1897

Catalogue of the Maine State College, 1896-1897, pages 1-60

University of Maine - Main

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CATALOGUE
OF THE
Maine State College
1896-1897
ORONO, MAINE

AUGUSTA
Kennebec Journal Print
1897
VIEW FROM THE CAMPUS.
CATALOGUE

OF THE

Maine State College

1896-1897

ORONO, MAINE

AUGUSTA
Kennebec Journal Print
1897
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### CALENDAR.

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<tr>
<td>August 31</td>
<td>Before-term examinations begin</td>
</tr>
<tr>
<td>September 1</td>
<td>Entrance examinations begin</td>
</tr>
<tr>
<td>September 2</td>
<td>Fall term begins</td>
</tr>
<tr>
<td>November 20</td>
<td>Senior debate</td>
</tr>
<tr>
<td>November 24</td>
<td>Meeting of the Board of Trustees</td>
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<tr>
<td>November 26</td>
<td>Thanksgiving recess</td>
</tr>
<tr>
<td>December 4</td>
<td>Sophomore prize declamation</td>
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<tr>
<td>December 22</td>
<td>Term examinations begin</td>
</tr>
<tr>
<td>December 24</td>
<td>Term ends</td>
</tr>
</tbody>
</table>

**SPRING TERM, 1897.**

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
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</thead>
<tbody>
<tr>
<td>February 1</td>
<td>Before-term examinations begin</td>
</tr>
<tr>
<td>February 2</td>
<td>Entrance examinations begin</td>
</tr>
<tr>
<td>February 3</td>
<td>Spring term begins</td>
</tr>
<tr>
<td>February 22</td>
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<td>May 14</td>
<td>Ivy day</td>
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<td>May 31</td>
<td>Decoration day</td>
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<td>June 5</td>
<td>Senior vacation begins</td>
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<td>June 9</td>
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<tr>
<td>June 19</td>
<td>Junior exhibition</td>
</tr>
<tr>
<td>June 20</td>
<td>Baccalaureate sermon</td>
</tr>
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</table>
MAINE STATE COLLEGE.

June 21, Monday, Convocation.
June 21, Monday, Class day.
June 22, Tuesday, Meeting of the Board of Trustees.
June 22, Tuesday, Exhibition drill.
June 22, Tuesday, Reception by the fraternities.
June 22, Tuesday, Reception by the President.
June 23, Wednesday, Commencement.
June 23, Wednesday, Commencement dinner.
June 23, Wednesday, Meeting of the Alumni Association.
June 23, Wednesday, Commencement concert.
June 24, Thursday, Entrance examinations begin.

FALL TERM, 1897.

August 30, Monday, Before-term examinations begin.
August 31, Tuesday, Entrance examinations begin.
September 1, Wednesday, Fall term begins.
November 19, Friday, Senior debate.
November 23, Tuesday, Meeting of the Board of Trustees.
November 25, Thursday, Thanksgiving recess.
November 28, Sunday, Sophomore prize declamation.
December 3, Friday, Term examinations begin.
December 21, Tuesday, Term ends.

SPRING TERM, 1898.

January 31, Monday, Before-term examinations begin.
February 1, Tuesday, Entrance examinations begin.
February 2, Wednesday, Spring term begins.
June 22, Wednesday, Commencement.
THE MAINE STATE COLLEGE.

ESTABLISHMENT.

By an Act of Congress, approved July 2, 1862, it was provided that there should be granted to the several States public lands, "thirty thousand acres for each Senator and Representative in Congress," from the sale of which there should be established a perpetual fund "the interest of which shall be inviolably appropriated, by each State which may take and claim the benefit of this act, to the endowment, support, and maintenance of at least one college where the leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts, ... in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life." The Act forbade the use of any portion of the principal or interest of this fund, for the purchase, erection, or maintenance of buildings; and the several States claiming and taking the benefit of the provisions of the Act were required, "to provide within five years not less than one college" to carry out the purposes of the Act.

The State accepted this grant in 1863, and in 1865 constituted Samuel F. Perley, Hannibal Hamlin, and fourteen other persons "a body politic and corporate, by the name of the Trustees of the State College of Agriculture and the Mechanic Arts." The Trustees were authorized to receive and hold donations, to select the professors and other officers of the college, to establish the conditions for admission, to lay out courses of study, to grant degrees, and to exercise other usual powers and privileges.
The Governor and Council were given the right, "to examine into the affairs of the college, and the doings of the trustees, and to inspect all their records and accounts, and the buildings and premises occupied by the college."

It was provided that in addition to the studies especially mentioned in the Act of Congress, the college should teach such other studies as the facilities would permit. Military instruction was explicitly ordered. Tuition was made free.

ENDOWMENT AND INCOME.

The State of Maine received, under the Act of Congress, two hundred and ten thousand acres of public land, from which the college has realized an endowment fund of about $118,300. To this have been added $100,000, by the bequest of Abner Coburn of Skowhegan, who was for many years president of the Board of Trustees. The town of Orono contributed $8,000, and the town of Oldtown $3,000, for the purchase of the site on which the college buildings stand. The State has appropriated about $300,000, mostly for the material equipment.

Under an Act of Congress approved March 2, 1887, the college receives $15,000 annually for the maintenance of its experimental work in agriculture, in charge of the department known as the Agricultural Experiment Station.

Under an Act of Congress approved August 30, 1890, the college received for its more complete endowment and maintenance, $15,000 for the year ending June 30, 1890. The Act provided that this amount should be increased by one thousand dollars each year until the annual appropriation should reach twenty-five thousand dollars, and then remain at this sum.

The college receives, during 1895 and 1896, $20,000 annually from the State for current expenses.
THE BOARD OF TRUSTEES.

Hon. Henry Lord, President, Bangor.

Hon. William Thomas Haines, B. S., LL. B., Secretary, Waterville.

Hon. Benjamin Franklin Briggs, Auburn.

Greenville Jefferson Shaw, Hartland.

Hon. Russell Benjamin Shepherd, Skowhegan.

Arthur Lee Moore, B. S., Orono.

Hon. Elliott Wood, Winthrop.

Hon. Charles Plummer Allen, B. S., Presque Isle.

EXECUTIVE COMMITTEE.

Trustees Lord, Haines, and Allen.

TREASURER.

Hon. Isaiah Kidder Stetson, B. Ph., Bangor.
THE EXPERIMENT STATION COUNCIL.

BENJAMIN FRANKLIN BRIGGS, .................Auburn.
ARTHUR LEE MOORE, B. S., .................Orono.
ELLIOTT WOOD, .......................Winthrop.
Committee of the Board of Trustees.

ABRAM WINEGARDNER HARRIS, Sc. D., President, Orono.
President of the College.

CHARLES DAYTON WOODS, B. S., Secretary, ......Orono.
Director of the Station.

BENJAMIN WALKER McKEEN, .................Fryeburg.
Representative of the State Board of Agriculture.

ORA OTIS CROSBY, .......................Albion.
Representative of the Maine State Grange.

CHARLES S. POPE,
Representative of the State Pomological Society.

JAMES MONROE BARTLETT, M. S., ...............Orono.
LUCIUS HERBERT MERRILL, B. S., ...............Orono.
FRANCIS LEROY HARVEY, Ph. D., ...............Orono.
FREMONT LINCOLN RUSSELL, V. S., ...............Orono.
WELTON MARKS MUNSON, M. S., ...............Orono.
Members of the Station Staff.
THE FACULTY AND OTHER OFFICERS.

ABRAM WINEGARDNER HARRIS, Sc. D., Campus. President.

MERRITT CALDWELL FERNALD, Ph. D., Bennoch Street. Emeritus Professor of Mathematics.

GEORGE HERBERT HAMLIN, C. E., Main Street. Professor of Civil Engineering.

ALFRED BELLAMY AUBERT, M. S., Campus. Professor of Chemistry.

ALLEN ELLINGTON ROGERS, M. A., College Street. Professor of Civics and Logic.

WALTER FLINT, M. E., College Street. Professor of Mechanical Engineering.

JAMES MONROE BARTLETT, M. S., College Street. Chemist in the Experiment Station.

LUCIUS HERBERT MERRILL, B. S., Forest Avenue. Chemist in the Experiment Station.

FRANCIS LEROY HARVEY, Ph. D., Forest Avenue. Professor of Natural History, and Entomologist of the Experiment Station.

JAMES NORRIS HART, C. E., Campus. Professor of Mathematics and Astronomy.

WELTON MARKS MUNSON, M. S., Campus. Professor of Horticulture, and Horticulturist of the Experiment Station.
HORACE MELVYN ESTABROOKE, M. S., M. A.,......Main Street.
Professor of English.

JAMES STACY STEVENS, Ph. D.,.................Main Street.
Professor of Physics.

GILBERT MOTTIER GOWELL, M. S.,..............Campus.
Professor of Animal Industry, and Agriculturist
of the Experiment Station.

CHARLES DAYTON WOODS, B. S.,.................Main Street.
Professor of Agriculture, and Director of the
Experiment Station.

HERBERT NATHAN ROYDEN, U. S. A.,...........Middle Street.
Professor of Military Science.

NATHAN CLIFFORD GROVER, B. C. E.,...........Campus.
Assistant Professor of Civil Engineering.

HOWARD SCOTT WEBB, M. E.,.................North Main Street.
Instructor in Mechanical Engineering.

FREEMONT LINCOLN RUSSELL, V. S.,...........College Street.
Instructor in Biology, and Veterinarian in
the Experiment Station.

DAVID WILDER COLBY, B. S.,.............Campus.
Instructor in Chemistry.

WILBUR FISK JACKMAN, B. S., Ph. C.,......North Main Street.
Instructor in Pharmacy.

BURTON SMITH LANPHEAR, M. E.,...........College Street.
Instructor in Electrical Engineering.

EDWIN BRYANT NICHOLS, B. A.,............Bennoch Street.
Instructor in Modern Languages.

GUY ASHTON ANDREWS, B. A.,.................Main Street.
Instructor in German and Latin.

HARRIET CONVERSE FERNALD, M. S.,...........Main Street.
Librarian.
IRVING WETHERBEE FAY, B. A., Ph. D., .......... Main Street. 
Instructor in Biological Chemistry, and Chemist 
in the Experiment Station.

HALBERT GARDNER ROBINSON, B. C. E.,.......... Mill Street.
Tutor in Mathematics.

HAROLD SHERBURNE BOARDMAN, B. C. E.,.......... Bangor 
Tutor in Drawing.

PERLEY WALKER, B. M. E.,.................. Peters Street. 
Tutor in Shop-work and Mathematics.

