.
Classic.
Romanesuque and Byzantine.
Gothic.
Renaissance.

ORDERS OF ARCHITECTURE.

HISTORY OF ORNAMENT.

PRINCIPLES OF DECORATION.

Text-books and Books of Reference.

Fergusson—History of Architecture.
Fletcher—A History of Architecture.
Gwilt—Encyclopædia of Architecture.
Leeds—Orders of Architecture (*b*).
Osborne—Art of House Planning (*d*).
Owen Jones—Grammar of Ornament.
Racinet—L'Ornement Polychrome.
Rickman—Gothic Architecture.
Sharpe—Seven Periods of Church Architecture.
Smith T. Roger—Classic and Early Christian Architecture (*a*), (*b*).
Smith, T Roger—Gothic and Renaissance (*c*).
Statham—Architecture for General Readers.
Sturgis—European Architecture.
Vignole—The Five Orders of Architecture (*b*), (*c*)

MATHEMATICS AND PHYSICS.

The Pure Mathematics included in this course is taught in the University of Toronto.

The Applied Mathemathics is taught partly in the University and partly in the school.

Text-Books and Books of Reference.

Ganot—Physics (*b*.
Hall & Knight—Plane Trigonometry (*a*.
Loomis—Calculus (*b*.
Louden & McLennan—Practical Physics (*b*).
Mackay—Elements of Euclid (*a*).
Newcomb & Holden—Astronomy (*b*).
Osborne—Calculus.
C. Smith—Conic Sections (*a*).
Hamblin Smith—Hydrostatics (*b*).
Balfour Stewart—Heat.
Todhunter—Algebra (*a*.
" Spherical Trigonometry (*b*).
Tyndall—Sound.

CHEMISTRY.

COURSES IN THE SCHOOL OF PRACTICAL SCIENCE.

Elementary chemistry.
Applied chemistry.
The chemistry of combustion, fuels, furnaces, artificial lighting, explosives, photography, building materials, water, air, sewage, chemical manufactures.
Laboratory work, including technical analysis, the analysis of food, water and air, and toxicology.

COURSES IN THE UNIVERSITY OF TORONTO.

Inorganic chemistry.
Organic chemistry.
Chemical theory.
Physical chemistry

Text-Books and Books of Reference.

Allen—Commercial Organic Analysis.
Beilstein—Organic Chemistry.
Bloxam—Chemistry.
Bloxam & Blount—Chemistry for Engineers and Manufacturers.
Blyth, A. W.—Poisons.
Blyth, A. W.—Foods.
Bolley—Handbuch der Chemischen Technologie.
Douglas & Johnston—Qualitative Analysis.
Fresenius—Qualitative and Quantitative Analysis.
Jones—Practical Chemistry.
Meyer—Modern Theories of Chemistry.
" —History of Chemistry.
Miller & Smale—Qualitative Analysis.
Miller, W. A.—Elements of Chemistry.
Ostwald—Lehrbuch der Allgemeinen Chemie.
Ostwald—Outlines of General Chemistry.
Pattison Muir—Thermo-Chemistry, Elements of.
Post—Chemisch-technsiche Analyse.
Remsen—Inorganic Chemistry.
Richter—Inorganic Chemistry.
Roscoe & Schorlemmer—Treatise on Chemistry.
Sadtler—Organic and Applied Chemistry.
Sutton—Volumetric Analysis.
Thomson—History of Chemistry.
Thorpe—Dictionary of Applied Chemistry.
Van't Hoff—Chemistry in Space
Von Meyer & Jacobson—Lehrbuch der Organischen Chemie.
Wagner—Chemical Technology.
Watt—Dictionary of Chemistry.
Winkler—Gas Analysis.
Wurtz—History of Chemical Theory.
" —Atomic Theory

MINERALOGY, GEOLOGY, MINING AND METALLURGY.

1. Mineralogy and Geology.
   - Mineralogy and crystallography
   - Geology and palæontology.
   - Petrography.
   - Physical geography.
   - Blowpipe analysis.
   - Determinative mineralogy.

2. Mining and metallurgy.
   - Mining geology.
   - Ore dressing.
   - Metallurgy of iron and steel.
   - Metallurgy of nickel, copper, silver, etc.
   - Assaying.
   - Milling.

Text-Books and Books of Reference.

Balling—Metallhuettenkunde.
Chapman or Brush—Mineral Tables.
Chapman—Mineralogy and Geology of Canada.
Dana—Manual of Geology.
Geikie—Text-Book of Geology.
Harker—Petrography.
Ihlseng—Manual of Mining.
Kemp—Handbook of Rocks.
Kemp—Ore Deposits of the United States.
Kühnhardt—Ore Dressing.
Mitchell—Assaying by Crookes.
Nicholson—Palæontology.
Phillips—Ore Deposits.
Phillips and Bauerman—Elements of Metallurgy.
Plattner—Manual of Blowpipe Analysis.
Roberts-Austen—Metallurgy.
Rosenbusch—Petrography.
Schnabel—Allgemeine Huettenkunde.

VACATION WORK.

THESIS AND CONSTRUCTION WORK.

A subject is given at the end of each session on which the student is required to write a thesis accompanied by drawings and specifications (when necessary) during the subsequent vacation.

The engineering and achitectural students are also required to make, during the vacation, full and clear notes of various constructions that may fall under their notice.

The value of both the thesis and the construction notes is taken into account in determining standing at the next following examination.

CIVIL ENGINEERING.

SUBJECT OF THESIS FOR SECOND YEAR.—City Streets and Pavements

" THIRD YEAR.—Sewers and Sewerage Systems.

Books of Reference.

Byrne—Highway Construction.
Judson—City Roads and Pavements.
Rafter and Baker—Sewage disposal in the United States.

MINING ENGINEERING.

SUBJECT OF THESIS FOR SECOND YEAR.—Ore Dressing.

" THIRD YEAR.—Mining.

Books of Reference.

Kuhnhardt—Ore Dressing in Europe.
Ihlseng—Manual of Mining.

MECHANICAL AND ELECTRICAL ENGINEERING.

SUBJECT OF THESIS FOR SECOND YEAR.—Machine-shop Practice.

" THIRD YEAR.—Foundry Practice.

Books of Reference.

Rose—Practical Machinist.
West—American Foundry Practice.
Spretson—Casting and Founding.

ARCHITECTURE.

For the Second year the following set of freehand pencil sketches is required :

I. Doorway from the object.
II. Staircase "
III. Fireplace with cross section.

And seven sheets from the object, prints or drawings, with plans and sections where possible.

SUBJECT OF THESIS FOR SECOND YEAR.—The above sketches.
" THIRD YEAR.—Twelve water-color studies

ANALYTICAL AND APPLIED CHEMISTRY.

SUBJECT OF THESIS FOR SECOND YEAR.—Sulphuric Acid and Alkali Manufacture.
" THIRD YEAR.—Coal Tar Products.

Books of Reference.

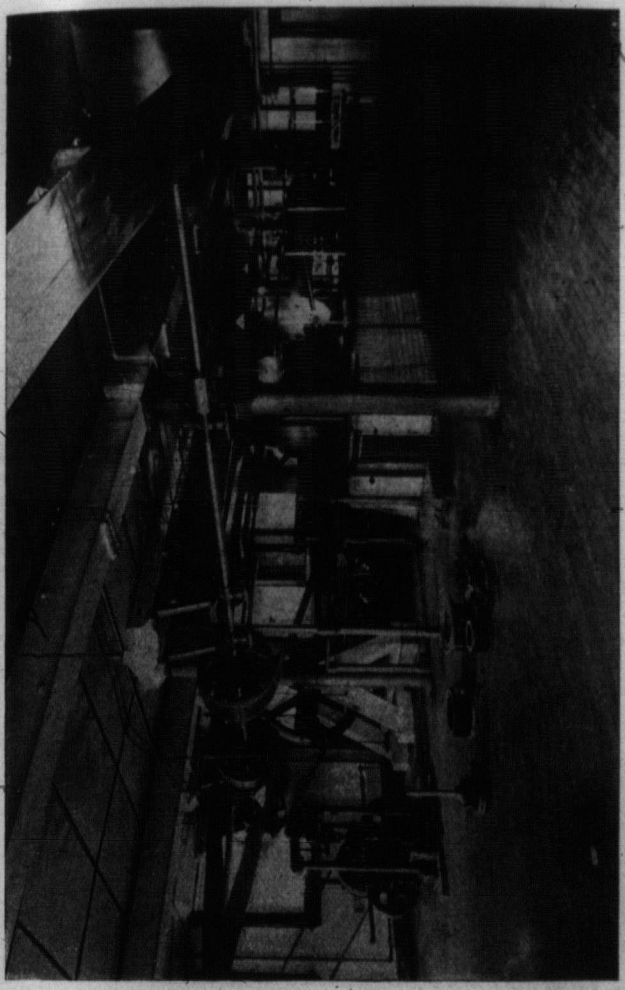
Lunge—Manufacture of Sulphuric Acid and Alkali.
Wagner—Chemical Technology.
Thorpe—Dictionary of Applied Chemistry.

