

1-1-1900

## 1899-1900 Course Catalog

University of Montana--Missoula. Office of the Registrar

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... THE ...

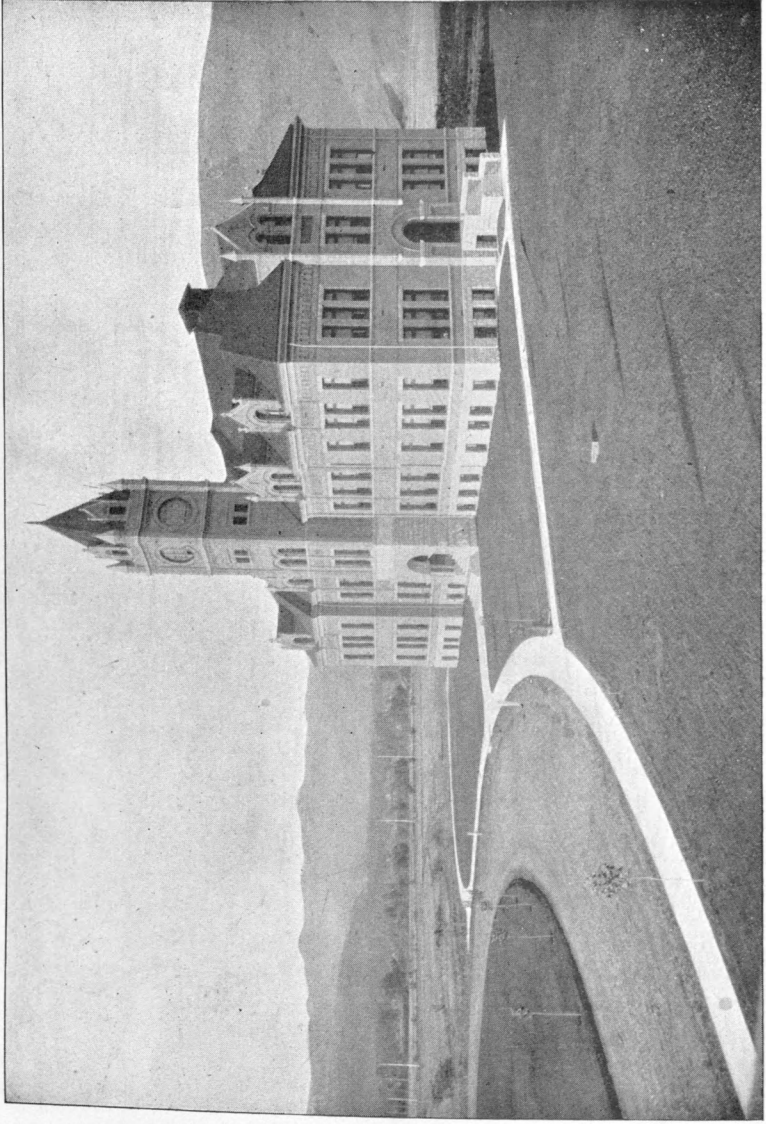
# UNIVERSITY OF MONTANA



Annual Register

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1899-1900



UNIVERSITY HALL

. . . THE . . .