CHARLES PARTRIDGE WESTON, B. C. E.,........... Campus. 
Tutor in Drawing.

HARVEY WATERMAN THAYER, B. A.,............. Campus. 
Tutor in French and English.

LUCIUS JERRY SHEPARD, B. S.,.................. Campus. 
Assistant Horticulturist in the Experiment 
Station.

HENRY BENNETT SLADE, B. A.,................... Main Street. 
Assistant Chemist in the Experiment 
Station.

ORA WILLIS KNIGHT, B. S.,.................... Bangor. 
Assistant in Natural Science.

ELIZABETH ABBOTT BALEN'TINE,................. Campus. 
Secretary to the President, and Secretary of the 
Faculty.

ALICE POTELLE, .................................... Bangor. 
Cashier and Stenographer.
ADMISSION.

Applicants for admission to the college must pass the required examinations, or present satisfactory certificates of fitness, and file with the Treasurer a bond for $150 signed by two bondsmen, as security for the payment of college bills. A cash deposit covering the bills of one term will be accepted in place of a bond. No distinction is made in regard to sex or place of residence. Candidates for advanced standing, are examined in the preparatory studies and in those previously pursued by the classes they propose to enter, or other equivalent studies. Certificates will be accepted for the preparatory work, but not for any part of the college work, unless done in some other college.

A student who has accomplished half or more of the preparatory course may be examined on that part, and receive credit therefor.

The required work of the college includes an unusually large amount of mathematics, and success in the engineering courses requires the ability to make easy use of the higher mathematics. It is therefore desirable that students preparing for admission to the college be subjected to the most rigorous drill in this subject. Fitting schools should give a part of the work in geometry and algebra, or a review of these subjects, during the last year.

The preparation in English should include the rapid reading of numerous standard works of fiction, the careful reading of other standard works, the writing of themes based upon this reading, and the frequent writing of themes on simple and familiar subjects, with exercises in punctuation, capitalization, etc.
Persons, not candidates for a degree, who wish to take special studies, will be permitted to do so upon giving satisfactory evidence that they are prepared to take the desired studies. If they subsequently desire to become candidates for a degree, or to take a regular course, they may be required to pass the entrance examinations.

No examinations are required for admission to the winter short courses or the summer school.

College graduates who wish to enter a technical course, will be admitted to the junior class without examination. Students in classical or literary courses, who expect to pursue technical courses after graduation, should avail themselves of all opportunities for the study of mathematics, physics, chemistry, and drawing, as a preparation for engineering courses; and of physics, chemistry, and drawing, for chemical, and biological courses.

ENTRANCE EXAMINATIONS.

Examinations are held at the college, beginning on the day before the opening of each term, and on the day after commencement. Examinations will be held, if desired, in each county of the State. The examinations in other places than the college are held on the day after commencement, and persons desiring examinations at such places must notify the President of the college not later than June 1.

To save expense to candidates, examination papers will be sent to any satisfactory person who will consent to conduct an examination for the accommodation of the candidate. The questions are to be submitted under the usual restrictions of a written examination, and the answers returned to the college accompanied by the indorsement of the examiner that the examination has been properly made. The candidate must secure the consent of the person to take charge of the examination, and make early request of the President of the college to have papers sent.

Candidates for the Chemical, Agricultural (four years), Preparatory Medical, Pharmacy (four years), Civil Engineering, Mechanical Engineering, and Electrical Engineering Courses are examined on—Elementary Subjects, Arithmetic, English Grammar, Physiology; Language, English; History, United States; Mathematics, Geometry, Algebra; Science,
Two of the following,—Botany, Chemistry, Physical Geography, Physics.

Candidates for the Latin-Scientific Course are examined on—
Elementary Subjects, Arithmetic, English Grammar, Physiology; Language, English, Latin, and either French or German; History, United States, Roman; Mathematics, Geometry, Algebra.

Candidates for the Scientific Course are examined on—
Elementary Subjects, Arithmetic, English Grammar, Physiology; Language, English, and either French or German; History, United States, and one of the following,—General, Roman, English; Mathematics, Geometry, Algebra; Science. Two of the following,—Botany, Chemistry, Physical Geography, Physics.

Candidates for the Short Courses in Agriculture (one and two years), are examined on—Elementary Subjects, Arithmetic, English Grammar, Physiology; Language, English; History, United States; Mathematics, Algebra through simple equations of the first degree; Science. One of the following,—Botany, Chemistry, Physical Geography, Physics.

Candidates for the Short Course in Pharmacy (two years) are examined on—Elementary Subject, Descriptive Geography, Arithmetic, English Grammar, Physiology; History, United States; Mathematics, Algebra through simple equations of the first degree.

Substitutes.—The requirements for the Latin-Scientific Course will be accepted for any other course. One year of Latin will be accepted as a substitute for one of the following groups: (a) Arithmetic, English Grammar and Physiology; (b) French or German; (c) One science.

French or German will be accepted as a substitute for one of the following groups: (a) Arithmetic, English Grammar, Physiology; (b) One science.

Other real substitutes will be accepted for any part of the requirements except Mathematics, English, and Latin.

Additional Requirements.—In 1898 the requirements for the engineering courses will be increased by Solid Geometry. In 1899 the requirements for The Chemical, Agricultural (4 years), Preparatory Medical, Pharmacy (4 years), and Engineering Courses will include one foreign language, either ancient or modern, as the candidate may prefer.
## ENTRANCE REQUIREMENTS FOR ALL COURSES.

THE STARS INDICATE THE STUDIES REQUIRED.

<table>
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<tr>
<th>Studies</th>
<th>General Courses</th>
<th>Technical Scientific Courses</th>
<th>Engineering Courses</th>
<th>Short Courses</th>
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</thead>
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<tr>
<td></td>
<td>Latin-Scientific</td>
<td>Scientific</td>
<td>Chemical</td>
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<td></td>
<td>Agricultural</td>
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<td>Prep. Medical</td>
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<td>Pharmacy</td>
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<td>Civil Engin.</td>
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<td>Elect. Engin.</td>
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<td></td>
<td></td>
<td></td>
<td>Pharmacy, 2 yrs.</td>
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<tr>
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<td></td>
<td>Agriculture, 2 yrs.</td>
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<td></td>
<td></td>
<td></td>
<td>Agriculture, 1 yr.</td>
<td></td>
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</tbody>
</table>

### Elementary: a
- Geography
- Arithmetic
- Eng. Gram
- Physiology

### Language: b
- English (a)
- French (c)
- German (c)
- Latin (a)

### History:
- United States (a)
- General (a, d)
- Roman (a, d)
- English (a)

### Mathematics: e
- Plane Geometry
- Algebra

### Science: a
- Botany
- Chemistry
- Phys. Geog.
- Physics

---

*a—One year of Latin, or of a modern language will be accepted as a substitute for all the elementary studies, or for one science.

*b—In 1899, one foreign language, either ancient or modern as the candidate may prefer, will be required for the technical scientific, and the engineering courses.

*c—Either French or German; one year of Latin will be accepted as a substitute.

*d—General, or Roman, or English History in addition to United States History.

*e—In 1898 solid geometry will be required for engineering courses.

*f—Through simple equations of the first degree only.

*g—Two sciences, from the list of four, are required.
ENTRANCE REQUIREMENTS.

The following statements will show in detail, the requirements in each subject.

ELEMENTARY SUBJECTS.

DESCRIPTIVE GEOGRAPHY.—Location of continents, mountain ranges, peninsulas, isthmuses, islands, capes; location of oceans, bays, sounds, straits, lakes, and rivers; location and boundaries of countries and states; location of important seaports, commercial cities, and capitals; approximate latitude and longitude of important places. Required for short course in pharmacy only.

ARITHMETIC.—Simple and denominate numbers; ratio and proportion; common and decimal fractions; percentage; metric system of weights and measures; square root. A satisfactory treatment of these subjects may be found in Wentworth and Hill’s, Greenleaf’s, or the Franklin Arithmetic. A thorough drill in mental arithmetic with a book like Colburn’s is recommended.

ENGLISH GRAMMAR.—Definition of terms; formation of plural number and possessive case of nouns; inflection of pronouns; comparison of adjectives and adverbs; the agreement of verbs with their subjects, and of pronouns with their antecedents; the synopsis of the verb; the analysis of sentences; the application of the rules of syntax. Attention should be given to punctuation and use of capital letters.

PHYSIOLOGY.—Cells and tissues, skeleton, muscles, blood and circulation, respiration, nutrition and digestion, lymphatic system, excretory organs, nervous system, special senses, hygiene.

LANGUAGE.

ENGLISH.—I. Reading and Practice. Each candidate will be required to present evidence of a general knowledge of the substance of the books mentioned below and to answer simple questions on the lives of their authors. The examination will usually be the writing of one or two paragraphs on each of several topics. The treatment of these topics is designed to test the power of clear and accurate expression, and will call for only a general knowledge of the substance of the books. In
place of this test, the candidate may present an exercise book, certified by his instructor, containing compositions or other written work done in connection with the reading of the books.

In 1897, this part of the examination will be based upon: Shakspere's As You Like It, Defoe's History of the Plague in London, Irving's Tales of a Traveller, Hawthorne's Twice Told Tales, Longfellow's Evangeline, George Eliot's Silas Marner.

In 1898, it will be based upon: Milton's Paradise Lost, books I and II, Pope's Iliad, books I and XXII, the Sir Roger de Coverley Papers in the Spectator, Goldsmith's Vicar of Wakefield, Coleridge's Ancient Mariner, Southey's Life of Nelson, Carlyle's Essay on Burns, Lowell's Vision of Sir Launfal, Hawthorne's House of the Seven Gables.

II. Study and Practice. This part of the examination presupposes a careful study of the works named below. The examination will be upon subject-matter, form, and structure; and will also test the candidate's ability to express his knowledge with clearness and accuracy.

In 1897, this part of the examination will be based upon: Shakspere's Merchant of Venice, Burke's Speech on Conciliation with America, Scott's Marmion, Macaulay's Life of Samuel Johnson.

In 1898, it will be based upon Shakspere's Macbeth, Burke's Speech on Conciliation with America, DeQuincey's Flight of a Tartar Tribe, Tennyson's Princess.

FRENCH.—The candidate offering French, should have: an accurate knowledge of the grammar, and especially of the regular and irregular verbs; an elementary knowledge of French composition; the ability to read at sight French novels of average difficulty.

GERMAN.—The candidate offering German should have: an accurate knowledge of the essentials of the grammar; an elementary knowledge of German composition; the ability to read a classical play, with fair ease.