Any other works on the above subjects may be consulted and results of original observations should be given.

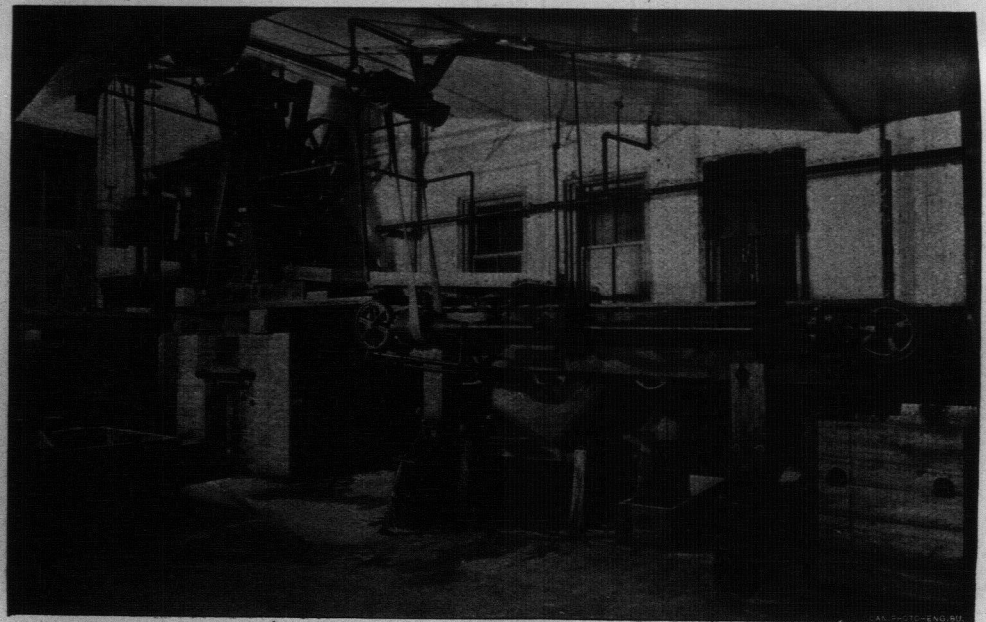
ENGINEERING LABORATORY.

This Laboratory occupies two floors, having a total area of 10,000 square feet. It consists of three departments, viz.;—

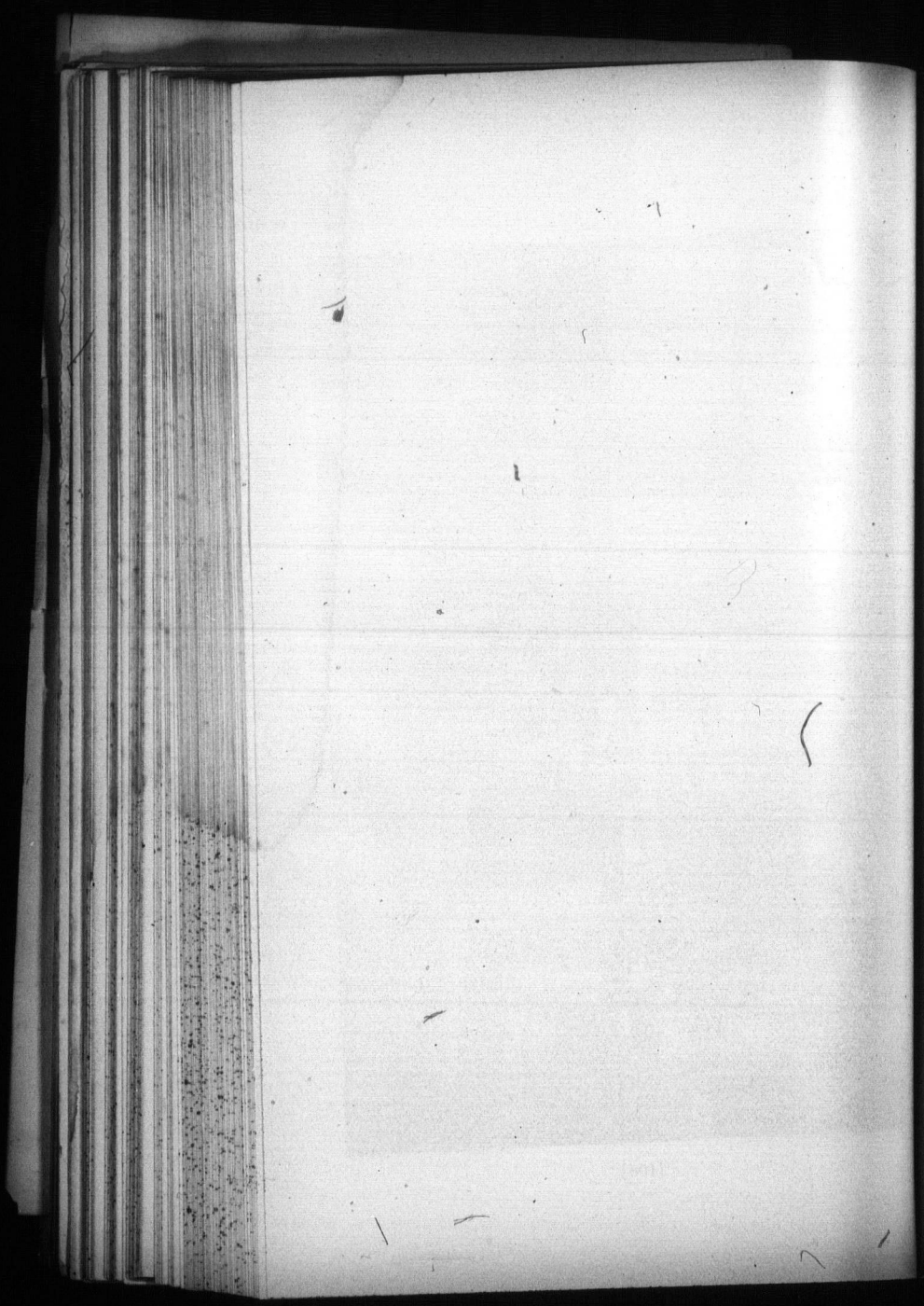
(*a*) The departments for testing materials of construction.



EXPERIMENTAL ENGINE.



STAMP MILL.



(*b*) The department for investigating the principles governing the application of power. This department is sub-divided into the steam laboratory, the hydraulic laboratory and electrical laboratory.

(*c*) The department for investigating problems connected with standards of length, time, astronomical observations, etc.

In order to prepare specimens for the testing machines, a shop has been fitted up with a number of high-class machine tools specially suited for reducing the specimens to the requisite shapes and dimensions with a minimum of hand labor. It is also supplied with the necessary appliances for making ordinary repairs.

The machines in the department for testing materials are the following :

An Emery 50-ton machine, built by Wm. Sellers & Co., of Philadelphia, for making tests in tension and compression.

A Riehle 100-ton machine for making tests in tension, compression, shearing and cross-breaking. It will take in posts twelve feet long and beams up to eighteen feet in length.

A Riehle 20,000-pounds Universal testing machine.

An Olsen torsion machine for testing the strength and elasticity of shafting. This machine will twist shafts up to sixteen feet in length and two inches in diameter.

A Riehle transverse testing machine of 5,000 pounds capacity. This machine will take specimens up to forty-eight inches in length.

A Riehle 2,000, and a Riehle 600 pounds cement testing machine. The cement testing-room is fitted with all the usual accessories.

The equipment of the power department is as follows :

A Babcock and Wilcox 52-h.p. boiler.

A Harrison-Wharton 12-h.p. boiler.

A 50-H.P. Brown engine. This engine was constructed specially for experimental investigation. It is steam jacketted and has three alternative exhausts, to the open air, to a jet condenser, and to a Wheeler surface condenser, kindly presented to the school by Mr. F. M. Wheeler, of New York, the inventor.

There are also a Blake circulating pump, a Knowles air pump, and a Blake feed pump, the latter of which was a gift from the manufacturers.

A machine for testing lubricating oils and measuring journal friction, built by Riehle Bros. of Philadelphia.