FIFTH ANNUAL REGISTER

OF THE

University of Montana

Missoula, Montana

1899-1900

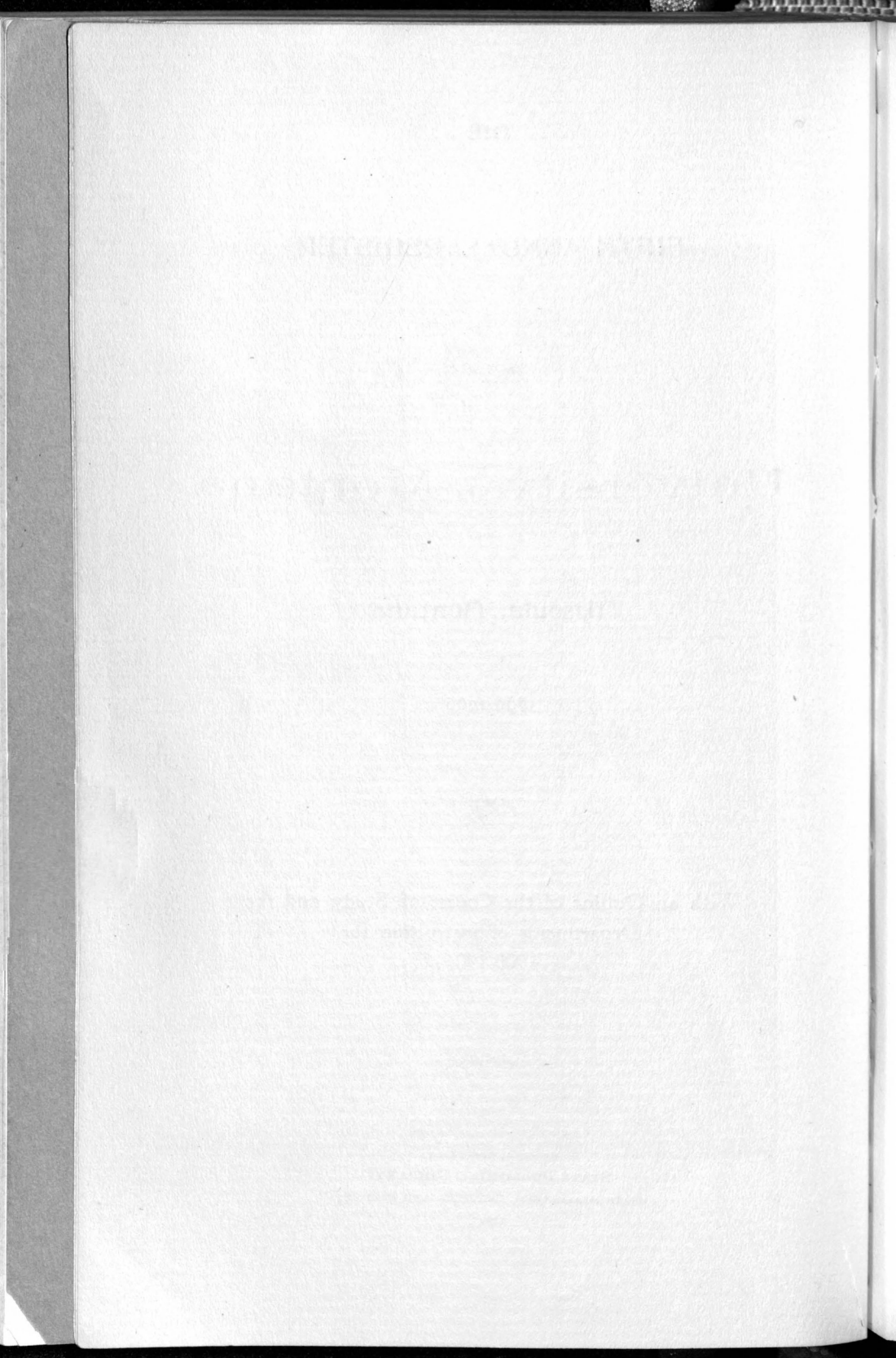


With an Outline of the Course of Study and the  
Departments of Instruction for  
1900-1901



HELENA, MONTANA  
STATE PUBLISHING COMPANY  
STATE STATIONERS, PRINTERS AND BINDER\*

1900



## College Calendar for 1900-1901.

1900.

Entrance Examination begins Monday, September 10, 10 A. M.  
First Semester begins Wednesday, September 12.  
Thanksgiving Vacation begins Wednesday, November 28, 12:30  
P. M.  
Thanksgiving Vacation ends Monday, December 3, 8:30 A. M.  
Christmas Holidays begin Friday, December 21, 12:30 P. M.

1901.

Christmas Holidays end Monday, January 7, 8:30 A. M.  
First Semester ends Friday, February 1.  
Second Semester begins Wednesday, February 6.  
Annual Entertainments of the Literary Societies, February 14  
and 15.  
Annual Lecture before Literary Societies, Friday, May 31, 8:30  
P. M.  
Prize Contest in Declamation, Preparatory Students, Saturday,  
June 1, 8:30 P. M.  
Baccalaureate Day, Sunday, June 2.  
Instruction ends Monday, June 3, 5:00 P. M.  
Annual Recital, School of Music, Monday, June 3, 8:30 P. M.  
H. N. Buckley Oratorical Contest, Tuesday, June 4, 8:30 P. M.  
Field Day, Wednesday, June 5.  
Alumni Reunion, Wednesday, June 5, 8:30 P. M.  
Commencement, Thursday, June 6, 10:30 A. M.

Chapter 10

The first part of the chapter discusses the importance of the...  
The second part of the chapter discusses the importance of the...  
The third part of the chapter discusses the importance of the...  
The fourth part of the chapter discusses the importance of the...  
The fifth part of the chapter discusses the importance of the...  
The sixth part of the chapter discusses the importance of the...  
The seventh part of the chapter discusses the importance of the...  
The eighth part of the chapter discusses the importance of the...  
The ninth part of the chapter discusses the importance of the...  
The tenth part of the chapter discusses the importance of the...