LATIN.—The grammar, including prosody; Cæsar's Gallic War, books I, II, III, and IV; Cicero's four orations against Cataline, and those for Archias and for the Manilian Law; Virgil's Eclogues and the Æneid, books I, II, III, IV, V, VI; the sight translation of Latin passages of average difficulty; transla-
tion into Latin of simple English sentences, and easy narrative passages based on the prose authors read. For the last, a vocabulary of unusual words will be furnished. Equivalent readings will be accepted for those prescribed.

**History.**

**United States History.**—An elementary knowledge such as may be obtained from Higginson’s History of the United States.

**General History.**—Myer’s General History.

**Roman History.**—Allen’s Short History of the Roman People, to the death of Marcus Aurelius.

**English History.**—An elementary knowledge such as may be obtained from Montgomery’s History of England.

**Mathematics.**

**Plane Geometry.**—The first five books of Chauvenet’s, Wells’, or Wentworth’s Geometry. The preparation should include the solution of numerical exercises, the demonstration of original propositions, and the construction of geometrical figures in a neat and careful manner. The examination will include some propositions for original demonstration or construction.

**Algebra.**—The elements, equations of the first degree, radicals, quadratic equations, arithmetical and geometrical progressions.

Candidates for the short courses in agriculture and the short course in pharmacy are not examined on the topics beyond simple equations of the first degree. A satisfactory preparation may be obtained from Greenleaf’s Elementary, Newcomb’s, Wells’ Academic or Wentworth’s School, Algebra.

**Science.**

**Botany.**—Any course will be satisfactory which brings the pupil into contact with plants. In schools possessing compound microscopes work should be done such as is presented in Bessey’s Essentials of Botany, Arthur, Barnes and Coulter’s Handbook of Plant Dissection, or Campbell’s Structural and Systematic
Botany. In case no compound microscopes are available such a text as Gray’s Text Book, revised edition, should be used, as both recitation book and laboratory guide.

Chemistry.—The necessary ground is covered by the following textbooks: Fisher, Remsen, Roscoe (inorganic part), Shepard, Storer and Lindsay, Williams.

Physical Geography.—Definition of terms; motions, form, size of the earth; magnetic action; physical features of the continents; relief forms; currents of air and water; volcanoes, earthquakes, geysers, etc.; forms of water; climate; drainage; tides; meteorology, clouds, rain, dew, etc.; glaciers and icebergs; races; metals and minerals; fauna and flora.

Physics.—A satisfactory treatment of this subject may be found in Avery’s or Gage’s Physics.

Certificates of Fitness.

Any preparatory school whose course of instruction covers in a satisfactory manner the requirements for admission to the college, may be admitted to its list of approved schools. Application for such approval should be made to the President of the college, and must be accompanied by a detailed statement of the course of study.

Candidates for admission to the college from these schools will be admitted to the Freshman Class upon the certificate of the principals, showing that the required studies have been completed satisfactorily. Certificates must be made out on blanks furnished by the college.

Approved Schools.

Athol High School, Athol, Mass., F. C. Avery, Principal.
Bangor High School, Bangor, Henry K. White, M. A., Principal.
Bar Harbor High School, Bar Harbor, Prescott Keyes, Jr., B. C. E., Principal.
Bath High School, Bath, H. E. Cole, M. A., Principal.
Belfast High School, *Belfast*,
Reuben L. Ilsley, M. A., Principal.

Berwick Academy, *South Berwick*,
Edward D. Merriman, B. A., Principal.

Boynton High School, *Eastport*,
J. B. Warren, M. A., Principal.

Brewer High School, *Brewer*,
Elmer T. Boyd, Principal.

Bridge Academy, *Dresden Mills*,
Alonzo A. Morelen, Principal.

Bridgton Academy, *North Bridgton*,
C. C. Spratt, B. A., Principal.

Caribou High School, *Caribou*,
William C. Hill, Principal.

Cherryfield Academy, *Cherryfield*,
Leroy S. Dewey, B. A., Principal.

Coburn Classical Institute, *Waterville*,
Franklin W. Johnson, M. A., Principal.

Cony High School, *Augusta*,
Albion Hale Brainard, M. A., Principal.

Corinth Academy, *East Corinth*,
John B. Merrill, Principal.

Deering High School, *Deering*,
Edgar H. Crosby, M. A., Principal.

Dexter High School, *Dexter*,
W. S. Brown, Principal.

Dover English High School, *Dover*,
W. J. Rideout, Principal.

East Maine Conference Seminary, *Bucksport*,
Rev. A. F. Chase, Ph. D., President.

Edward Little High School, *Auburn*,
J. F. Moody, M. A., Principal.

Ellsworth High School, *Ellsworth*,
H. A. Moore, Principal.


Farmington High School, *Farmington*,
Charles M. Pennell, Principal.
Fort Fairfield High School, *Fort Fairfield*,
    H. F. Kalloch, B. A., Principal.
Foxcroft Academy, *Foxcroft*,
    W. R. Fletcher, B. A., Principal.
Framingham Academy and High School, *Framingham, Mass.,*
    John H. Parsons, M. A., Principal.
Gardiner High School, *Gardiner*,
    William L. Powers, M. A., Principal.
Greeley Institute, *Cumberland Center*,
    Edgar L. Pennell, B. A., Principal.
Guilford High School, *Guilford*,
    Leland A. Ross, B. A., Principal.
Hallowell High School, *Hallowell*,
    George W. Singer, Principal.
Hampden Academy, *Hampden*,
    George C. Webber, Principal.
Higgins Classical Institute, *Charleston*,
    Henry W. Foss, B. A., Principal.
Lewiston High School, *Lewiston*,
    G. H. Libby, Principal.
Limington Academy, *Limington*,
    Herbert L. Whitman, B. A., Principal.
Lincoln Academy, *Newcastle*,
    G. H. Larrabee, M. A., Principal.
Lisbon High School, *Lisbon*,
    Charles P. Barnes, Principal.
Machias High School, *Machias*,
    D. L. Fisher, M. A., Principal.
Madison High School, *Madison*,
    Fred L. Tapley, Principal.
Maine Wesleyan Seminary, *Kent's Hill*,
    Rev. G. W. Gallagher, D. D., President.
Milo High School, *Milo*,
    Charles E. Perkins, Principal.
Monson Academy, *Monson*,
    Harry W. Dunn, B. A., Principal.
North Yarmouth Academy, *Yarmouth*,
    Rev. B. P. Snow, M. A., Principal.
Oldtown High School, Oldtown, Harry Thornton Watkins, B. A., Principal.
Orono High School, Orono, S. H. Powell, M. A., Principal.
Parsonsfield Seminary and Piper High School, N. Parsonsfield, Isaiah Trufant, M. A., Principal.
Patten Academy, Patten, William L. Bounney, B. A., Principal.
Pennell Institute, Gray, W. B. Andrews, M. A., Principal.
Portland High School, Portland, Albro E. Chase, Principal.
Ricker Classical Institute, Houlton, Arthur M. Thomas, M. A., Principal.
Rockland High School, Rockland, L. E. Moulton, Principal.
Skowhegan High School, Skowhegan, W. N. Donovan, M. A., Principal.
South Paris High School, South Paris, F. T. Wingate, B. A., Principal.
South Portland High School, South Portland, Ralph A. Parker, Principal.
Thomaston High School, Thomaston, Percy Bartlett, Principal.
Thornton Academy, Saco, Edwin P. Sampson, M. A., Principal.
Topsham High School, Topsham, John A. Cone, Principal.
Waterville High School, Waterville, Austin H. Evans, Principal.
Washington Academy, East Machias, F. O. Small, B. A., Principal.
Westbrook High School, Westbrook, F. W. Freeman, M. A., Principal.
Westbrook Seminary, Deering, Rev. H. S. Whitman, M. A., President.
Yarmouth High School, Yarmouthville, H. M. Moore, B. A., Principal.
BUILDINGS FOR ENGINEERING, CHEMISTRY AND NATURAL SCIENCE.
WINGATE HALL.—The most conspicuous building on the campus, Wingate Hall, named in honor of William P. Wingate of Bangor, long an honored member of the board of trustees, is a three-story brick structure rectangular in form, with a handsome tower furnished with a clock. It was erected for the departments of civil and mechanical engineering, but is at present occupied in part by other departments. On the ground floor are two large designing rooms, recitation rooms, armory, instrument rooms, and private offices for the professors of civil and mechanical engineering. On the second floor is a handsome room occupied by the Young Men’s Christian Association, the offices and recitation rooms of the professor of mathematics and the professor of physics, the physical laboratory, and the apparatus room. On the third floor are large drawing rooms, well lighted, and said to be the best of their kind in New England. In the basement are the testing room of the department of civil engineering, and the laboratory for electrical measurements and optics. The testing room contains a Riehlé testing machine of 60,000 pounds capacity, cement testing machine, etc. The testing machines are driven by the engine used for forcing air through the building. The electrical laboratory contains a dark room, solid stone tables, and working accommodations for twenty students.

OAK HALL.—North of Wingate Hall is Oak Hall, a substantial four-story brick building used as a dormitory, named in honor of Lyndon Oak of Garland, for many years a useful member of the board of trustees. It contains forty-nine rooms for students,
bath rooms, and reading room, is heated by steam, supplied with water, and lighted by electricity. It was remodeled and re-finished in 1895.

**Fernald Hall.**—This building, named in honor of Merritt C. Fernald, Ph. D., president of the college from 1879 to 1893, is a two-story brick building, situated south of Wingate Hall. It contains twenty rooms devoted to the needs of the department of chemistry. On the first floor are the quantitative and pharmacutical laboratories, supplied with fume closets, water, gas, air blasts, drying closets, steam cups, and filter pumps; the balance room supplied with assay and analytical balances; two stock rooms containing all necessary apparatus; offices and private laboratories for the professor of chemistry, and the instructor in pharmacy. On the second floor are the lecture room, the qualitative laboratory, supplied with fume closets, water, gas, and air blast; the office and private laboratory of the instructor in qualitative analysis, a store room, and recitation room. This room serves as the laboratory of mineralogy, and is thoroughly equipped with the apparatus necessary for the determination of minerals. Under the roof are arranged the photographic studio, laboratory, and dark rooms. In the basement is an assay laboratory supplied with large and small furnaces, a crusher, grinding plate, etc.; the laboratory for beginners; and two store rooms.

The department of chemistry is well supplied with special apparatus such as spectrosopes of direct vision and other forms, two Reichert's microscopes with sets of objectives, polarscope, Westphal's specific gravity balance, apparatus for the bacteriological examination of water, apparatus for gas analysis, and lecture apparatus for illustrative purposes. The greater part of the chemical library, including the current and bound volumes of journals, is kept in this building.