The hydraulic division of the laboratory is furnished with a three-throw pump with double acting cylinders. It has a capacity of 500,000 gallons per 24 hours. There are also large tanks furnished with orifices and weirs, measuring tanks, etc. A three foot jet turbine, a nine-inch McCormick, and a six-inch New American turbine, the latter the gift of the firm of William Kennedy & Sons, Owen Sound, form a part of the same equipment.

The power department is equipped with the usual measuring instruments, indicators, gauges, gauge testing apparatus, scales, brakes, dynamometers.

The shafting is driven by a 7-h.p. Otto gas engine, a 20 kw. Edison motor, and the Brown engine above described.

In the geodetic and astronomical department are a 100-foot and a 66-foot standard of length; a 10-foot Rogers comparator with a graduating attachment; a Kater's pendulum; a Howard astronomical clock and electro-chronograph; a Troughton & Simms 10-inch theodolite, and all the ordinary surveying instruments.

ELECTRICAL LABORATORY.

The first section of this laboratory is the engineering division, in which a 20 kilowatt motor furnishes power to drive several continuous current dynamos, series, shunt and compound wound, bipolar and multipolar, an alter-

nator, and the rotary transformer when used as polyphase dynamo. There are direct current motors of 6 H.P. and 3 H.P., (Edison and Crocker Wheeler), a rotary converter which may be run as a motor from the continuous current circuit and supply either three phase or two phase alternating currents, a three phase induction motor, and smaller motors, of which one is for alternating current.

On the walls, besides rheostats, are four types of transformers, Westinghouse, Stanley, Wagner and Thomson-Houston, and recording meters for continuous and alternating currents. Arc lamps of eight types, are hung arouud the laboratories, including the Manhattan incandescent arc lamp, Ward, Universal, Thomson-Houston, Ball, an alternating current arc, and the Turbayne, the latter a gift from Mr. W. A. Turbayne.

There are two sets of "Chloride" accumulators available for testing purposes.

A new switchboard has recently been constructed which affords every facility for interconnection of circuits and carries measuring instruments which may be readily introduced into any circuit.

A Thomson balance, a multicellular electrostatic voltmeter, and an high potential electrostatic voltmeter, a Siemen's electrodynamometer, and standard Weston voltmeters, ammeters and wattmeters furnish the means either of accurate observation or for standardizing of instruments for ordinary use. These are generally used in a separate room to which connection is made.

The second section of the electrical laboratory is a room 24 by 49 ft., in another part of the basement, from which iron has as far as possible been removed. Here ten masonry piers support galvanometers, an electrometer, and other mirror reflecting instruments, and testing work can be done free from disturbing influences.

Fume cupboards and sinks have been provided for work with galvanic and storage cells ; the room is also supplied with Wheatstone bridges, Kohlrausch apparatus for electrolytes, standard divided microfarad condenser, Clark cells and other apparatus. Wires leading from this room to the switchboard allow measurements to be made here in connection with experiments in the other laboratory.

Connections to the 110-volt circuit of the city are accessible in all the rooms.

THE CHEMICAL LABORATORIES.

The Qualitative Laboratory affords accommodation for about forty students working at one time. The working tables are supplied with water and gas, and there is a fume cupboard within easy reach of each. A complete set of apparatus is supplied to each student on payment of the deposit prescribed.

The Quantitative Laboratories will accommodate about twenty students. They are furnished with convenient work tables and fume cupboards, and are supplied with the most recent apparatus for gravimetric, volumetric and gasometric analysis, both scientific and technical.

The apparatus includes a number of excellent balances by the best makers, furnaces for fusion, etc., and for organic combustions for experimental vacuum pan, and filler press.

A very complete set of apparatus for technical gas analysis ; all requisites of the assay of ores and furnace products in the wet way ; the latest forms of Fischer's and Mahler's apparatus for the determination of the heating power of fuel ; facilities for the electrolytic determination of metals, including a Gulcher's thermoelectric pile, spectroscopes, polariscopes, microscopes, and, in short, all the apparatus required for a thorough course in analytical chemistry and assaying

BLOWPIPE LABORATORY.

This laboratory will accommodate a class of thirty-six students, and is supplied with all the equipment required for qualitative and quantitative blowpipe work.

ASSAYING LABORATORY.

This laboratory is equipped with three gas crucible furnaces, three gas muffle furnaces, two gas roasting furnaces, three charcoal crucible furnaces, and one charcoal cupel furnace, a Taylor hand crusher, Blake laboratory crusher, a muller and all other necessary appliances for pulverizing and preparing ores for fire assay. Adjoining the assay laboratory is a room with a lathe for preparing rock sections for examination under the microscope ; also the necessary appliances for making rock sections by hand. Four petrographical microscopes are reserved for the use of advanced students in lithology.

MILL ROOM.

This room contains a Dodge crusher, a Tulloch ore feeder, a Fraser and Chalmers three-stamp mill, with amalgamated silvered copper plates, and a Frue Vanner. The concrete floor of the mill room provides ample space for sampling lots of ore of one or two tons. The machinery is driven by an 8-horse-power Edison motor, which is supplied with current from the city circuit. The mill room is also provided with settling tanks for the tailings and concentrates.

With this plant a complete mill test can be made of a ton or more of ordinary mill ore, thus affording an opportunity to those desiring it, of having a test made under conditions similar to those of actual practice, and upon a larger scale than that of an assay of a few pounds.

The mill room affords the student an excellent opportunity of studying milling, as all the machines in use are of the same construction as those employed in the best large mills.

Two other rooms have been fitted up with a reverberatory furnace for roasting sulphide and arsenical ores; leaching vats for treating ores by the cyanide process and a chlorination plant.

This completes the equipment for treating gold ores, and makes it possible to extract the gold from the concentrates saved by the Frue Vanner.

PHYSICAL LABORATORY.

University of Toronto.

The Physical laboratory in connection with the University of Toronto is furnished with a large collection of apparatus for lecture experiments in the departments of mechanics, sound, light, heat and electricity. It is also well supplied with instruments of precision for individual work in the same departments. In addition to an elementary laboratory, there are several special laboratories which offer unusual facilities for the conduct of experiments in the various branches of physics.

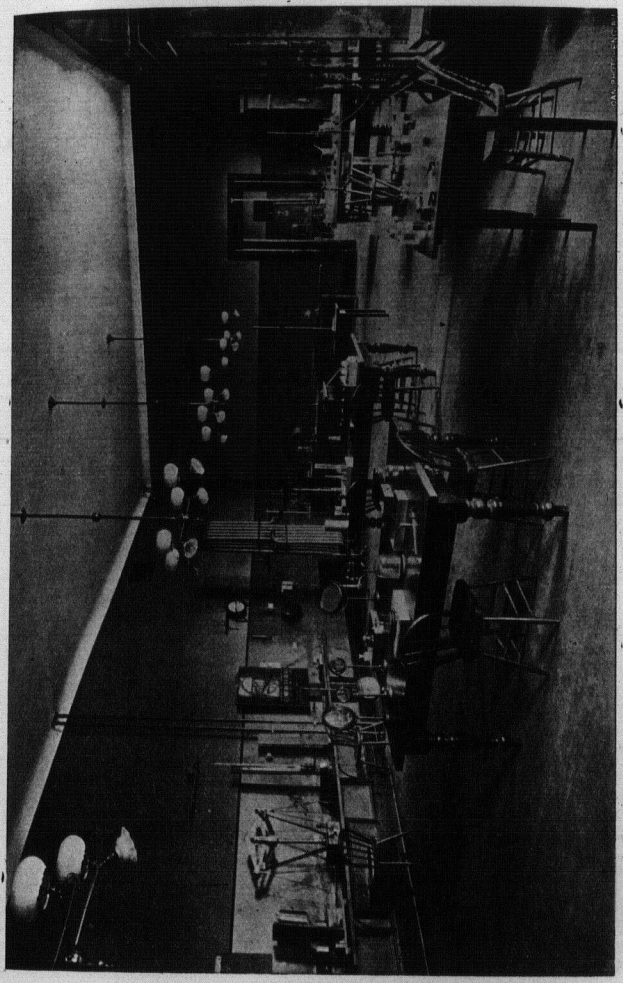
The electrical apparatus includes electrometers, galvanometers, resistance coils and bridges, testing keys, batteries, electrical machines (Holz and Carre, Ruhmkorff coils, Crookes' tubes, telephones, etc.

MODERN LANGUAGES.