# CALENDAR FOR 1900-1901

| 1900.     |    |    |    |    |    |    | 1901     |    |    |    |    |    |    |
|-----------|----|----|----|----|----|----|----------|----|----|----|----|----|----|
| JULY      |    |    |    |    |    |    | JANUARY  |    |    |    |    |    |    |
| S         | M  | T  | W  | T  | F  | S  | S        | M  | T  | W  | T  | F  | S  |
| 1         | 2  | 3  | 4  | 5  | 6  | 7  | ..       | .. | 1  | 2  | 3  | 4  | 5  |
| 8         | 9  | 10 | 11 | 12 | 13 | 14 | 6        | 7  | 8  | 9  | 10 | 11 | 12 |
| 15        | 16 | 17 | 18 | 19 | 20 | 21 | 13       | 14 | 15 | 16 | 17 | 18 | 19 |
| 22        | 23 | 24 | 25 | 26 | 27 | 28 | 20       | 21 | 22 | 23 | 24 | 25 | 26 |
| 29        | 30 | 31 | .. | .. | .. | .. | 27       | 28 | 29 | 30 | 31 | .. | .. |
| AUGUST    |    |    |    |    |    |    | FEBRUARY |    |    |    |    |    |    |
| ..        | .. | .. | 1  | 2  | 3  | 4  | ..       | .. | .. | .. | .. | 1  | 2  |
| 5         | 6  | 7  | 8  | 9  | 10 | 11 | 3        | 4  | 5  | 6  | 7  | 8  | 9  |
| 12        | 13 | 14 | 15 | 16 | 17 | 18 | 10       | 11 | 12 | 13 | 14 | 15 | 16 |
| 19        | 20 | 21 | 22 | 23 | 24 | 25 | 17       | 18 | 19 | 20 | 21 | 22 | 23 |
| 26        | 27 | 28 | 29 | 30 | 31 | .. | 24       | 25 | 26 | 27 | 28 | .. | .. |
| SEPTEMBER |    |    |    |    |    |    | MARCH    |    |    |    |    |    |    |
| ..        | .. | .. | .. | .. | .. | 1  | ..       | .. | .. | .. | .. | 1  | 2  |
| 2         | 3  | 4  | 5  | 6  | 7  | 8  | 3        | 4  | 5  | 6  | 7  | 8  | 9  |
| 9         | 10 | 11 | 12 | 13 | 14 | 15 | 10       | 11 | 12 | 13 | 14 | 15 | 16 |
| 16        | 17 | 18 | 19 | 20 | 21 | 22 | 17       | 18 | 19 | 20 | 21 | 22 | 23 |
| 23        | 24 | 25 | 26 | 27 | 28 | 29 | 24       | 25 | 26 | 27 | 28 | 29 | 30 |
| 30        | .. | .. | .. | .. | .. | .. | 31       | .. | .. | .. | .. | .. | .. |
| OCTOBER   |    |    |    |    |    |    | APRIL    |    |    |    |    |    |    |
| ..        | 1  | 2  | 3  | 4  | 5  | 6  | ..       | 1  | 2  | 3  | 4  | 5  | 6  |
| 7         | 8  | 9  | 10 | 11 | 12 | 13 | 7        | 8  | 9  | 10 | 11 | 12 | 13 |
| 14        | 15 | 16 | 17 | 18 | 19 | 20 | 14       | 15 | 16 | 17 | 18 | 19 | 20 |
| 21        | 22 | 23 | 24 | 25 | 26 | 27 | 21       | 22 | 23 | 24 | 25 | 26 | 27 |
| 28        | 29 | 30 | 31 | .. | .. | .. | 28       | 29 | 30 | .. | .. | .. | .. |
| NOVEMBER  |    |    |    |    |    |    | MAY      |    |    |    |    |    |    |
| ..        | .. | .. | .. | 1  | 2  | 3  | ..       | .. | .. | 1  | 2  | 3  | 4  |
| 4         | 5  | 6  | 7  | 8  | 9  | 10 | 5        | 6  | 7  | 8  | 9  | 10 | 11 |
| 11        | 12 | 13 | 14 | 15 | 16 | 17 | 12       | 13 | 14 | 15 | 16 | 17 | 18 |
| 18        | 19 | 20 | 21 | 22 | 23 | 24 | 19       | 20 | 21 | 22 | 23 | 24 | 25 |
| 25        | 26 | 27 | 28 | 29 | 30 | .. | 26       | 27 | 28 | 29 | 30 | 31 | .. |
| DECEMBER  |    |    |    |    |    |    | JUNE     |    |    |    |    |    |    |
| ..        | .. | .. | .. | .. | .. | 1  | ..       | .. | .. | .. | .. | .. | 1  |
| 2         | 3  | 4  | 5  | 6  | 7  | 8  | 2        | 3  | 4  | 5  | 6  | 7  | 8  |
| 9         | 10 | 11 | 12 | 13 | 14 | 15 | 9        | 10 | 11 | 12 | 13 | 14 | 15 |
| 16        | 17 | 18 | 19 | 20 | 21 | 22 | 16       | 17 | 18 | 19 | 20 | 21 | 22 |
| 23        | 24 | 25 | 26 | 27 | 28 | 29 | 23       | 24 | 25 | 26 | 27 | 28 | 29 |
| 30        | 31 | .. | .. | .. | .. | .. | 30       | .. | .. | .. | .. | .. | .. |