**Coburn Hall.**—Directly south of Fernald Hall is Coburn Hall, named in honor of Abner Coburn of Skowhegan, the chief benefactor of the college. It is a brick building, three stories in height. On the first floor are located the laboratory and recitation room of the professor of agriculture, the recitation room of the professor of English, the reading room, and the library. The
latter is a well lighted room about forty feet square, fitted up with the best modern library furniture. About 10,000 volumes, exclusive of pamphlets, are on its shelves, and the number of books is rapidly increasing. On the walls are portraits of Governor Coburn, President Allen, and President Fernald. On the second floor are the botanical and entomological laboratories, and recitation rooms for the departments of natural history, civics, and modern languages. Directly over the library is the museum, extending through two stories. The collections exhibited here, already large and constantly increasing, will soon outgrow their present quarters. On the third floor is the college chapel capable of seating three hundred and fifty persons. In the basement is the college office.

THE MACHINE SHOP.—In the rear of Fernald Hall is the machine shop, a wooden building 125 feet long, and two stories high, containing a foundry, forge shop, carpenter shop, machine shop, and tool room. The shop is thoroughly equipped with one 18-inch cupola furnace, ladles, slickers, trowels, rammers, shovels, bellows, etc., power blast forges, anvils, tongs and cutters, heading tools, blower, exhaust fan, sledges, etc., engine lathes, planers, shaper, milling machine, drills, double head emery grinder, taps, dies, reamers, mandrels, drills, milling cutters, wrenches, chucks, and lathe dogs, benches and vises, saw benches with attachments, jig saw, planers, lathes, tool grinder, carpenter's tools, work benches, vises, and cases for tools. Power for running the machinery is furnished by a 60-horse-power steam engine. Adjoining the shop is a one-story building, 30 by 57 feet, containing the dynamos, motors, and storage battery, which operate the college lighting plant, and serve the seniors for study in their technical work in electrical engineering.

THE EXPERIMENT STATION BUILDING.—South of the Machine Shop stands a substantial two-story brick building with basement which is devoted to the uses of the Agricultural Experiment Station. In the basement are rooms for the storage and preparation of samples for analysis, a food laboratory, and the boiler room. On the ground floor are the journal room, re-agent room, the laboratory used in the analysis of foods and feeding stuffs, nitrogen room, and the laboratory used in the analysis of fertilizers. On the second floor are the general offices, the director's
private office, the bacteriological laboratory, and a storage room for books and pamphlets. The building is heated by steam, lighted by gas, and thoroughly equipped with apparatus.

The Horticultural Building.—East of the Experiment Station is the Horticultural Building, consisting of a head-house and three greenhouses. In the head-house are the office of the professor of horticulture, a working room, a seed storage room, a photographing room, the janitor’s room, and a room used for storage. The main greenhouse, 20 feet by 100 feet, is devoted to the use of the Experiment Station, and to the instruction of students. A second structure, 20 feet by 80 feet, running parallel to the main greenhouse, is divided, one-half being used for growing plants, and the remainder as a potting and storage room. The third greenhouse is designed for investigations in plant nutrition. In the south end of this building is the conservatory.

The Dairy Building.—The Dairy Building, 50 feet by 42 feet, contains a milk room, a butter room, a cheese room, a cold storage room, a cheese curing room, a lecture room, the office of the professor of animal industry, and a laboratory. It is supplied with a Sharpless cream separator, a United States separator, a De Laval hand cream separator, creamers, churns, butter workers, cream and cheese tempering vats, weighing tanks, Babcock testers, and other appliances necessary for teaching the most approved methods of handling milk, cream, butter, and cheese. The building is heated with steam and supplied with hot and cold water. Power is furnished by a 6-horse power engine, and by a baby tread horse power.

Other Buildings.—In addition to the buildings already described, there are nine others devoted to various college purposes. Among these are the President’s house, three fraternity club houses, a chapter house, and three residences occupied by members of the faculty.
DEPARTMENTS OF INSTRUCTION.

A—ENGLISH.

Professor Estabrooke.

A 1. RHETORIC.—The classification of sentences—rhetorical, grammatical; analysis of the sentence with reference to punctuation; exercises in punctuation; diction, with special reference to purity, propriety, and precision of language; clearness, strength, and unity of sentences; extended study of the paragraph; themes—including the narrowing of the subject from general to particulars; construction of outline, etc.; fortnightly exercises in extemporaneous speaking; frequent exercises in extemporaneous writing; formal essays.

The text-book is Genung's Outlines of Rhetoric. Five hours a fortnight for sixteen weeks.

A 2. RHETORIC. Extended study of narration and description, argumentative composition, and persuasion; construction of analytical outlines of selections from Burke, Webster, Macaulay, and others; practice in different kinds of composition; exercises in extemporaneous speaking and writing as in course 1.

The text-book is A. S. Hill's Principles of Rhetoric. Five hours a fortnight for twenty weeks.

A 3. ANGLO-SAXON.—Elements of Anglo-Saxon grammar; reading of easy prose and poetry. Constant reference is made to the relation of Anglo-Saxon to modern English.

The text-book is Cook's Grammar. Five hours a fortnight for twenty weeks.
A 4. **ENGLISH LITERATURE.**—The text-book is Painter’s Introduction to English Literature, which is supplemented by frequent lectures. Some of the masterpieces of our language, together with the historical and social conditions under which they were produced, are studied in detail. The student prepares frequent essays upon the times and characters studied, makes analyses of the books, and writes critical reviews of the same. The work of the classroom is supplemented by study in the library.

*Five hours a week for sixteen weeks.*

A 5. **DECLAMATIONS.**—During the freshman and sophomore years the student is required to give ten declamations before his class each year—four in the fall and six in the spring. During the junior year he is required to give two declamations in the fall and three in the spring. In the senior year he takes part in a public debate.

A 6. **THEMES.**—During his sophomore year the student writes five themes, each containing from 1,200 to 1,500 words. The themes are historical in character—the results of the student’s reading on special epochs of history, or of his study of the lives of historic men. In his junior year he prepares the same number of themes, each containing from 1,500 to 2,000 words. He also submits a theme for a prize at the close of the year. In the senior year, he writes themes, prepares orations, or takes part in debates.

A 7. **EUROPEAN LITERATURE.**—An outline of the best literature of the principal European nations, since the revival of learning. The class-room work is supplemented by reading.

*Five hours a week for twenty weeks.* **MISS FERNALD.**

**B—MODERN LANGUAGES.**

**MR. NICHOLS; MR. ANDREWS; MR. THAYER.**

B 1. **FRENCH.**—The object of this course is to enable the student to acquire the essentials of the grammar, and the ability to read moderately easy novels.

The text-books are: Grandgent, Short French Grammar; Verne, *L’Expédition de la Jeune-Hardie*; Erckmann-Chatrian,
Le Conscrit de 1813; Molière, L'Avare; De Musset, Pierre et Camille. *Five hours a week for sixteen weeks.* Mr. Nichols; Mr. Thayer.

B 2. FRENCH.—This course is for the study of advanced grammar and composition in connection with considerable reading of French.

The text-books are: Merimée, Colomba; Balzac, Le Curé de Tours; Sand, La Petite Fadette; Sainte-Beuve, Selected Essays; Hugo, Hernani. *Five hours a week for twenty weeks.* Mr. Nichols; Mr. Thayer.

B 3. FRENCH.—Selections from French writers of the second half of the 19th century. *Five hours a fortnight for sixteen weeks.* Mr. Nichols.

B 4. FRENCH.—Selections from French writers of the first half of the 19th century. *Five hours a fortnight for twenty weeks.* Mr. Nichols.

B 5. GERMAN.—A general introductory course covering the main parts of the grammar.

The text-books are: Otis, Elementary German; Stern, Studien und Plaudereien; Storm, Immensee. *Five hours a week for sixteen weeks.* Mr. Andrews.

B 6. GERMAN.—Riehl, Burg Neideck; Lessing, Minna von Barnhelm; Schiller, Wilhelm Tell. *Five hours a week for twenty weeks.* Mr. Andrews.

B 7. GERMAN.—Goethe’s Faust.

*Five hours a fortnight for sixteen weeks.* Mr. Nichols.

B 8. GERMAN.—Schiller’s Wallenstein.

*Five hours a fortnight for twenty weeks.* Mr. Nichols.

B 9. SPANISH.—This course is designed to enable the student to read Spanish with only occasional difficulty of vocabulary or idiom. Given in 1896–7, and alternate years. Elective for those having completed course 2.

The text-books are: Edgren, Spanish Grammar; Knapp, Spanish Readings; Calderon, La Vida es Sueño. *Five hours a fortnight for sixteen weeks.* Mr. Nichols.

B 10. SPANISH.—A continuation of course 9.

*Five hours a fortnight for twenty weeks.* Mr. Nichols.
B 11. ITALIAN.—The main aim of this course is a reading knowledge of Italian. Given in 1897-8, and alternate years. Elective for those having completed course 2.

The text-books are: Grandgent, Italian Grammar; De Amicis, Cuore, and Alberto; Manzoni, I promessi Sposi. Five hours a fortnight for sixteen weeks. Mr. Nichols.

B 12. ITALIAN.—A continuation of course 11.
Five hours a fortnight for twenty weeks. Mr. Nichols.


One hour a week, counting as two, for sixteen weeks. Mr. Nichols.

One hour a week, counting as two, for twenty weeks. Mr. Nichols.

C—LATIN.

Mr. Andrews.

C 1. LIVY.—History of Rome, books I, II, XXI and XXII. The text-book is Lincoln's Livy. Five hours a week for sixteen weeks.

C 2. CICERO.—De Amicitia and De Senectute, selected letters. The text-book is Montague's Letters of Cicero. Five hours a week for twenty weeks.


C 7. JUVENAL AND HORACE.—The text-books are Lindsay's Satires of Juvenal, and Kirkland's Satires and Epistles of Horace. **Five hours a fortnight for sixteen weeks.**

C 8. TACITUS AND QUINTILIAN.—Annals. Quintilian, Institutes, book X.

The text-books are Tyler's Histories of Tacitus, and Frieze's Institutes of Quintilian. **Five hours a week for twenty weeks.**

D—LOGIC AND CIVICS.

**Professor Rogers.**

D 1. GENERAL HISTORY.—The text-book is Myer's General History. **One hour a week for sixteen weeks.**

D 2. GENERAL HISTORY.—A continuation of course 1. **One hour a week for twenty weeks.**

D 3. GENERAL HISTORY.—A study of primitive institutions and customs.