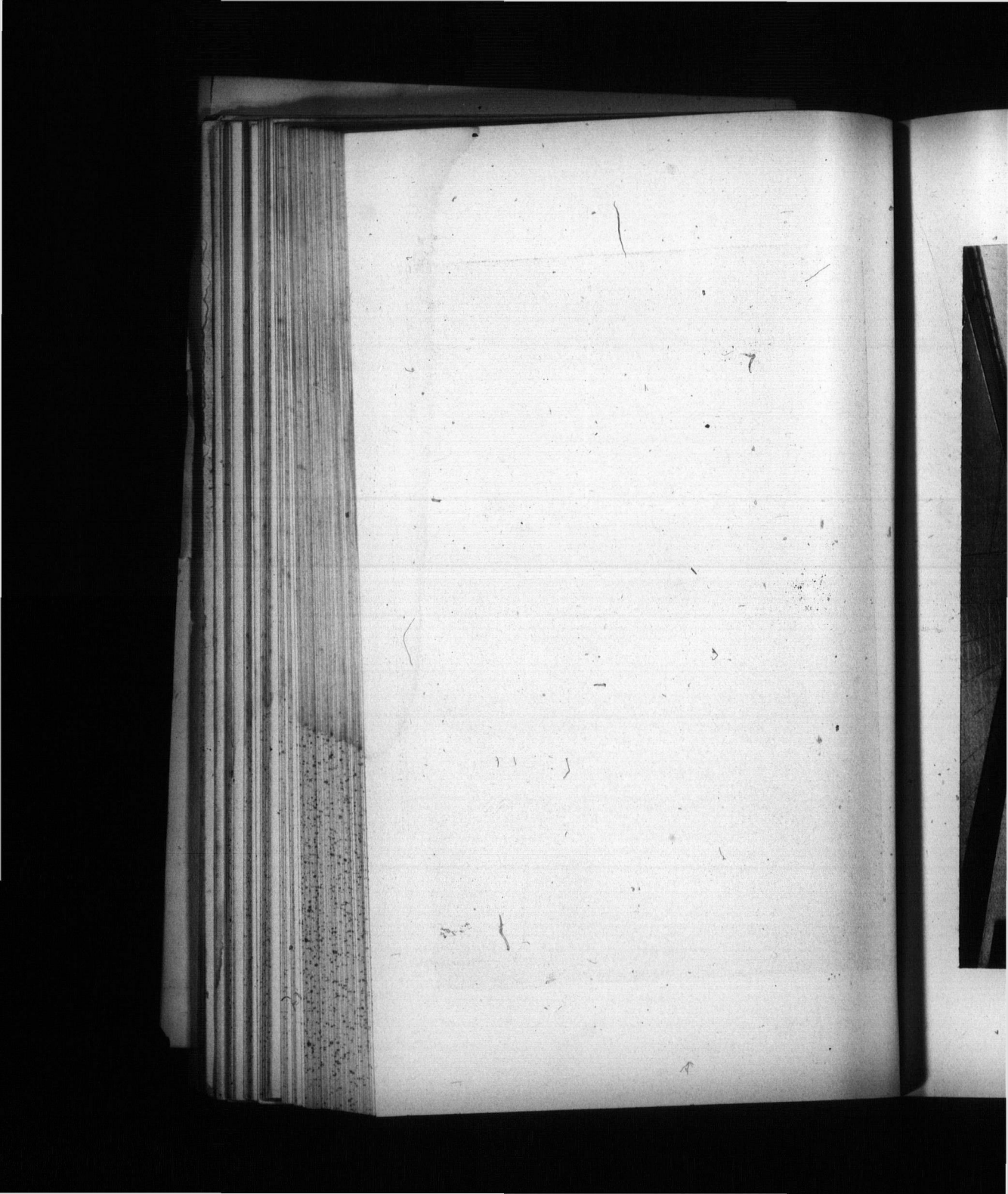
No special examinations are held in these languages except in the Fourth Year, but it is expected that every student in a regular course should be able to acquaint himself with the contents of any of the works necessary to his profession, written in these languages. Such books may be prescribed for the terminal examinations.

LIBRARY.

The library is supplied with a number of the more important scientific and technical periodicals. A valuable collection of works of reference on the subjects of study pursued in the School has been formed and is being added to year by year.



ELEMENTARY PHYSICAL LABORATORY (UNIVERSITY OF TORONTO).



ARCHITECTURAL LECTURE ROOM.

MUSEUMS.

The Geological Museum, includes collections of minerals, rocks, and fossils. There is a large general collection of minerals classified in the usual manner, and intended for comparison and reference in advanced classes; but special attention is paid to the extensive collection of Ontario minerals, which, with few exceptions, contains all the species known in the province, and is particularly rich in examples of economic minerals. The Ontario collection is constantly being added to and is believed to be as complete as any in the Dominion.

Adjoining the mineral collection is a series of ores of all descriptions. Particular prominence is given to the gold and silver ores of Canada, especially the Ontario gold ores.

The rocks also are arranged in two collections, one a large general collection from foreign localities, containing massive, schistose and sedimentary rocks; the other, a set of Canadian rocks, especially complete in typical country rocks from important ore deposits. An extensive set of thin sections enables advanced students to study both rock collections microscopically.

The paleontological collection consists of fossils and casts, including the chief typical forms needed for determining the age of sedimentary rocks.

A number of wall cases have been prepared for a collection of specimens illustrating industrial chemistry, and a beginning made toward arranging the materials on hand.

In a separate room there is an interesting collection of dressed building and ornamental stones from various parts of Ontario, serving as illustrations in the architectural department.

EXCURSIONS.

Opportunities to visit mines in actual operation will be afforded, when possible, to students in the third and fourth years These excursions will be made in the early part of October provided suitable arrangements can be made with the proprietors. Applications to join such excursions must be sent to the Secretary on or before September 15th.

THE ENGINEERING SOCIETY OF THE SCHOOL OF PRACTICAL SCIENCE.

Officers for 1898-9.

President ..... W. E. H. CARTER.
Vice-President ..... T. SHANKS.
Recording Secretary ..... F. W. THOROLD.
Treasurer ..... G. POWER.
Corresponding Secretary ..... R. LATHAM.
Editor ..... J. W. BAIN, B.A.Sc.
Librarian ..... W. W. VAN EVERY.
Assistant Librarian ..... G. HUNT.
Graduates' Representative ..... W. H. BOYD.
Fourth Year do ..... W. F. GRANT.
Third Year do ..... G. HALL.
Second Year do ..... H. S. HOLCROFT.
First Year do ..... J. P. RIGSBY.

The Society meets every second Wednesday during the Academic Year. Papers are read and discussions are held on engineering subjects. The Society subscribes for the leading engineering journals for the use of the students, and publishes a pamphlet annually, containing the best papers read before the Society.

SESSION 1898-9.

STUDENTS IN ATTENDANCE.

FIRST YEAR.

Regular Students.

1. Barrett, R. H .....Gesto.
3 Batt, T. W .....West Toronto Junction.
3. Beatty, W. G .....Fergus.
3. Bell, J. W .....St. George.
3. Benson, T. B. F .....Port Hope.
3. Bertram, G. M .....Toronto.
3. Bowes, W. J .....Toronto.
3. Brandon, E. T .....Toronto.
3. Brereton, W. P .....Bethany.
3. Broughton, J. T .....Harriston.
3. Chace, W. G .....St. Catharines.
3. Christie, A. G .....Manchester.
3. Cockburn, J. R .....Toronto.
2. Conlon, F. T .....Thorold.
1. Denison, F. C .....Toronto.
1. Duff, W. A .....Hamilton.
2. Eason, D. E .....Keene.
2. Forbes, D. L. H .....Toronto.
3. Fotheringham, J. M ....Bethany.
3. George, R. E .....Port Elgin.
3. Gibson, N. R .....Toronto.
2. Hamer, A. T. E .....Bradford.
1. Harvey, C .....Indian Head.
3. Laidlaw, A .....Durham.
3. Larkworthy, W. J .....Mitchell.
3. McCallum, G. C .....Welland.

3. McMaster, A. T. C ....Toronto.
1. McMillan, G. .....South Finch.
3. McVean, H. G .....Dresden.
1. Morley, R. W.....Waterloo.
3. Mustard, W. A.....Brucefield.
3. Pinkerton, W. T.....Lloydtown.
3. Rigsby, J. P .....Toronto.
1. Roberstson, D. F.. ....Almonte.
1. Rust, H. P .....Toronto.
3. Sauer, M. V.....Toronto.
4. Shepherd, W. F..... St. Marys.
1. Sill, A. J.....Jarvis.
3. Stevenson, W. H.....Lancaster.
3. Sutherland, W. H .....Toronto.
1. Twiss, A. T .. ..Glencoe.
3. Wolverton, A. N .....Lindsay.
3. Zahn, H. J .....Stratford.

Non-Regular Students taking full courses.