## The Montana State Board of Education

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### EX-OFFICIO.

GOVERNOR ROBERT B. SMITH, President  
C. B. NOLAN, Attorney General  
E. A. CARLETON, Supt. Public Instruction, Secretary.

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### APPOINTED

|                                |                                 |
|--------------------------------|---------------------------------|
| HENRY R. MELTON, Dillon.....   | Term Expires February 1st, 1901 |
| M. J. GARRETT, Helena .....    | “ “ “ “ 1901                    |
| J. M. HAMILTON, Missoula ..... | “ “ “ “ 1902                    |
| J. P. HENDRICKS, Butte.....    | “ “ “ “ 1902                    |
| N. W. McCONNELL, Helena.....   | “ “ “ “ 1903                    |
| O. F. GODDARD, Billings.....   | “ “ “ “ 1903                    |
| J. G. MCKAY, Hamilton.....     | “ “ “ “ 1904                    |
| O. P. CHISHOLM, Bozeman.....   | “ “ “ “ 1904                    |
| SARA B. MACLAY.....            | Clerk of the Board              |

### EXECUTIVE COMMITTEE OF THE STATE UNIVERSITY

|                                 |          |
|---------------------------------|----------|
| J. H. T. RYMAN, President ..... | Missoula |
| T. C. MARSHALL, Secretary.....  | Missoula |
| HIRAM KNOWLES .....             | Missoula |

## The Faculty.

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OSCAR J. CRAIG, A. M., Ph. D., President.  
Professor of History.

CYNTHIA ELIZABETH REILEY, B. S.,  
Professor of Mathematics.

W. M. ABER, A. B.,  
Professor of Latin and Greek.

FREDERICK C. SCHEUCH, B. M. E., A. C.,  
Professor of Modern Languages.

MORTON J. ELROD, A. M.,  
Professor of Biology.

FRED D. SMITH, B. S.,  
Professor of Chemistry and Physics.

EUNICE JULIA HUBBELL, B. Ph.,  
Professor of English Literature.

ARTHUR L. WESTCOTT, B. M. E.,  
Professor of Mechanical Engineering.

MRS. WALTER WHITAKER,  
Instructor in Music.

ELOISE KNOWLES, Ph. B.,  
Instructor in Drawing, and Assistant in English.

GRACE HERNDON,  
Instructor in Vocal Music and Physical Culture.

LOUISE HATHEWAY, B. A.,  
Assistant in Preparatory Department.

GUY M. CLEAVELAND,  
Instructor in the Gymnasium.

EARL DOUGLASS, M. S.,  
Assistant in Geology and Physics.

MARY A. CRAIG, B. S.,  
Librarian.

## **The University and Its Endowment.**

The University of Montana was created by an act of the Montana State Legislature, approved February 17, 1893. The following extracts give the title of the act; and also certain sections that indicate the purpose of the University and the scope of its work.

“An Act to establish, locate, maintain, and govern the University of the State of Montana.

Section 1. “There is hereby established, in this State at the City of Missoula, an institution of learning under the name and style of the University of Montana.”

Section 6. “The object of the University of Montana shall be to provide the best and most efficient manner of imparting to young men and women, on equal terms, a liberal education and thorough knowledge of the different branches of Literature, Science and the Arts, with their varied applications; and to this end there shall be established the following colleges or departments, to-wit:

First—A Preparatory Department.

Second—A Department of Literature, Science and the Arts.

Third—Such professional and technical colleges as may from time to time be added to or connected therewith.