The text-book is Tylor's Anthropology. **Five hours a fortnight for twenty weeks.**

D 4. ENGLISH HISTORY.—The text-book is Green's Shorter History of the English People. **Five hours a fortnight for sixteen weeks.**

D 5. AMERICAN HISTORY.—Lectures, supplemented by topical investigation and study. **Two hours a week for twenty weeks.**

D 6. THE PHILOSOPHY OF HISTORY.—The literature, learning, political and economic conditions of the great historic nations, and the growth of their institutions.

The text-book, Fisher's Outlines of General History, is supplemented by lectures and topical studies. Offered in even years. **Five hours a fortnight for sixteen weeks.**

D 7. PSYCHOLOGY.—In the brief time allotted to this subject only its outlines can be considered. **Five hours a week for ten weeks.**

D 8. PSYCHOLOGY.—A course similar to course 7. **Five hours a fortnight for twenty weeks.**
D 9. Logic.—The object of this course is to give the student a just appreciation of the functions of language as a means of expressing thought, and familiarity with the principles of deductive and inductive reasoning. The student is given frequent drill in the application of logical principles. Lectures.

*Five hours a week for ten weeks.*


D 11. Constitutional Law and History.—An outline of Anglo-Saxon institutions, the development of the English Constitution, the growth and political conditions of the American colonies, the Articles of Confederation, the adoption of the Constitution, and the comparative study of the Federal and the State Constitution from the historical and legal standpoints.

The text-book is Roger's Our System of Government. *Five hours a week for sixteen weeks.*

D 12. Political Economy.—Instruction is given by lectures. Topical readings and investigation are required.

*Five hours a week for twenty weeks.*

D 13. Municipal Law.—Lectures on the general principles of contracts, sales, notes, bills, conveyancing, agency, bailments, and insurance.

*One hour a week for twenty weeks.*


D 15. Library Work.—The aim of this work is to familiarize the student with the literature of history and economies and to teach him to make critical and independent investigation of questions arising in connection with these subjects.

† *Five hours a week for twenty weeks.*
E - MATHEMATICS AND ASTRONOMY.

Professor Hart; Professor Fernald; Mr. Robinson; Mr. Walker.

E 1. SOLID GEOMETRY.—Solid and spherical geometry, including the mensuration of solids, and original demonstrations.
The text-book is Baker's Solid Geometry. Five hours a week for eight weeks. Mr. Robinson; Mr. Walker.

E 2. ALGEBRA.—Review of quadratic equations and of the binomial theorem with integral, fractional, and negative exponents; variation; progression; convergence and divergence of series.
The text-book is Wells' College Algebra. Five hours a week for eight weeks. Mr. Robinson; Mr. Walker.

E 3. ALGEBRA.—Undetermined coefficients; partial fractions; permutations and combinations; probability; logarithms; exponential and logarithmic series; computation of logarithms; the theory of equations.
The text-book is Wells' College Algebra. Five hours a week for eight weeks. Mr. Robinson; Mr. Walker.

E 4. TRIGONOMETRY.—Plane and spherical trigonometry.
The text-book is Bowser's Elements of Trigonometry. Five hours a week for twelve weeks. Mr. Robinson.

E 5. ANALYTICAL GEOMETRY.—A brief study of the point, right line, and conic sections.
The text-book is Briggs' Analytic Geometry. Five hours a fortnight for sixteen weeks. Mr. Robinson.

E 6. ANALYTICAL GEOMETRY.—A more extended course; the straight line and conic sections, including polar and oblique coordinates; equation of the second degree; introduction to solid analytical geometry.
The text-book is Nichols' Analytic Geometry. Five hours a week for sixteen weeks. Prof. Hart; Prof. Fernald.

E 7. CALCULUS.—Differentiation; integration by fundamental formulas; integration regarded as a summation; definite integrals.
The text-book is Osborne's Differential and Integral Calculus. *Five hours a week for twenty weeks.* Prof. Hart; Prof. Fernald.

E 8. **Calculus.**—Applications of differential calculus; various methods of integration; applications of integral calculus. The text-book is Osborne's Differential and Integral Calculus. *Five hours a fortnight for sixteen weeks.* Prof. Hart.

E 9. **Descriptive Astronomy.**—The text-book is supplemented by informal lectures, and illustrated by lantern slides, the Trouvelot drawings of celestial objects, and observations with an equatorial telescope.

The text-book is Young's Elements of Astronomy. *Five hours a fortnight for twenty weeks.* Prof. Hart.

E 10. **Practical Astronomy.**—Problems in the conversion of time, the determination of terrestrial latitudes and longitudes, and the establishment of meridian lines. The instruments used are the sextant, and artificial horizon, a portable chronometer, theodolite, and vertical circle. *Five hours a fortnight for twenty weeks.* Prof. Hart.

E 11. **Advanced Algebra.**—Determinants and the solution of higher equations.

*Five hours a fortnight for twenty weeks.* Prof. Hart.

E 12. **Modern Analytical Geometry.**—An introduction to the use of trilinear coordinates, determinants, and the abridged notation in the study of the conic sections and solid geometry. Given in 1897-8 and alternate years. *Five hours a fortnight for sixteen weeks.* Prof. Hart.

E 13. **Advanced Integral Calculus.** Chapters from Byerly's Integral Calculus, with lectures. Given in 1897-8 and alternate years. *Five hours a fortnight for twenty weeks.* Prof. Hart.

E 14. **Theory of Equations.**—Given in 1896-7 and alternate years.

E. 15. **DIFFERENTIAL EQUATIONS.**—Given in 1896-7 and alternate years.

The text-book is Osborne's Examples of Differential Equations. *Five hours a fortnight for twenty weeks.* **Prof. Hart.**

E 16. **PRACTICAL ASTRONOMY.**—The theory and use of the sextant, universal instrument, transit, and zenith telescope. Given in 1897-8 and alternate years.

*Five hours a fortnight for sixteen weeks.* **Prof. Hart.**

E 17. **PRACTICAL ASTRONOMY.**—A continuation of course 16.

Given in 1897-8 and alternate years.

*Five hours a week for twenty weeks.* **Prof. Hart.**

F—PHYSICS.

**Professor Stevens; Mr. Weston.**

F 1. **GENERAL PHYSICS.**—Recitations and problems; experiments before the class, and lectures on modern physical theories and subjects not discussed in the text-book.

The text-book is Carhart's University Physics. *Five hours a week for sixteen weeks.* **Prof. Stevens; Mr. Weston.**

F 2. **GENERAL PHYSICS.**—A continuation of course 1.

The text-book is Carhart's University Physics. *Five hours a fortnight for twenty weeks.* **Prof. Stevens; Mr. Weston.**

F 3. **ELEMENTARY PHYSICS.**—A non-mathematical course, covering the ground of course 1. The recitations are supplemented by lectures and experimental demonstrations.

The text-book is Carhart and Patterson's Elements of Physics. *Five hours a fortnight for sixteen weeks.* **Mr. Weston.**

F 4. **ELEMENTARY PHYSICS.**—A continuation of course 3.

The text-book is Carhart and Patterson's Elements of Physics. *Five hours a fortnight for twenty weeks.* **Mr. Weston.**

F 5. **LABORATORY PHYSICS.**—The subjects usually included in an under-graduate course. Especial attention is given to the reduction of observations, and the tabulation of results.

Nichols' Laboratory Manual is made the basis of most of the experiments. †*Five hours a week for twenty weeks.* **Prof. Stevens; Mr. Weston.**
F 6. LABORATORY PHYSICS.—This course is arranged with special reference to the needs of students in the short course in pharmacy. It includes calibration, thermometry, distillation, the theory and use of balances, the determination of specific gravity and specific heat of solids and liquids by the usual methods.

† Three hours a week for twenty weeks. MR. WESTON.

F 7. ADVANCED OPTICS.—Lectures in continuation of course 1, based chiefly upon Preston’s Light.

Five hours a fortnight for sixteen weeks. PROF. STEVENS.

F 8. MATHEMATICAL PHYSICS.—One course in mathematical physics is offered each year. This year it is a general mathematical course.

Five hours a fortnight for sixteen weeks. PROF. STEVENS.

F 9. LABORATORY PHYSICS.—General laboratory work in continuation of course 5.

† Five hours a week for sixteen weeks. PROF. STEVENS.

F 10. LABORATORY PHYSICS — Advanced laboratory work in optics, in continuation of course 9.

† Five hours a week for twenty weeks. PROF. STEVENS.

G—DRAWING.

Mr. BOARDMAN.

G 1. DRAWING.—Free-hand work in perspective and model drawing.

The text-book is Prang’s Form Study and Drawing. † Five hours a week for sixteen weeks.

G 2. MATHEMATICAL DRAWING.—The plotting of functions, and the solution of equations by the graphic method.

† Three hours a week for ten weeks.

G 3. MECHANICAL DRAWING.—Instruction and practice in the care and use of drawing instruments, in the drawing of geometrical problems, and in the use of water colors. Especial attention is given to accuracy and neatness.

† Five hours a week for twenty weeks.
G 4. MECHANICAL DRAWING.—Problems in shades and shadows, and dimension drawing.

The text-book is Faunce’s Mechanical Drawing. † Seven hours a week for sixteen weeks.

G 5. GENERAL DRAWING.—Isometric and cabinet projections, perspective, and the preparation of working drawings. Lectures and exercises in the drawing room.

† Ten hours a week for twelve weeks.

G 6. DESCRIPTIVE GEOMETRY.—The time is divided equally between the recitation room and drawing room. The drawing consists of sixteen elementary problems, twelve tangent problems, and eight problems in working out the curves of intersection of planes, cylinders, cones, spheres, etc.

The text-book is Church’s Descriptive Geometry. Five hours a fortnight for sixteen weeks.

G 7. DESCRIPTIVE GEOMETRY.—A continuation of course 6.

Three hours a fortnight for twenty weeks.

G 8. STEREOTOMY.—The application of the methods of descriptive geometry to the preparation of drawings for retaining walls, bridge abutments, piers, arches, etc.

† Three hours a week for twenty weeks.

G 9. DETAIL DRAWING.—The preparation of complete working drawings of an electrical machine from a model.

† Four hours a week for twenty weeks.

H.—CHEMISTRY.

PROFESSOR AUBERT; MR. COLBY; MR. JACKMAN.

H 1. GENERAL CHEMISTRY.—Recitations and lectures on the general principles of chemistry, illustrated by charts, experiments, etc.