1. Alison, J. G. R .....Toronto.
2. Anderson, A. W.....Sutton West.
3. Armstrong, H. J..... .Markdale.
3. Beatty, F. R.....Toronto.
5. Beardmore, W. W.....Toronto.
5. Bochmer, C H.....Berlin.
2. Bolger, E. B..... .....Lindsay.
3. Dawson, C. N .....Peterboro'.
3. Elwell, W. J .....Toronto.
3. Evans, W. F ..... Toronto.
1. Fuller, W. J .....Leamington.
1. Gagne, L.....St. Joseph d'Alma, P.Q.
2. Henry, J. S .....Toronto.
2. Jackson, F. C.....Seaforth.
2. Knight, R .....Bruce Mines.
3. Lacher, B. H .....Toronto.
3. Lytle, C. W.....Toronto.

3. Mace, F. G ..... Toronto.
1. Macdonald, W. R ..... Toronto.
1. MacLennan, A. L ..... Toronto.
3. Mason, H. C ..... Potsdam, N.Y., U.S.
3. Minnie, R. S ..... Toronto.
3. Mitchell, C. H ..... Enniskillen.
4. Pickett, A. B ..... St. John, N.B.
3. Reid, T ..... Toronto.
1. Ritchie, G. F ..... Toronto.
3. Thompson, W. J ..... Carberry, Man.
1. Vassar, A. W ..... Toronto.
3. Wanless, A. A ..... Toronto.
2. Wilkin, J. F ..... Toronto.

SECOND YEAR.

2. Ardagh, E. G. R ..... Toronto.
3. Barley, J. H ..... Mitchell.
2. Boswell, M. C ..... Peterboro'.
2. Burd, J. H ..... Parry Sound.
3. Clark, J ..... St. Helens.
1. Clarke, F. F ..... Deer Park.
3. Clarke, N ..... Toronto.
1. Davison, J. E ..... Toronto.
3. Dickinson, E. D ..... Barrie.
3. Dickson, G ..... Toronto.
2. Dixon, H. A ..... Eglington.
2. Fullerton, C. H ..... Atwood.
3. Guest, W. S ..... Elginfield.
3. Henderson, S. E. M ..... London.
3. Henry, J. A ..... St. Ives.
2. Holcroft, H. S ..... Toronto.
2. Hunt, G. A ..... Galetta.
3. Johnston, H. A ..... Toronto.
2. Johnston, J. A ..... Pefferlaw.
3. Johnston, J. C ..... Toronto.
3. Lumbers, W. C ..... Toronto.

2. Mackenzie, J. R.....Toronto.
2. McArthur, R. E.....Toronto.
2. McMillan, J. G .....Dutton.
2. Matheson, W. C .....Milton.
3. Middleton, H. T.....Toronto.
3. Miller, L. H .....Aylmer, Ont.
2. Morrison, J. A .....Winthrop.
2. Neelands, E. V .....Lindsay.
1. Phillips, E. H .....Tilsonburg.
1. Power, G. H .....Toronto.
3. Price, H. W .....Brampton.
2. Roaf, J. R .....Toronto.
2. Saunders, H. W.....Petrolea.
2. Smith, A. H .....Toronto.
1. Tennant, W. C.....Toronto.
2. Thorne, S. M .....Toronto.
1. Thorold, F. W .....Toronto.
1. Weir, H. M.....Brantford.
3. Withrow, F. D .....Toronto.

THIRD YEAR.

1. Allan, J. L .....Halifax, N. S.
3. Barber, T.....Meaford.
1. Bray, L. T .....Amherstburg.
2. Burnside, T .....Deer Park.
3. Chubbuck, L. B .....Ottawa.
2. Clothier, G. A .....Kemptville.
1. Cooper, C .....Hampden.
2. Coulthard, R. W .....Toronto.
3. Craig, J. A .....Port Hope.
2. Elliot, J. C .....Kelso.
3. Foreman, W. E .....Walkerville.
3. Guy, E .....Columbus.
3. Hall, G. A .....Washington.
3. Hare, W. A.....Dartmouth, N. S.

3. Hemphill, W .....Toronto.
1. Latham, R .....Eglington.
2. Monds, W .....Caledon, East.
1. Patterson, J .....Thamesford.
2. Perry, F. M .....Toronto.
3. Pope, A. S. H .....Toronto.
2. Revell, G. E .....Woodstock.
3. Richards, E .....Brockville.
3. Rounthwaite, C. H. E...Collingwood
3. Saunders, G. A .....Petrolea.
1. Shanks, T .....Mouse, Creek.
1. Tennant, D. C .....Toronto.
3. Van Every, W. W .....Petrolea.
3. Wagner, W. E .....Toronto.
2. Watt, G. H .....Walkerton.
1. Willson, R. D .....Toronto.
3. Yeates, E .....London.

FOURTH YEAR.

Boyd, W. H .....Toronto.
Carter, W. E. H... ....Toronto.
Grant, W. F .....Toronto.
Kormann, J. S .....Toronto.
Shipley, A. E .....Cheltenham.
Williamson, D. A .....Jarvis.

Occasional Students.

Anglin, B .....Toronto.
Davidson, J. L .....Toronto.
Hamilton, T. E .....Fergus.
Manning, W. M .....Spokam, U. S.
Ross, D. A .....Toronto.
Swannell, F. C .....Toronto.

PRIZEMEN.

Engineering.

1879.—	I. Year	J. McAree	1st prize.
1880.—	II. Year	J. L. Morris	1st prize.
1881.—	I. Year	G. H. Duggan	1st prize.
	II. Year	D. Jeffrey	1st prize.
1882.—	I. Year	A. R. Raymer	1st prize.
	I. Year	E. W. Stern	2nd prize.
	II. Year	G. H. Duggan	1st prize.
	III. Year	D. Jeffrey	1st prize
1883.—	I. Year	B. A. Ludgate	1st prize.
	I. Year	A. M. Bowman	2nd prize.
	II. Year	A. R. Raymer	1st prize.
	II. Year	E. W. Stern	2nd prize.
	III. Year	G. H. Duggan	1st prize.
1884.—	II. Year	B. A. Ludgate	1st prize.
	III. Year	E. W. Stern	1st prize.
	III. Year	A. R. Raymer	2nd prize.
1885.—	I. Year	A. F. Lott	1st prize.
	I. Year	J. Roger	2nd prize.
	II. Year	T. K. Thomson	1st prize.
	III. Year	B. A. Ludgate	1st prize.
1886.—	I. Year	C. H. C. Wright	1st prize.
	I. Year	J. E. Ross	2nd prize.
	II. Year	A. E. Lott	1st prize
1887.—	I. Year	H. E. T. Haultain	1st prize.
	II. Year	C. H. C. Wright	1st prize.
	III. Year	A. E. Lott	1st prize.
	III. Year	J. Roger	2nd prize.
1888.—	I. Year	E. B. Merrill	1st prize.
	I. Year	F. M. Bowman	2nd prize.
	II. Year	D. D. James	1st prize.
	III. Year	C. H. C. Wright	1st prize.

1889.— I. Year.....J. K. Robinson.....1st prize.
I. Year.....G. E. Silvester.....2nd prize.
II. Year.....E. B. Merrill.....1st prize.
II. Year.....F. M. Bowman.....2nd prize.
III. Year.....D. D. James.....1st prize.

1890.— I. Year.....C. Fairchild.....1st prize.
II. Year.....J. K. Robinson.....1st prize.
III. Year.....F. M. Bowman.....1st prize.
III. Year.....E. B. Merrill.....2nd prize.

1891.— I. Year.....A. J. McPherson.....1st prize.
I. Year.....R. B. Watson.....2nd prize.
II. Year.....J. B. Goodwin.....1st prize.
III. Year.....G. E. Silvester.....1st prize.
III. Year.....C. W. Dill.....2nd prize.

1892.— I. Year.....A. E. Bergey.....1st prize.
I. Year.....R. W. Angus.....2nd prize.
II. Year.....A. J. McPherson.....1st prize.
II. Year.....R. B. Watson.....2nd prize.
III. Year.....E. J. Laschinger.....1st prize.
III. Year.....C. Fairchild.....2nd prize.

The grant for prizes was withdrawn at the close of 1892.

Architecture.

The prizes in Architecture is the gift of Mr. D. B. Dick, Architect, Toronto.

1891.— I. Year.....H. Ballantyne.
1892.— I. Year.....J. A. Ewart.
1893.— I. Year.....A. Harkness.
1894.— I. Year.....E. A. Forward.
1895.— I. Year.....W. F. Scott.
1896.— I. Year.....D. Mackintosh.

Civil Engineering.

The prize in Civil Engineering is the gift of Mr. T. Kennard Thomson, C.E., New York.