The Preparatory Department may be dispensed with at such rate and in such wise as may seem just and proper to the State Board of Education.”

Section 7. “Such duties or Courses of Instruction shall be pursued in the Preparatory Department as shall best prepare the students to enter any of the regular colleges or departments of the University.

“The college or department of Literature, Science, and the Arts shall embrace courses of instruction in Mathematical, Physical and Natural Sciences with their applications to the Industrial Arts; a liberal course of instruction in the Languages, Literature, History, Philosophy, and such other branches as the State Board of Education may prescribe. And, as soon as the income of the University will allow, and in such

order as the demands of the public seem to require, the said courses of instruction in the Sciences, Literature and the Arts shall be expanded into distinct colleges or departments of the University, each with its own Faculty and appropriate title."

Section 9. "Tuition shall ever be free to all students who shall have been residents of the State for one year next preceding their admission; except in the Law and Medical Departments, and for extra studies. The State Board of Education may prescribe rates of tuition for any student in the Law or Medical Department, or who shall not have been a resident as aforesaid, and for teaching such studies."

#### ENDOWMENT.

Section 11. 'For the support and the endowment of the University there is annually and perpetually appropriated—

"First—The University Income Fund and all other sums of money appropriated by law to the University Income Fund.

"Second—All tuition and matriculation fees.

"Third—All such contributions as may be derived from public or private bounty.

Section 10. Any person contributing a sum not less than fifteen thousand dollars (\$15,000) shall have the privilege of endowing a professorship in the University, or any department thereof, the name and object of which shall be designated by the State Board of Education."

By an act of Congress dated February 18, 1892, 46,080 acres of land were donated to the State of Montana for University purposes. This land was granted by the Federal Government upon condition that the proceeds from the sale of such lands should become a Permanent University Fund.

The Income Fund arises from the rental of lands unsold, from licenses to cut trees and from the interest on the proceeds of the sale of lands invested in the Permanent University Fund. This fund is applied to the payment of the bonds, principal and interest, which were issued in 1897 for the construction and equipment of buildings.

The University lands have all been selected. They comprise some of the very best lands in the State and are rapidly increasing in value.

## The Equipment of the University.

### DESCRIPTION OF CAMPUS AND BUILDINGS.

#### THE UNIVERSITY CAMPUS.

The University Campus is forty acres in extent, and lies near the southeastern limit of the City of Missoula, at the base of the hills which enclose the eastern end of the valley. To the north lies the Missoula River; westward stretches a wide plain, whose western and southern horizons are bounded by the Bitter Root Mountains. A substantial beginning has been made toward the improvement of the Campus. A double row of trees was planted along the north, west and south sides three years ago. Near the center an oval lawn of about three acres in extent is marked out by a broad graveled driveway; around this is a sidewalk, with a space between the walk and driveway for grass, flowers, or shrubbery. The entrance to this driveway is at the western side, from University Avenue.

A double row of trees is planted around the drive, one on the lawn around the inner edge of the drive, the other on the outer side of the walk. The trees planted this year, and the lawns started around the buildings and within the oval, have made an excellent growth, and already present a beautiful appearance.

The northwestern corner of the Campus has been laid out for an athletic field, and some work has been done there.

#### BUILDINGS

University Hall, the larger building, stands on the east side of the oval, directly opposite the entrance to the driveway, facing the west. A little to the south stands Science Hall, which faces toward the northwest, and, like University Hall, fronts upon the oval.

A little north of University Hall stands the bicycle shed, a small, neat building, in harmony with its surroundings. In the rear of University Hall stands a shed for the shelter of horses.

University Hall is 140 by 65 feet in its ground dimensions, and its central tower rises to a height of one hundred and twelve feet. This building has four floors, including the basement, which is so largely above ground as to be well lighted and fit for any sort of use. The basement walls are of granite; above

rise double brick walls of the most substantial character; the inner partition walls are also of brick.

Throughout the building, from basement upwards, is a uniform, handsome finish of dark tamarack and white pine wainscoting, in alternate strips; above this are white plaster walls.