The text-books are Fisher’s Lessons in Elementary Chemistry, and Hart’s Laboratory Exercises for Beginners in Chemistry. Five hours a fortnight for sixteen weeks. PROF. AUBERT; MR. COLBY.
H 2. GENERAL CHEMISTRY.—A continuation of course 1. One exercise in each week is given to introductory laboratory work, consisting of the preparation of the more common elements and inorganic compounds, a study of their properties, and of elementary qualitative analysis.

The text-books are Fisher's Lessons in Elementary Chemistry, Attfield's Chemistry, and Hart's Laboratory Exercises for Beginners in Chemistry. *Five hours a fortnight for twenty weeks.* Prof. Aubert; Mr. Colby; Mr. Jackman.

H 3. CHEMICAL THEORY.—The text-book is Walker and Dobson's Chemical Theory. *Five hours a fortnight for sixteen weeks.* Mr. Colby.

H 4. INORGANIC CHEMISTRY.—The non-metallic elements.

The text-book is Serres Principes de Chimie, vol. 1. *Five hours a fortnight for twenty weeks.* Mr. Colby.

H 5. INORGANIC CHEMISTRY.—The metals.

The text-book is Serres Principes de Chimie, vol. 2. *Five hours a fortnight for sixteen weeks.* Mr. Colby.

H 6. ORGANIC CHEMISTRY.—Lectures and recitations, illustrated by specimens from the collection of organic chemicals; and supplemented by a laboratory course in the preparation of organic compounds.

The text-book is Serres Principes de Chimie, vol. 3. *Five hours a fortnight for twenty weeks.* Prof. Aubert.

H 7. ORGANIC CHEMISTRY.—A short course setting forth the properties of organic compounds, the general methods of preparing them, and special methods for preparing some of the most important.

The text-book is Turpin's Organic Chemistry. *Five hours a fortnight for sixteen weeks.* Prof. Aubert.

H 8. CHEMICAL READING.—Study and translations of foreign works.

One hour a week for sixteen weeks. Prof. Aubert.

H 9. LABORATORY PROCESSES.—Laboratory methods and processes used in the arts.

*Five hours a fortnight for sixteen weeks.* Prof. Aubert.
H 10. **Organic Chemicals.**—The more common forms of apparatus and processes used in the preparation and synthesis of organic substances.
Cohen's Practical Organic Chemistry is used for reference.
† Twenty-two hours a week for four weeks. Prof. Aubert.

H 11. **Photography.**—Lectures on photography and photographic chemistry, and practical work.
† Two hours a week for twenty weeks. Mr. Colby.

H 12. **Mineralogy.**—Determinative mineralogy and blowpipe analysis.
The text-books are Dana's Manual of Mineralogy and Petrography, and Crosby's Tables for Determination of Minerals.
† Two hours a week for twenty weeks. Mr. Colby.

H 13. **Qualitative Analysis.**—The determination and separation of acids and bases in simple and complex substances; and the writing of the reactions.
The text-book is Medicus' Qualitative Analysis. The time varies; it is stated in the tables. Mr. Colby.

H 14. **Advanced Qualitative Analysis.**—The text-book is Medicus' Qualitative Analysis. The time varies; it is stated in the tables. Mr. Colby.

H 15. **Elementary Quantitative Analysis.**—The gravimetric determination of simple substances.
The text-book is Appleton's Quantitative Analysis. The time varies; it is stated in the tables. Prof. Aubert.

H 16. **Quantitative Analysis.**—A continuation of course 15. The time varies; it is stated in the tables. Prof. Aubert.

H 17. **Quantitative Analysis.**—Analysis of complex alloys, minerals, etc.
The text-book is Cowles and Coleman's Quantitative Analysis.† Ten hours for sixteen weeks. Prof. Aubert.

H 18. **Volumetric Analysis and Assaying.**—Acidimetry, alka-limetry, oxydimetry; gold and silver assaying.
The text-book is Cowles and Coleman's Quantitative Analysis, and Clark's Assay Notes. The time varies; it is stated in the tables. Prof. Aubert.
H 19. AGRICULTURAL ANALYSIS.—The analysis of fodders, fertilizers, milk, and other agricultural products. The methods are those recommended by the Association of Official Agricultural Chemists.

The time varies; it is stated in the tables. PROF. AUBERT.

H 20. TOXICOLOGY AND BIOLOGICAL ANALYSIS.—The determination of the commoner poisons; the analysis of urine and other animal secretions and products, normal and pathological.

The text-book is Witthaws’ Urinalysis. The time varies; it is stated in the tables. PROF. AUBERT.

H 21. THESIS WORK.—Each student in the chemical course is required, as a condition of graduation, to prepare a thesis on some chemical subject embodying the results of original work in analysis or research.

† Twenty-two hours a week for sixteen weeks.

I—NATURAL HISTORY.

PROFESSOR HARVEY.

I 1.—CRYPTOGAMIC BOTANY.—A detailed study of about thirty type forms. Special attention is given to useful and injurious fungi, to fungicides and spraying apparatus. Students collect specimens and prepare a herbarium.

The facilities are a convenient laboratory, a good working library, a herbarium of five thousand species, a set of Brendel models, charts, and a rich local cryptogamic flora.

Five hours a fortnight for sixteen weeks.

I 2. LABORATORY BOTANY.—The use of the microscope, micrometers, camera lucida and microtome; the preparation of slides; the analysis, description, classification, illustration of cryptogams, and their preparation for the herbarium.

† Two hours a week for sixteen weeks.

I 3. ADVANCED PHYSIOLOGY.—Lectures on the anatomy, physiology, hygiene and pathology of the human body, illustrated by a skeleton, manikin, models of the human larynx, ear, eye, and brain, charts, microscopic slides, fresh, dried, and alcoholic material.

Five hours a fortnight for twenty weeks.
I 4. **Laboratory Physiology.**—Examination of skeleton, manikin, charts, models, microscopic slides, and the dissection of lower animals.

† *Two hours a week for twenty weeks.*

I 5. **Invertebrate Zoology.**—The detailed study of type forms of all the branches. The student uses the compound microscope, makes dissections and careful drawings, and classifies the forms studied. Fresh, dried, and alcoholic materials, charts, models, and the working library of reference books are in constant use.

*Five hours a fortnight for sixteen weeks.*

I 6. **Laboratory Zoology.**—A continuation of course 5.

† *Five hours a week for sixteen weeks.*

I 7. **Helminthology.**—A course in zoology with especial attention to helminthology.

† *Four hours a week for twenty weeks.*

I 8. **Comparative Vertebrate Zoology.**—A comparative study of type forms of vertebrate animals. Special attention is given to the zoology of the domestic animals. The department is provided with a set of Auzoux's models and a good working collection of type forms.

The text-book is Packard's Zoology. *Seven hours a fortnight for sixteen weeks.*

I 9. **Laboratory Zoology.**—Museum work; study of charts, and models; dissections of a fish, frog, turtle, bird, and rat; methods of preparing specimens for collections.

† *Four hours a week for twenty weeks.*

I 10. **Entomology.**—The anatomy, physiology, classification, and economic importance of insects. The department has for illustration a collection of insects, charts, models, and an abundant insect fauna.

The text-books are Packard's Entomology for Beginners, and Comstock's Entomology. *Five hours a fortnight for twenty weeks.*

I 11. **Geology.**—Especially attention is given to the origin and formation of soils, to the method of conducting a geological sur-
vey, and to the geology of Maine. The course is illustrated by mineral, rock, and fossil specimens, and by charts, maps, and diagrams.

The text-book is Le Conte's Elements of Geology. *Five hours a fortnight for sixteen weeks.*

I 12. HUMAN ANATOMY.—A detailed study of the human skeleton. Examination of a manikin showing details of the respiratory, digestive, circulatory, reproductive, depurgatory, nervous, and muscular systems, and of the organs of the special senses.

The text-book is Gray's Anatomy. *Five hours a fortnight for twenty weeks.*

J—AGRICULTURE.

PROFESSOR WOODS; PROFESSOR GOWELL; DR. RUSSELL; DR. FAY.

J 1. BIOLOGICAL CHEMISTRY.—Lectures and recitations on the chemical changes in nature important to agriculture, the composition of air, soils, natural waters, and plants, the sources and assimilation of plant food, and the chemical processes and methods of investigation by which these subjects are studied.

The text-book is Johnson's How Crops Grow. *Five hours a fortnight for sixteen weeks.* DR. FAY.

J 2. BIOLOGICAL CHEMISTRY.—A continuation of course 1. Lectures and recitations in physiological chemistry, including the composition of the animal body, the composition of food materials, the chemical changes involved in the digestion and assimilation of food; also the chemistry of milk and dairy products, and the chemical processes and methods of investigation by which these subjects are studied.

The text-book is Halliburton's Chemical Physiology and Pathology. *Five hours a week for twenty weeks.* DR. FAY.

J 3. AGRICULTURAL CHEMISTRY.—Lectures on the origin, composition, preparation and use of commercial fertilizers, the supply, composition, care and use of farm manures, and the general considerations which pertain to the maintenance of soil fertility.

*Five hours a fortnight for eight weeks.* PROF. WOODS
J 4. AGRICULTURAL PHYSICS.—Lectures on the relation of soils to heat and moisture, the mechanical condition of soils best suited to plant growth, and the objects to be gained by cultivation.

*Five hours a fortnight for ten weeks.* Prof. Woods.

J 5. AGRICULTURAL ENGINEERING.—Lectures on farm drainage, irrigation, water supply for stock and household, farm implements and machinery, handling crops, and construction of farm buildings, sites, etc.

*Five hours a fortnight for ten weeks.* Prof. Gowell.

J 6. STOCK FEEDING.—Lectures on the production of cattle foods and their composition, on formulating rations for milk and meat production, and application of the lectures to the animals in the herd.

The text-books are Armsby's Cattle Feeding, Stewart's Feeding Animals, and experiment station reports. *Five hours a fortnight for eight weeks.* Prof. Gowell.

J 7. DAIRYING.—Lectures upon the formation and composition of milk; sources of infection; bacteria and their relation to dairying; ferment and their effects.


J 8. STOCK BREEDING.—Lectures upon animal reproduction, the principles of breeding, and the means of improvement and development. Practice is given in judging animals by a scale of points.

The text-books are Miles's Cattle Breeding, Sauner's Horse Breeding, and Curtis' Breeds. *Five hours a week for eight weeks.* Prof. Gowell.