1897.—III. Year.....M. B. Weekes.
1898.—III. Year.....J. A. Stewart.

Mechanical and Electrical Engineering.

Donor, Mr. F. A. Riehle, Philadelphia.

1897.—III. Year.....A. T. GRAY.
1898.—III. Year.....F. C. SMALLPIECE.

Certificates in Mining and Metallurgy.

Date of certificate.	Name.	Date of certificate.	Name.
1896..	Johnson, G.	1896..	Tye, A. F.
1898..	McMillan, A. N.	1897..	Webster, E. B.

Certificate in Electricity.

Date of certificate.	Name.
1896.....	Sifton, E. I.

UNIVERSITY OF TORONTO.

Degree of Bachelor of Applied Science (B.A.Sc.)

Date of admission.	Name.	Date of admission.	Name.
1893..	Alison, T. H.	1893..	Lawson, W.
1897..	Angus, R. W.	1893..	Lea, W. A.
1896..	Armstrong, J.	1894..	McAllister, A. L.
1897..	Bain, J. W.	1895..	McAllister, J. E.
1894..	Ballantyne, H. F.	1893..	McAree, J.
1895..	Beauregard, A. T.	1897..	Macallum, A. F.
1896..	Brodie, W. M.	1893..	McEntee, B.
1895..	Bucke, W. A.	1896..	McGowan, J.
1898..	Carpenter, H. S.	1896..	McKinnon, H. L.
1898..	Charlton, H. W.	1894..	McPherson, A. J.
1894..	Chewett, H. J.	1895..	McTaggart, A. L.
1896..	Dobie, J. S.	1897..	Macbeth, C. W.
1897..	Elliott, H. P.	1897..	Martin, T.
1895..	Ewart, J. A.	1894..	Merrill, E. B.
1894..	Goodwin, J. B.	1893..	Milne, C. G.
1898..	Gray, A. T.	1896..	Mines, W. H.
1897..	Haight, H. V.	1895..	Minty, W.

1897..Harkness, A. H.
1895..Herald, W. J.
1896..Hull, H. S.
1894..James, D. D.
1893..James, O. S.
1895..Job, H. E.
1895..Johnson, S. M.
1895...Johnston, A. C.
1894..Keele, J.
1894..Laidlaw, J. T.
1893..Laing, A. T.
1893..Laschinger, E. J.
1894..Mitchell, C. H.
1898..Robinson, A. H. A.
1895..Shields, J. D.
1894..Speller, F. N.
1898..Smillie, R.
1894..Squire, R. H.
1898..Stull, W. W.
1893..Thomson, R. W.
1896..Tremaine, R. C. C.
1898..Weekes, M. B.
1893..Wright, C. H. C.

Degree of Civil Engineer (C.E.)

Date of admission.	Name.	Date of admission.	Name.
1898	Alison, T. H.	1895	McAllister, J. E.
1898	Ashbridge, W. T.	1898	Mitchell, C. H.
1895	Bowman, A. M.	1896	Moore, J. E. A.
1893	Bowman, F. M.	1885	Morris, J. L.
1892	Chewett, H. J.	1892	Thomson, T. K.
1893	Innes, W. L.	1894	Tyrrell, H. G.
1886	Kennedy, J. H.	1889	Tyrrell, J. W.

Degree of Mining Engineer (M.E.)

Date of admission.	Name.
1897	Bucke, M. A.

Degree of Electrical Engineer (E.E.)

Date of admission.	Name.
1896	Ross, R. A.

GRADUATES.

NOTE.—Graduates are requested to inform the Secretary of changes in their addresses.

Year.	Dept.	Name.	Address.
1892..	1	Alison, T. H., B.A. Sc., C.E., Assistant Engineer	Augustus Smith & Co., 39, 41 Cortlandt St., New York.
1892..	1	Allan, J. R., O.L.S.	Renfrew, Ont.
1892..	1	Anderson, A. G	Port Dover, Ont.
1897..	2	Andrewes, E., Assistant Assayer	War Eagle Mine, Rossland, B.C.
1894..	3	Angus, R. W., B.A.Sc., Fellow in Mechanical Engineering	School of Practical Science, Toronto.
1888..	1	Apsey, J. F., O.L.S., Resident Engineer Baltimore Belt R. R.	2125 N. Congress St., Baltimore, Md.
1893..	1	Ardagh, J. A., Town Engineer	Barrie, Ont.
1895..	1	Armstrong, J., B.A.Sc., Hydraulic Engineer	Kakabeka Power Co., Port Arthur.
1888..	1	Ashbridge, W. T., C.E.	Toronto, Ont.
1896..	2	Bain, J. W., B.A.Sc., Fellow in Mining Engineering	School of Practical Science, Toronto.
1888..	1	Ball, E. F., A.M. Can. Soc. C.E., Surveyor and Consulting Engineer	Dawson, N.W.T.
1893..	4	Ballantyne, H. F., B.A.Sc.	Cady, Berg & See, New York.
1894..	1	Barker, H. F.	Orillia, Ont.
1891..	1	Beatty, H. J., O.L.S.	Pembroke, Ont.
1894..	3	Beauregard, A. T., B.A.Sc.	New England Engineering Company, Waterbury, Mass.
1894..	1	Bergey, A. E.	Riter & Conley, Allegheny, Pa.
1895..	3	Blackwood, A. E.	Sullivan Machinery Co., Claremont, N.H.
1885..	1	Bleakley, F. W.	Room 46, Sullivan Block, Seattle, W.T.
1895..	1	Boswell, E. J., O.L.S., Assistant Engineer	Crow's Nest Pass Ry., Lethbridge, B.C.
1890..	5	Boustead, W. E., B.A.Sc., deceased.	

GRADUATES.—*Continued.*

Year.	Dept.	Name.	Address.
1897..	2	Bow, J. A., Inspector of Mines for Western Ontario	Rat Portage, Ont.
1886..	1	Bowman, A.M., C.E., D. & O.L.S., Assistant Engineer Ohio River Improvement	Bellevue, Pa.
1890..	1	Bowman, F. M, C.E., O.L.S., Chief Engineer	Riter & Conley, Alleghany, Pa.
1885..	1	Bowman, H. J., D. & O.L.S, A.M. Can. Soc. C.E.	Berlin, Ont.
1894..	5	Boyd, D. G., Inspector of Mines	Michipicoten, Ont.
1898..	2	Boyd, W. H., (Post graduate course)	School of Practical Science, Toronto.
1895..	2	Brebner, G.	General Electric Co, Schenectady, N.Y.
1895.	3	Brodie, W.M., B A.Sc., Draftsman	Pendrith & Co, Toronto, Ont.
1888..	1	Brown, D. B., O.L.S.	Ferrocarril de Cabello Blanco — Cuidad de Guatemala, Guatemala.
1888..	1	Brown, G. L., O.L.S., Town Engineer	Morrisburg, Ont.
1895..	3	Brown, L. L., Locomotive Dept.	N. Y., N. H. & H. Ry., New Haven, Conn.
1890..	1	Bucke, M. A., M.E., Mining Engineer	Tretheway & Bucke, Kaslo, B.C.
1894 .	3	Bucke, W. A., B.A.Sc.	Royal Electric Co., Montreal, P.Q.
1883.	1	Burns, D., O.L.S., Am. Can. Soc. C.E.	Keystone Bridge Co., Pittsburgh, Pa.
1887.	1	Burns, J. C., deceased.	
1896..	2	Burwash, L. T., Mining Engineer	N. A. T. & T. Co., Dawson, N.W.T.
1896..	3	Campbell, G. M.	Westinghouse Electric Mfg. Co., East Pittsburgh, Pa.
1895..	4	Campbell, R. G.	Buffalo, N.Y.
1888..	1	Canniff, C. M.	Luxfer Prism Co., Toronto, Ont.
1889..	1	Carey, B.	Engineer's Office, Toronto.
1897..	1	Carpenter, H. S., B.A.Sc.	Engineer's Office, Berlin, Ont.
1898..	2	Carter, W. E. H., (Post graduate course)	School of Practical Science, Toronto.
1894..	1	Chalmers, J., O.L.S.	Rat Portage, Ont.