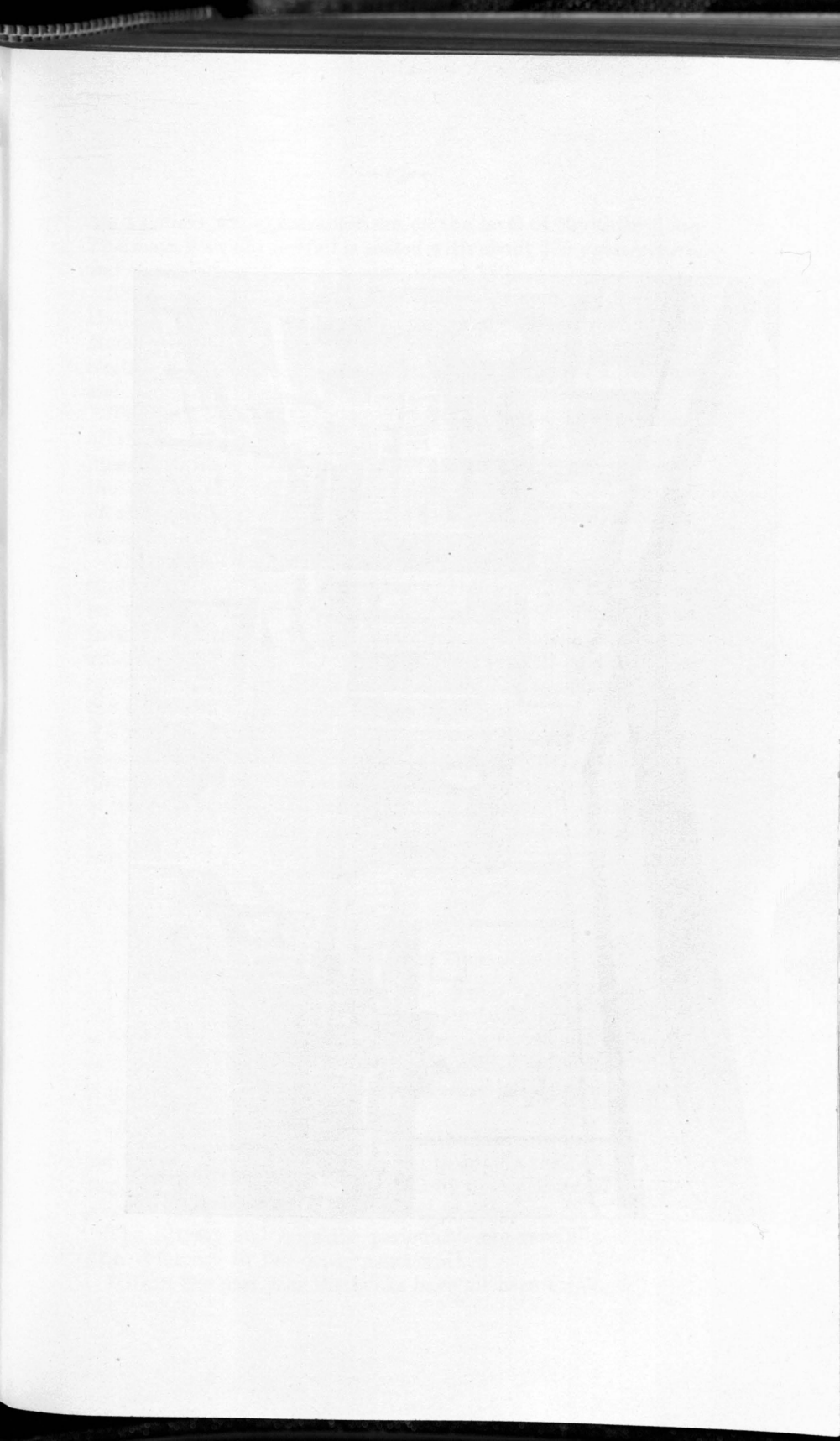
Every room is connected with a large ventilating shaft, whose outlet is above the roof. The steam-heated radiators are fitted with a cold-air box, whose connections with the outer air through the walls of the building can be opened and closed at pleasure. When these are open, fresh air is drawn into the room through the radiator, while the air of the room is drawn out through the ventilating shafts. This ventilating arrangement, while simple and inexpensive, is found to be efficient. Ample heat is furnished by the steam plant in Science Hall. The three essential requirements—light, heat, and ventilation—are well supplied.

The basement has a wide hallway running through it between the north and south entrances, with rooms on each side. This hall is divided in the center by a partition, which separates the whole basement into a northern and southern half, whose sole connection is the door through this partition. The northern hall contains two small store rooms, now used by the Library, a room for the advanced work in drawing, a fire-proof vault, a cloak room, and a toilet room for women. The southern half contains two small storage rooms, a photographic dark room, a toilet room for men, and three large rooms, used at present as storage and work rooms for the Museum, and for the Departments of Biology and Geology.