J 9. POULTRY INDUSTRY.—Lectures, with practice in handling poultry, and judging by a scale of points; in breeding; in hatching by natural and artificial processes; and in the use of machinery. Caponizing, and the construction and arrangement of buildings receive careful attention.

*Five hours a week for six weeks.—Prof. Gowell.*
J 10. Dairy Practice.—The treatment and handling of milk and cream; milk testing for fat and other solids; aeration, pasteurization and sterilization of milk and cream; the application of acid tests and ferments to butter and cheese making; operating and caring for the boiler, engine, gravity creamers, centrifugal separators, churns, workers, vats, presses, and the making, curing and judging of butter and cheese, together with the business management of factories and creameries. Each student must provide himself with two suits of clothes made of white drilling.

†Seven hours a week for fourteen weeks. Prof. Gowell.

J 11. Veterinary Science.—Lectures, demonstrations and clinics, illustrated by models, natural preparations, and living animals.

Five hours a fortnight for twenty weeks. Dr. Russell.

J 12. Dissecting.—A brief course intended to make the student familiar with the location and appearance of the more important organs of the animal body.

†Seven hours a week for six weeks. Dr. Russell.

J 13. Bacteriology.—Methods of cultivating bacteria, the morphological and biological character of bacteria and fungi, particularly of those relating to disease, and of those of importance from an economic standpoint, the methods of making biological examinations of air, water, etc. During the time given to laboratory work, exercises in this course will be held every day, and the number of exercises will be correspondingly decreased. The instructor will arrange for an exchange of time with other laboratory courses.

†Five hours a week for ten weeks. Dr. Russell.

J 14. Animal Histology.—Dissecting and the preparation of the most important tissues and organs, accompanied with lectures and recitation.

†Ten hours a week for ten weeks. Dr. Russell.

J 15. Laboratory Bacteriology.—An advanced course.

†Ten hours a week for ten weeks. Dr. Russell.
K—HORTICULTURE.

PROFESSOR MUNSON.

K 1. Pomology.—The economic importance, methods of culture, and marketing of fruits; the principles and practice of spraying plants.
   *Five hours a fortnight for ten weeks.*

K 2. Oleiculture, or Vegetable Gardening.—The history and uses of leading garden vegetables, with directions for their culture in the field and under glass. Lectures and practical demonstrations.
   *Five hours a fortnight for ten weeks.*

K 3. Plant Variation.—A discussion of the underlying principles of horticulture. The origin and distribution of cultivated plants; their variation as affected by soil, climate, and cultivation; a systematic study of plant breeding, including the methods and effects of crossing, the principles of selection, and the influence of heredity. Students in this course must have taken course 7.
   *Five hours a fortnight for eight weeks.*

K 4. Landscape Gardening.—The principles of landscape art and their application.
   *Five hours a fortnight for eight weeks.*

K 5. Laboratory Horticulture.—The propagation and culture of plants, the construction and management of forcing structures, and the making of plans for rural improvements.
   †*Four hours a week for twenty weeks.*

K 6. Laboratory Horticulture.—A continuation of course 5.
   †*Five hours a week for sixteen weeks.*

K 7. General Botany.—The structure and functions of the organs of plants; the development and relationship of the leading groups. Lectures, supplemented by laboratory work in the greenhouses and the field.

Gray’s School and Field Book of Botany is used for reference.
   †*Five hours a week for twenty weeks.*
K 8. **Histology of Plants.**—A description and comparison of tissues with investigation of the minute anatomy of vegetable organs and studies in the phenomena of cell development and fertilization.

† *Five hours a week for ten weeks.*

**L—Pharmacy.**

**Mr. Jackman.**

**L 1. Physical and Official Pharmacy.**—The history of pharmacopoeias, dispensatories, etc.; weights and measures, specific gravity, the pharmaceutical uses of heat, distillation, solution, filtration, etc.; official preparations; pharmaceutical problems, involving percentage solutions, parts by weight, and measure, chemical principles and equations, actual pharmacy operations.

The text-book is Remington’s Practice of Pharmacy. *Five hours a week for sixteen weeks.*

**L 2. Inorganic, Organic, and Extemporaneous Pharmacy.**—The elements, the official salts, and inorganic acids, their preparation and classification. Organic compounds, their classification, official preparations; official drugs of the Materia Medica classified according to their proximate principles, the preparations of these drugs, etc., animal preparations. Extemporaneous pharmacy; the principles of dispensing, store management, etc.

The text-book is Remington’s Practice of Pharmacy, *Five hours a week for sixteen weeks.*

**L 3. Laboratory Pharmacy.**—Official preparations and tests. The operations of manufacturing pharmacy, including the preparation of granular and scale salts, infusions, syrups, tinctures, etc. Official tests of chemicals, drugs, and preparations, for identity, strength, adulteration, etc.

The text-book is Remington’s Practice of Pharmacy, or the U. S. Pharmacopoeia. † *Ten hours a week for sixteen weeks.*

**L 4. Pharmacopoeia and Prescriptions.**—A complete review of the pharmacopoeia, with especial reference to the chemical and pharmaceutical principles involved in processes and preparations; critical examination of copies of prescriptions
from actual files, with reference to inelegance, physiological pharmaceutical, and chemical incompatibility; doses; methods and order of compounding, etc.

The text-book is Remington's Practice of Pharmacy. *Three hours a week for twenty weeks.*

L 5. **INORGANIC PHARMACOGNOSY.**—Official and common names, practical exercises in the identification of specimens.

The text-book is the Era Key to the U. S. Pharmacopoeia. *Five hours a fortnight for sixteen weeks.*

L 6. **ORGANIC PHARMACOGNOSY.**—Official and common names, practical exercises.

The text-book is the Era Key to the U. S. Pharmacopoeia. *Four hours a week for twenty weeks.*

L 7. **MATERIA MEDICA.**—Chemicals and drugs, their nature, uses, classification, therapeutic action, and doses; poisons, and antidotes.

The text-book is White and Wilcox's Materia Medica. *Three hours a week for sixteen weeks.*

L 8. **THESIS WORK.**—Each student in the pharmacy courses is required, as a condition of graduation, to prepare a thesis, embodying the results of original work in analysis or research.

† *Ten hours a week for twenty weeks.*

**M—CIVIL ENGINEERING.**

**Professor Hamlin; Assistant Professor Grover.**

M 1. **PLANE SURVEYING.**—Recitations on the general principles of land surveying; the laying out of land, the dividing of land, surveying of public lands, direct leveling, and the variation of the magnetic needle.

The text-book is Johnson's Surveying. *Twenty weeks, three hours a week during the first ten weeks, and two hours a week during the last ten weeks.* Prof. Grover.

M 2. **FIELD WORK IN SURVEYING.**—The uses of the chain, compass, transit, and level. Instruments are adjusted, original surveys made, and old lines retraced. Deeds are examined, and descriptions of property traced back in the Penobscot County Registry of Deeds. Plats are prepared of the surveys made in the field.
Twelve weeks, †three hours a week during the first ten weeks, and †five hours a week during the second ten weeks. Prof. Grover.

M 3. Railroad Engineering.—Lectures and recitations on the theory of railroad curves, switches, turnouts and slope stakes, the calculation of earth works, and the resistance to trains offered by grades and curves, and the theory of economic location.

The text-book is Searles's Field Engineering. Seven hours a fortnight for twelve weeks. Prof. Grover.

M 4. Railroad Work.—The location and detailed survey of a railroad several miles long. The curves are laid out, levels taken, and all the necessary measurements made to enable the student to compute the excavations and embankments and estimate the cost of construction.

†Five hours a week for sixteen weeks. Prof. Grover.

M 5. Highway Engineering.—The location, construction, and improvement of country roads under different conditions of soil, climate, and traffic.

Seven hours a fortnight for four weeks. Prof. Grover.

M 6. Mechanics.—Problems in the composition and resolution of forces, followed by exercises in finding the moment of inertia, the center of gravity, the shearing force, and bending moment.


M 8. Graphic Statics.—The principles involved in the graphical resolution of forces are given by lectures. The stresses in the different parts of various trusses, under uniform or concentrated loads, are determined graphically in the drawing room.

Five hours a fortnight for sixteen weeks. Prof. Grover.


Five hours a fortnight for sixteen weeks. Prof. HamlIn.
M 10. **Higher Surveying.**—The plane table, the solar compass as applied to the survey of public lands, stadia measurements, topographical surveying, the elements of geodesy, the measurement of base lines, calculation of a system of triangulation.

†*Ten hours a week for eight weeks.* Prof. HAMLIN.

M 11. **Hydraulics.**—The weight, pressure, and motion of water; the flow of water through orifices and pipes; weir gauging; the flow of water in open channels, mains, and distribution pipes; distribution systems; the construction of water works for towns and cities.

The text-books are Fanning’s Hydraulics, and Church’s Mechanics of Engineering. *Five hours a week for seven weeks.* Prof. HAMLIN.

M 12. **Hydraulics Field Work.**—The measurement of the flow of rivers is illustrated by the application of the current meter and the various forms of floats to the Penobscot River or some of its large branches. The department is well supplied with apparatus.

†*Seven hours a week for eight weeks.* Prof. HAMLIN.

M 13. **Mechanics of Materials.**—A detailed study of the properties of materials used in engineering structures, such as iron, steel, wood; and their resistance to bending, breaking, extension, and compression, under the various conditions of practice. The testing laboratory is well equipped.

The text-books are Lanza’s Mechanics, Merriman’s Mechanics, Church’s Mechanics of Materials. Lectures. *Five hours a week for nine weeks.* Prof. HAMLIN.

M 14. **Foundations, Masonry Construction, and Cements.** The testing and use of the materials of masonry construction. Among the subjects considered are different classes of foundations, natural and artificial; the stability of dams and retaining walls; the designing of bridge piers and abutments. The class room work is supplemented by exercises in the laboratory.

The text-book is Baker’s Masonry Construction. *Seven hours a fortnight for twenty weeks.* Prof. HAMLIN.
M 15. DESIGNING.—The student is taught the method of calculating the stresses in the various forms of roof and bridge trusses, and the methods of loading.

The text-book is Johnson's Modern Framed Structures. † Seven hours a week for eight weeks. Prof. Hamlin.

M 16. DESIGNING AND THESIS WORK.—A continuation of course 15. Designs for bridges in wood and in iron, working out the dimensions of the parts, and preparing the drawings for the shop.

† Twelve hours a week for twenty weeks. Prof. Hamlin.

N—MECHANICAL ENGINEERING.

Professor Flint; Mr. Webb; Mr. Walker.

N 1. MACHINE DESIGN.—Rules and formulas are applied to existing machines of standard manufacture for the comparison of the actual and theoretical dimensions. In connection with this work the student is required to design a complete speed lathe and make working drawings for its construction.