GRADUATES.—*Continued.*

Year.	Dept.	Name.	Address.
1889..	1	Chalmers, W. J., Assistant Engineer Ohio River Improvement	Vanport, Pa.
1893..	1	Charlesworth. L.C., O.L.S.	Stewart & Charlesworth, Collingwood and Rat Portage.
1897	5	Charlton, H. W., B.A.Sc., Fellow in Chemistry	School of Practical Science, Toronto.
1888..	1	Chewett, H. J., B.A.Sc., Am. Can. Soc. C.E., Civil and Mining Engineer	83½ York St., Toronto.
1889..	1	Clement, W. A., Roadways Engineer	City Engineer's Office, Toronto, Ont.
1895..	3	Connor, A. W., B.A	Hamilton Bridge Co., Hamilton, Ont.
1890..	1	Corrigan, G. D. deceased.	
1898..	3	Darling, E. H	Hamilton Bridge Works, Hamilton, Ont.
1891..	1	Deacon, T. R., O.L.S., Town Engineer	Rat Portage, Ont.
1896..	2	De Cew, J. A	Arrowhead, B.C.
1891..	1	Dill, C. W., Superintendent	Clifton, Suspension Bridge, Niagara Falls, N.Y.
1895..	1	Dobie, J. S., B.A.Sc., O.L.S., Mining Engineer	Port Arthur.
1890..	1	Duff, J. A., B.A., A.M. Can. Soc. C.E., Lecturer in Applied Mechanics	School of Practical Science, Toronto.
1883..	1	Duggan, G. H., M. Can. Soc. C.E., Chief Engineer	Dominion Bridge Co., Montreal, P.Q.
1893..	1	Dunn, T. H	Morrisburg, Ont.
1896..	3	Elliott, H. P., B.A.Sc	Technical School, Toronto, Ont.
1890..	1	English, A. B	Toronto.
1894..	4	Ewart, J. A., B.A.Sc., Architect	Arnoldi & Ewart, Architects, Ottawa, Ont.
1893..	1	Fairbairn, J. M. R.	Kaslo, B.C.
1892..	1	Fairchild C., O.L.S	Brantford, Ont.
1893..	4	Fingland, W., Architect	307 W. 119th St., New York.

GRADUATES.—*Continued.*

Year.	Dept.	Name.	Address.
1893..	1	Forester, C.....	Toronto, Ont.
1897..	4	Forward, E. A., Assistant.....	Farran's Point Canal, Ont.
1893.	1	Francis, W. J., A.M. Can. Soc. C.E., Staff of Trent Canal.....	P. O. Box 228, Peterboro' Ont.
1890..	1	Garland, N. L.....	Eglinton, Ont.
1888..	1	Gibbons, J., D. & O.L.S.....	Alaska Boundary Survey, Department of the Interior, Ottawa, Ont.
1893..	3	Goldie, A. R., Assistant Manager	Goldie & McCulloch Co., Ltd., Galt, Ont.
1892..	1	Goodwin, J. B., B.A.Sc	Can. Pac. Ry., Winnipeg, Man.
1898..	1	Grant, W. F., Post Graduate course....	School of Practical Science, Toronto.
1897..	3	Gray, A. T	Toronto Electric Motor Co., Toronto.
1895..	1	Guernsey, F. W., Engineer	Neepawa Gold Mining Co., Wabigoon.
1896..	3	Gurney, W. C.....	Gurney Foundry Co., Toronto, Ont.
1896 .	3	Haight, H. V., B.A.Sc.....	Canadian Rand Drill Co., Halifax, N.S.
1893.	3	Hanly, S. C.....	Midland, Ont.
1889..	1	Hanning, G. F	City Engineer's Office, Toronto.
1895..	4	Harkness, A. H., B.A.Sc.' Fellow in Civil Engineering	School of Practical Science, Toronto.
1889..	1	Haultain, H. E. T., Mining Engineer...	Yellowstone Mine, Salmo, B.C.
1885..	1	Henderson, E. E., O.L.S	Henderson P.O., Piscatiquois, Me.
1894..	3	Herald, W. J., B.A.Sc., Mechanical Engineer	Leadville, Colo.
1896..	1	Hermon, E. B., D. & O.L.S	Gordon, Hermon & Burwell, Vancouver, B.C.
1897..	3	Hicks, W. A. B.....	Northey Mnfg. Co., Toronto, Ont.
1895..	3	Hull, H. S., B.A.Sc., Draftsman	Wilmington, Del.
1890..	1	Hutcheson, J., O.L.S., City Engineer ..	Guelph, Ont.

GRADUATES.—*Continued.*

Year.	Dept.	Name.	Address.
1890..	1	Innes, W. L., O.L.S., C.E.	Ranney & Innes, Civil Engineers and Surveyors, Peterboro', Ont.
1889..	1	Irvine, J	Harriston, Ont.
1889..	1	James, D. D., B.A., B.A.Sc., O.L.S.	Rat Portage, Ont.
1891..	5	James, O.S., B.A.Sc., Analytical Chemist.	75 Adelaide E., Toronto.
1892..	1	Jeffrey, D	Contractor, Stratford, Ont
1894..	3	Job, H. E., B.A.Sc., Manager	Kay Electric Co, Hamilton, Ont.
1894..	1	Johnson, S.M., B.A.Sc, O.L.S., Engineer.	Johnson & McAllister, Anaconda, B.C.
1894..	3	Johnston, A. C., B.A.Sc., Draftsman	Westinghouse Electrical Co., East Pittsburg, Pa.
1894..	1	Jones, J. E., Draftsman	Carnegie Steel Co., Pittsburg, Pa.
1893..	4	Keele, J., B.A.Sc	Geological Survey, Ottawa, Ont.
1882..	1	Kennedy, J. H., C.E., O.L.S., Architect, etc	St. Thomas, Ont.
1897..	4	King, C. F	Warren Chemical & Manufacturing Co., Detroit, Mich.
1884..	1	Kirkland, W. C	Illinois Central Ry., New Orleans, La.
1898..	1	Kormann, T. S. (Post Graduate course)	School of Practical Science, Toronto.
1893..	1	Laidlaw, J. T., B. A. Sc., Consulting Mining Engineer	Fort Steele, B.C.
1892..	1	Laing, A. T., B.A.Sc., Acting Demonstrator in Surveying	School of Practical Science, Toronto.
1896..	1	Laing, W. F	Deacon & Switzer, Rat Portage.
1886..	1	Laird, R., O.L.S	Reduction Works, Rat Portage.
1891..	1	Lane, A., O.L.S., Chief Draftsman	Structural Department Maryland Steel Co., Sparrows' Point, Md.
1892..	4	Langley, C. E., Architect	Langley & Langley, Architects, Toronto.

GRADUATES.—*Continued.*

Year.	Dept.	Name.	Address.
1892..	1	Laschinger, E. J., B.A.Sc., Chief Draftsman	Consolidated Gold Fields of South Africa, Johannesburg, South African Republic.
1893..	3	Lash, F. L., Chief Engineer	Sugar Factory, Boedoeran, Java.
1894..	3	Lash, N. M.	Bell Telephone Co., Montreal, Que.
1898..	3	Lavrock, J. E.	E. Leonard & Sons, London, Ont.
1896..	3	Lawrie, R. R., deceased	
1892..	5	Lawson, W., B.A.Sc	16 Washington Ave., Toronto, Ont.
1892..	3	Lea, W.A., B.A.Sc., Mechanical Engineer	Mexico St. Ry., Mexico.
1887..	1	Lott, A. E., Railway Construction	San Antonio de la Huerta, Mexico.
1885..	1	Ludgate, B.A., O.L.S.	Texas Midland Ry., Terrell, Texas.
1893..	1	McAllister, A. L., B.A.Sc., Draftsman	New Jersey Steel and Iron Co., Trenton, N.J.
1891..	1	McAllister, J. E., B.A.Sc., C.E.	Johnston & McAllister, Trail, B.C.
1893..	1	Macallum, A. F., B.A Sc	Technical School, Toronto, Ont.
1892..	1	McAree, J., B.A.Sc., D.T.S., O.L.S., Mining Engineer and Surveyor	Dominion Gold Mining and Reduction Co., Limited, Rat Portage, Ont.
1896..	3	Macbeth, C, B.A.Sc., Manager	Ontario Electric Co., London, Ont.
1887..	1	McCullough, A. L., O.L.S., A.M. Can. Soc. C.E.	Civil and Hydraulic Eng., Petrolea, Ont.
1888..	1	McDowall, R., O.L.S., A.M. Can. Soc. C.E., Town Engineer	Owen Sound, Ont.
1884..	1	McDougall, J., B A., County Engineer	Court House, Toronto.
1892..	1	McEntee, B., B.A.Sc., Assistant	J. McAree, Rat Portage, Ont.
1888..	1	McFarlane, G. W., O.L.S., Assistant County Engineer	Court House, Toronto.
1893..	1	McFarlen, T. J., Assayer	Forona Junction, N.S.