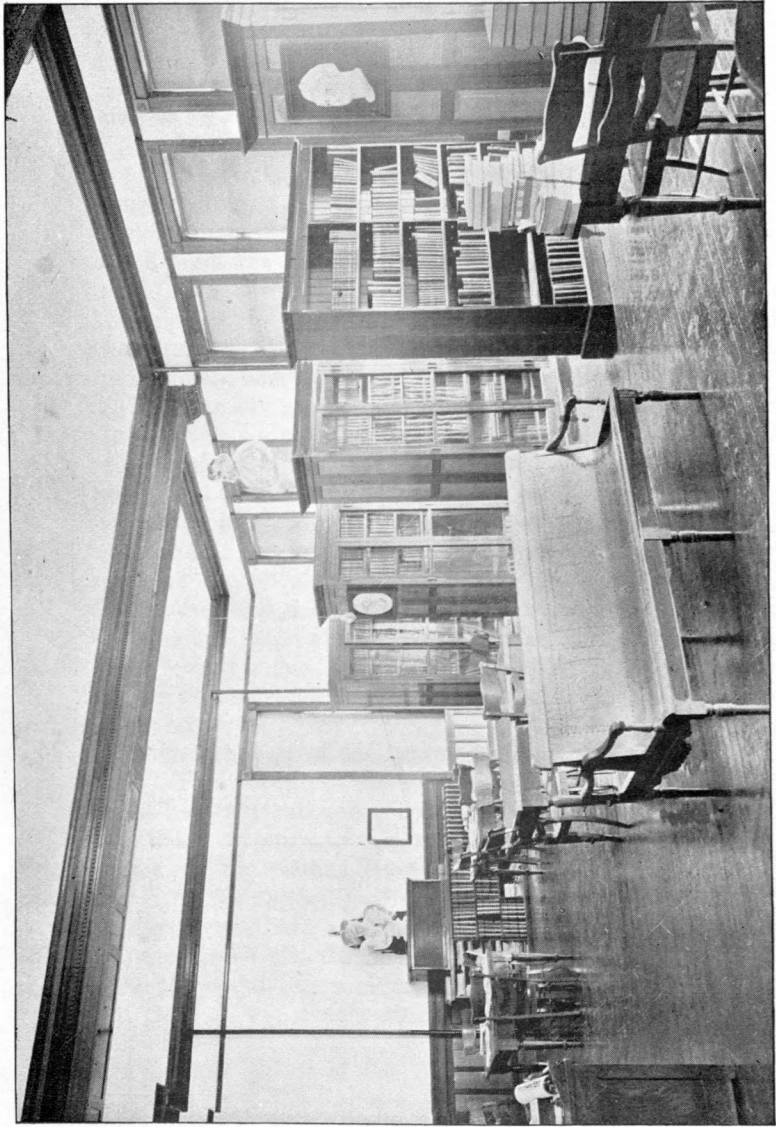
From each half of the basement a stairway rises to the first floor. This floor, like the basement, is divided lengthwise by a broad hallway, extending between north and south entrances. The main entrance to the building, through the tower at the center of the western front, opens into this hallway. The center of the eastern half of the floor, all that part lying between the northern and southern stairways, is occupied by the Library, which also furnishes a reading and study room.

At the northeastern corner of the floor is the room for drawing, and at the southeastern is the Museum. The western half of the floor contains, in the southern part, the Laboratory and Lecture Room of the Biological Department, and in the northern part, the Lecture Room for History, the President's office, and a room for the use of the Faculty and its Secretary.

The central part of the second floor is occupied by the Assembly Hall, a room of fine proportions and simple but elegant adornment. In height it rises through two stories, and







LIBRARY

has a gallery whose entrances are on the level of the third floor. The main floor of the Hall is seated with about 300 opera chairs, and the gallery will accommodate about 150.

The second floor has three rooms on each side of the Assembly Hall. On the northern side are the rooms for Mathematics and Modern Languages, to the latter of which is attached a smaller recitation room. On the southern side are rooms for Literature and Ancient Languages, and a smaller recitation room.

The central part of the third floor is occupied by the gallery of the Assembly Hall; north of this is a large room for the literary societies, and a recitation room; south of the gallery is the Gymnasium, which extends along the whole southern end of the building; adjacent to this is a smaller room, used for storage.

The whole building contains thirty-one rooms, without including six small rooms in the rear of the Assembly Hall—three on the second and three on the third floor. These rooms furnish a passage way from one end of the building to the other, without going through the Assembly Hall, and may also serve as cloak rooms; those on the second floor give access from the rear to the platform of Assembly Hall.