The text-book is Benjamin's Machine Design. † Seven hours a week for twenty weeks. Prof. Flint.

N 2. MACHINE DESIGN.—A brief course.

The text-book is Benjamin's Machine Design. † Seven hours a fortnight for twenty weeks. Prof. Flint.

N 3. CARPENTRY.—Instruction and practice in the care and sharpening of tools, the squaring of stock, and taking work out of wood; followed by practice in making the different joints in soft and hard wood. Wood turning. The charge for materials is $5.00 a term.

† Six hours a week for sixteen weeks. Mr. Walker.

N 4. FORGE WORK.—Drawing and upsetting; the welding of straight pieces of various sizes, the making of rings, and chain links, the welding of eye bolts and bolt heads, etc. Each student makes from steel a center punch, cold chisels, and a full set of lathe tools, which are finished and tempered for future use in the machine shop. Each student is required to furnish a
forging hammer, calipers and square at a cost of $2.50. Moulding and pouring. The charge for materials is $5.00 a term.

†Eight hours a week for twenty weeks. MR. WALKER.

N 5. ANALYTIC MECHANICS.—Elementary principles and definitions, composition and resolution of forces, center of gravity, friction, virtual velocities, elementary machines, work and energy, moment of inertia.

The text-book is Bowser’s Analytic Mechanics. Five hours a week for sixteen weeks. MR. WALKER.

N 6. ANALYTIC MECHANICS — A continuation of course 5.

The text-book is Bowser’s Analytic Mechanics. Five hours a week for eight weeks. MR. WALKER.

N 7. APPLIED MECHANICS.—Stress, its resultants and centers, moments, moments of inertia, theory of mechanism, uniform motion under balanced forces, rotation of rigid bodies.

The text-book is Rankine’s Applied Mechanics. Five hours a week for twelve weeks. MR. WALKER.

N 8. APPLIED MECHANICS.—The theory of structures.

The text-book is Rankine’s Applied Mechanics. Five hours a fortnight for sixteen weeks. MR. WALKER.


†Five hours a week for sixteen weeks. PROF. FLINT.

N 10. KINEMATICS.—A brief course.

†Three hours a week for sixteen weeks. PROF. FLINT.

N 11. LINK AND VALVE MOTION.—The design and proportion of engine cylinders, steam pipes, and ports, the design and working of engine valves, the setting of eccentrics, adjustable eccentrics, the design and working of the locomotive link motion with its connections. Problems in slide valve and locomotive link motion are worked out in the drawing room.

The text-book is Auchincloss’ Link and Valve Motion. Five exercises, counting as four hours, a week for sixteen weeks. MR. WEBB.
N 12. LINK AND VALVE MOTION.—A brief course.

Five exercises, counting as four hours, a week for eight weeks. Mr. Webb.

N 13. MACHINE WORK.—Exercises in filing and chipping; lathe work, drilling, boring and threading in the lathe, making cut gears, machinist's taps, finished bolts, and exercises on the planer and shaper. Each student provides himself with center gauge, steel scale, and a set of files at a cost of $2.50. The charge for materials is $5.00 a term. Students who have worked in commercial shops, will be given credit for their work on presentation of satisfactory proof.

The time devoted to machine work varies; it is stated in the tables. Mr. Webb.

N 14. HYDRO-MECHANICS.—The behavior of liquids in motion and under pressure, flowing through pipes and in open channels, with problems involving a large number of different conditions.

The text-book is Bowser's Hydromechanics. Three hours a fortnight for twenty weeks. Prof. Flint.

N 15. STEAM BOILERS.—The characteristics of steam and its behavior in pipes and boilers, with particular attention to its action in the cylinders of engines. Problems involving the properties of saturated steam are solved. The student is required to design a boiler to run an engine under given conditions, and to make a complete set of detailed drawings for its construction. He is also required to calculate sizes of steam pipes and safety valves.

The text-book is Benjamin's Heat and Steam. Five hours a fortnight for twenty weeks. Prof. Flint.

N 16. STEAM BOILERS.—Additional work similar to that of course 15.

The text-book is Benjamin's Heat and Steam. Five hours a fortnight for twenty weeks. Prof. Flint.

N 17. STEAM BOILERS.—A brief course, for students in electrical engineering.

Two hours a week for twenty weeks. Prof. Flint.
N 18. TESTING.—Instruction is given in testing steam guages, boilers, etc. The properties of the various metals and their behavior under tension and compression, are illustrated by the use of the testing machine.

*Two hours a week for twenty weeks. PROF. FLINT.*

N 19. STEAM ENGINE DESIGNING.—Drawings are made of the more important parts of the design worked out in course 12.

† *Ten hours a week for sixteen weeks. PROF. FLINT.*

N 20. STEAM ENGINE.—The steam engine is studied with reference to its adaptability as a prime mover or source of power. The various details of a steam engine are calculated and drawings of them are made. The results are compared with the indicator. By means of diagrams the student is taught to determine the setting of valves, to calculate the horse power, and to estimate the water consumption, and the number of pounds of coal required per horse-power per hour.

The text-book is Whitham's Steam Engine Design. † *Ten hours a week for ten weeks. PROF. FLINT.*

N 21. THESIS WORK.—Each student in the mechanical engineering course is required to prepare a thesis, as a condition of graduation, which is to consist of a design of some piece of machinery.

† *Ten hours a week for ten weeks. PROF. FLINT.*

O—ELECTRICAL ENGINEERING.

PROFESSOR STEVENS; MR. LANPHEAR.

O 1. ELECTRICITY AND MAGNETISM.—This course continues the subject of electricity and magnetism begun in physics. Lectures are given, and laboratory methods and results are discussed with the class.

The text-book is Silvanus Thompson's Electricity and Magnetism. *Two hours a week for sixteen weeks. MR. LANPHEAR.*

O 2. ELECTRICITY AND MAGNETISM.—A continuation of course 1. The work is more directly connected with the dynamo and apparatus connected with its operation.
The text-book is Houston and Kennelly's Electrical Engineering Leaflets. *Three hours a week for twenty weeks.* Mr. Lanphear.

O 3. **Electrical Measurements and Testing.**—This is the usual junior laboratory course. The work consists of the measurement of resistance, potential, capacity, and current, the testing of galvanometers, electrolysis, etc. The charge for this course is $2.50.

†*Four hours a week for sixteen weeks.* Prof. Stevens; Mr. Lanphear.

O 4. **Electrical Machinery.**—Lectures on the theory and construction of dynamos, motors, etc.

*Two hours a week for sixteen weeks.* Mr. Lanphear.

O 5. **Electrical Engineering.**—The designing, construction, and operating of alternating current machinery and the use of direct and alternating current machinery in lighting, and the transmission of power.

*Five hours a fortnight for ten weeks.* Mr. Lanphear.

O 6. **Electrical Design.**—This course corresponds to the course in machine design given to the students in mechanical engineering. Each student is required to make the computations and complete drawings for a dynamo.

*Six hours a week for sixteen weeks.* Mr. Lanphear.

O 7. **Electrical Design.**—The problems involved in designing alternating current machinery, in the electrical transmission of power, and in the distribution of electric light.

†*Five hours a week for twenty weeks.* Mr. Lanphear.

O 8. **Laboratory Electricity.**—Tests of electrical instruments; experimental work with dynamos, motors, etc.; tests of efficiency; photometric tests of electric lamps; the practical management of the electric light plant. The charge for this course is $2.50.

†*Eight hours a week for eight weeks.* Mr. Lanphear.

O 9. **Theoretical Electricity.**—Lectures on the mathematical theory of electrical instruments. This course will be varied from year to year.

*Five hours a fortnight for ten weeks.* Prof. Stevens.
O 10. Power Stations.—The selection and arrangement of power house machinery; methods of operation. Lectures.  
Two hours a week for sixteen weeks. Mr. Lanphear.

O 11. Shop Work.—The winding of armatures and magnets, the building up of transformer cores and the winding of transformers and impedance coils, the construction of condensers for alternating current circuits, construction of rheostats and bridges, tangent and ballistic galvanometers, ammeters and other measuring instruments, a standard cell, a secondary battery, the preparation of fuse wire and fuses, the construction of automatic switches and arc lamps. The charge for this course is $5.00.
†Four hours a week for sixteen weeks. Mr. Lanphear.

O 12. Thesis Work.—A continuation of course 8. The student devotes a large part of his time to some special investigation selected as the subject for his graduating thesis. The charge for this course is $2.50.
†Six hours a week for twenty weeks. Mr. Lanphear.

P—Military Science and Tactics.

Each man student is required to take military drill, unless physically unfit, and to attend recitations in military science.

The drill, course 1, occupies the first thirteen weeks of the fall term, and the last thirteen weeks of the spring term, one hour a day, and three days in the week, counting as one hour and a half in reckoning the student's total time. The remaining three weeks in the fall term, and seven weeks in the spring term, are given: by the senior class, to recitations in military science, course 4, three recitations a fortnight; by the junior class, to recitations in military science, course 3, three recitations a fortnight; by the sophomore classes, to recitations in military science, course 2, three hours a fortnight; by the freshman class, to mathematical drawing.

P 1. Military Drill.—(a.) Infantry exercises begin with setting-up exercises and military gymnastics, and continue with manual of arms and bayonet exercise. School of the company, school of the battalion, and extended order movements follow.
(b.) Target practice at known distances up to six hundred yards, and skirmish firing over range of six hundred yards. Marksman’s buttons are awarded to cadets who qualify. (c.) Military signalling with flag, lantern, heliograph, and field telegraph. (d.) Band practice. (e.) One week is spent in camp. Cadets are instructed in the duties of a sentinal, learn advance guard and outpost duties, and work out practically the problems of minor tactics. Required of all men students.

†Three hours a week for the first thirteen and last thirteen weeks of each year.


Three hours a fortnight for ten weeks.


Three hours a fortnight for ten weeks.

P 4. Art of War.—Lectures and recitations on military science, including organization, administration, discipline and instruction of armies; logistics; security and information; manufacture and use of gunpowder; high explosives; small arms; cannon; projectiles; armor; mines and torpedoes; construction of military bridges, and destruction of bridges, roads, etc.; coast defences; military law and military history; studies on campaigns illustrating the principles of the art of war. Required of seniors.

The text-book is Mercur’s Elements of the Art of War. Three hours a fortnight for ten weeks.

Essays.—Each member of the senior class is required to submit an essay at the beginning of the spring term on a military subject, preferably allied to his other college work.