GRADUATES.—*Continued.*

Year.	Dept.	Name.	Address.
1895..	3	McGowan, J., B.A., B.A.Sc. Draftsman.	Keystone Bridge Wks, Pittsburg, Pa.
1898..	4	Mackintosh, D.	G. W. Gouinlock, Architect, Toronto.
1885..	1	McKay, O., O.L.S., Railway Engineer..	Windsor, Ont.
1895..	3	McKay, W. N	100 Madison ave., Toronto, Ont.
1895..	3	McKinnon, H. L., B.A.Sc	Hughes Steam Pump Co., Cleveland, O.
1896..	3	MacMurchy, J. A	Westinghouse Machine Co., East Pittsburg, Pa.
1898..	1	McNaughton, F. W	Wiggins & McNaughton, Cornwall, Ont.
1893..	1	McPherson, A. J., B.A.Sc., O.L.S., Town Engineer.	Galt, Ont.
1894..	1	McTaggart, A. L., B.A.Sc	Building Dept., Carnegie Steel Co., Pittsburg, Pa.
1893..	1	Main, W. T	Brampton, Ont.
1888..	1	Marani, C. J., General Agent	Canada Permanent Loan Co., Vancouver, B.C.
1893..	1	Marani, V. G., Assistant Engineer	Cleveland Gas, Light & Coke Co., 356 Superior st., Cleveland, O.
1887..	1	Martin, F., O.L.S., M.D	Hospital for Sick Children, Toronto, Ont.
1896..	1	Martin, T., B.A.Sc., Amalgamator	Regina Mine.
1895..	1	Meadows, W. W., O.L.S	Rat Portage.
1890 & 1891	1 & 3	Merrill, E. B., B.A., B.A.Sc	Brush Electric Co., London, Eng.
1888..	1	Mickle, G. R., B.A., Mining Engineer, Lecturer in Mining	School of Practical Science, Toronto.
1889..	1	Mill, F. X	268 Main St. E., Pittsburg, Pa.
1892..	3	Milne, C. G., B.A.Sc., Chief Draftsman.	Hamilton Bridge Co., Hamilton, Ont.
1893..	1	Mines, W., B.A.Sc	Gt. N. Ry. Elevator Co., Buffalo.
1894..	4	Minty, W., B.A.Sc., Draftsman	28 Albert Drive, Queen's Park, Glasgow, Scotland.

GRADUATES.—*Continued.*

Year.	Dept.	Name.	Address.
1892..	1	Mitchell, C. H., B.A.Sc., C.E., Town Engineer	Niagara Falls, Ont.
1889..	1	Moberly, H. K., Asst. Mechanicsl Engineer	Youghiogheny River Coal Company, Scott Haven, Pa.
1891..	1	Moore, J. E. A., C.E., Draftsman	Wellman-Seaver Engineering Co., Cleveland.
1888..	1	Moore, J. H., O.L.S., Town Engineer	Smith's Falls, Ont.
1881..	1	Morris, J. L., C.E., O.L.S	Pembroke, Ont.
1891..	1	Newman, W., O.L.S., City Engineer.	Windsor, Ont.
1894..	3	Nicholson, C. J	J. W. Tyrrell, Hamilton, Ont.
1890..	1	Pedder, J. R., O.L.S., deceased.	
1887..	1	Pinhey, C. H., D. & O.L.S	Soulanges Canal, Coteau Landing, P.Q.
1892..	1	Playfair, N. L	131 Isabella Street, Toronto.
1892.	1	Prentice, J. M., deceased.	
1897..	1	Proudfoot, H. W	Bonheur, Ont.
1884..	1	Raymer, A. R., Asst. Engineer	P. & L. E. Ry., Pittsburg, Pa.
1888 .	1	Richardson, G. H., Divisional Engineer, C.P.R	Revelstoke, B.C.
1884..	1	Robertson, J., O.L.S	Coad & Robertson, Civil Engineers, Surveyors, etc., Glencoe.
1893..	3	Robertson. J. M	62 Admiral Road, Toronto.
1897..	2	Robinson, A. H. A., B.A.Sc	Sudbury, Ont.
1895..	1	Robinson, F. J., O.L.S	Barrie, Ont.
1891..	1	Robinson, J. K.. deceased.	
1887..	1	Roger, J., O.L.S	Mitchell, Ont.
1894..	1	Rolph, H	Dawson, N.W.T.
1888..	1	Rose, K	Havana, Cuba.

GRADUATES.—*Continued.*

Year.	Dept.	Name.	Address.
1889..	1	Rosebrugh, T. R., M.A., Lecturer in Electrical Engineering	School of Practical Science, Toronto.
1892..	1	Ross, J. A., Chief Draftsman	L. S. & M. S. Ry., Toledo, O.
1888..	1	Ross, J. E., D. & O.L.S.	New Westminster, B.C.
1890..	3	Ross, R. A., E.E., Consulting Engineer	Montreal, P.Q.
1893..	1	Russell, R., Engineer's Staff	Crow's Nest Pass Ry.
1891..	1	Russell, W	Russel, Poulin & Co., Contractors, Pembroke, Ont.
1897..	4	Scott, W. F., Draftsman	Koken Iron Works, St. Louis, Mo.
1898..	1	Shaw, J. H	Beachburg, Ont.
1894..	1	Shields, J. D., B.A.Sc.	Rat Portage, Ont.
1896..	3	Shipe, R. R.	Shipe Wood Rim Co., 66 Esplanade W., Toronto, Ont.
1898..	3	Shipley, A. E. (Post-graduate Course)	School of Practical Science, Toronto.
1891..	1	Sylvester, G. E., O.L.S	Sudbury, Ont.
1898..	3	Smallpiece, F. L.	Can. Gen. Elec. Co., Toronto.
1897 .	3	Smillie, R.	McMyler Mnfg. Co., Cleveland, O.
1892..	1	Smith, Albert	Keystone Bridge Co., Pittsburg, Pa.
1894..	1	Smith, Angus, O.L.S	Ridgetown, Ont.
1898..	1	Smith, R. W	Rossland, B.C.
1893..	1	Speller, F. N., B.A.Sc.	Speller & Watson, Dawson, N.W.T.
1894..	3	Spotton, A. K.	Bertram Engine Wks., Toronto.
1893..	1	Squire, R. H., B.A.Sc., O.L.S.	City Engineer's Office, Brantford, Ont.
1884..	1	Stern, E. W., Chief Engineer	Jackson Architectural Iron Works, New York.
1898..	1	Stewart, J. A.	Bridge Dept., N.Y.C. Ry., New York.
1895..	3	Stocking, F. T	689 Prospect Avenue, Buffalo, N.Y.

GRADUATES.—*Concluded.*

Year.	Dept.	Name.	Address.
1897..	2	Stull, W. W., B.A.Sc	Georgetown, Ont.
1891..	1	Symmes, H. D., Manager	Street Railway, St. Catharines, Ont.
1893 .	1	Taylor, W. V., O.L.S	Bay of Quinte Ry. and Navigation Co., Gananoque, Ont.
1892..	1	Thomson, R. W., B.A.Sc	Consolidated Gold Fields of South Africa, Johannesburg, South African Republic.
1886..	1	Thomson, T. Kennard, C.E., M. Am. Soc. C.E., Consulting Engineer	11 Broadway, N.Y.
1895..	3	Tremaine, R. C. C., B.A Sc., Manager	Exeter Electric Light & Power Co., Exeter, Ont.
1886.	1	Tyrrell, H. G., C.E., A.M. Can. Soc. C.E	Berlin Iron Bridge Co., East Berlin, Conn.
1883..	1	Tyrrell, J. W., C.E., D. & O.L.S	42 James Street, N., Hamilton, Ont.
1898..	1	Vercoe, H. L	Dauphin Ry., Sifton, Man.
1893..	1	Watson, R. B	Speller and Watson, Dawson, N.W.T.
1897..	1	Weekes, M. B. B.A.Sc	City Engineer's Office, Brantford, Ont.
1897..	1	Weldon, E. A	Glenora & Teslin Lake Ry., Glenora.
1892..	3	White, A. V., Managing Director	The Spoke and Specialty Mfg. Co., London, N.W., England.
1889..	1	Wickett, T., M.D	Watford, Ont.
1898..	3	Wilkinson, T. A., Fellow in Electrical Engineering	School of Practical Science, Toronto.
1898..	3	Williamson, D. A. (Post-graduate Course)	School of Practical Science, Toronto.
1890..	1	Wiggins, T. H., D. & O.L.S., Town Engineer	Cornwall, Ont.
1890.	1	Withrow, W. J	Luxfer Prism Co., Toronto.
1888..	1	Wright, C. H. C., B.A.Sc., Lecturer in Architecture	School of Practical Science, Toronto.
1894..	3	Wright, R. T	Goldie & McCulloch, Galt, Ont.