The most important of the rooms in University Hall are the Assembly Room, Library, Museum, Literary Society Hall, Gymnasium, Offices, Biological Laboratory, and seven lecture rooms of uniform size, for the departments of History, Drawing, Biology, Mathematics, Literature, Modern Languages and Ancient Languages.

## THE LIBRARY.

MARY A. CRAIG, B. S. LIBRARIAN.

The Library must always be the center of all college and university work. Without an adequate book supply the work of every department must be narrowed and curtailed. The accumulated knowledge of the ages is recorded in books. There is no line of student work or investigation but demands the use of books.

With the limited means at command, the attempt has been not to supply what was needed, but to supply that which is indispensable and absolutely demanded by the work already in progress in the different departments of the University.

The literary and scientific periodicals are carefully selected, with reference to the department work.

Within the past year the books have all been catalogued and

indexed. The cards give accession number, author, title, and other necessary details concerning the books.

The books are being shelved and classed according to the Dewey decimal system. This work will include all pamphlets and periodicals, thereby making all of the material of the library accessible and easily drawn upon. The following are the rules governing the Library and Reading Room:

#### VII. LIBRARY AND READING ROOM.

1. The library shall be open for reading and study at such hours as the Faculty may prescribe, and in these hours conversation, or other conduct which may divert attention or otherwise annoy, shall not be allowed.

2. Any one wishing any book or periodical (dictionary excepted) must apply to the Librarian for it, and before leaving the room the same must be returned to the Librarian, if not regularly drawn

3. Books not marked "Reference Book" may be drawn from the Library and retained one week, and then may be re-drawn for another week, but no book can be kept by one person longer than two weeks.

4. If a book is not returned within the week for which it is drawn the holder shall be subject to a fine of 10 cents; if not returned within two weeks from the time it was drawn, a fine of 25 cents; if not returned within a month a fine equal to the price of the book.

5. Reference books, current periodicals and papers cannot be taken from the library room except by special permission of the Librarian, and then only from the closing of the Library to the first succeeding hour of opening.

6. A violation of any of the foregoing regulations, or other rules, which may from time to time be prescribed, may forfeit a student's right to the use of the Library for such time as may be designated.

7. It is the duty of the Librarian to enforce the above regulations.

The following is a list of the magazines and periodicals on file for the use of members of the University:

- The Forum.
- Popular Science Monthly.
- Harper's Weekly.
- Harper's Monthly Magazine.
- North American Review.
- Atlantic Monthly.

The Cosmopolitan.  
The American Naturalist.  
Science.  
Journal of Geology.  
The Scientific American and Supplement.  
The Railway Age.  
Foundry.  
Entomological News.  
The Analyst.  
American Archaeologist.  
Bulletin de la Chimie.  
Journal of London Chemical Society.  
American Journal of Mathematics.  
Zum Fels und Meer.  
Die Gartenlaube.  
Mutter Erde.  
Illinois Staats Zeitung.  
Ueber Land und Meer.  
Psyche.  
Nature.  
The American Monthly Microscopical Journal.  
The Journal of Applied Microscopy.  
The American Journal of Science.  
Bird Lore.  
Zoologischer Anzeiger.  
Journal of Morphology.  
The Photographic Bulletin.  
The American Architect.  
The Outlook.  
Current History.  
The Educational Review.  
School and Home Education.  
Engineering News.  
Engineer's Magazine.  
Cassier's Magazine.  
The American Machinist.  
The Electrical World.  
The Western Electrician.  
Mining.  
Political Science Quarterly.  
Ladies' Home Journal.  
American Journal of Psychology.  
The Independent.  
The Dial.  
The Century Magazine.

Review of Reviews.  
Scribner's Magazine.  
Chautauquan.  
Forest and Stream.  
The Chemical Journal.  
The American Chemical Society Journal.  
The School Review.  
Book Reviews.  
The Monist.  
Education.  
Zietschrift fur Anorganische Chemie.  
Botanical Gazette.  
The Classical Review.  
The Journal of Association of Engineering Societies  
The Engineering and Mining Journal.  
The Western Mining World.  
Power.  
The Electrical Review.  
The Public School Journal.  
Public Opinion.  
Fliegende Blaetter.  
Merck's Report.  
The Bookman.  
The Literary Digest.  
The Artist.  
The International Studio.

The following newspapers are on file and are for the most part donated by their respective publishers:

The Chronicle, Bozeman.  
The Bitter Root Times, Hamilton.  
Avant Courier, Bozeman.  
The Anaconda Standard, Anaconda.  
The Western News, Hamilton.  
The Billings Times, Billings.  
The Billings Gazette.  
Democrat-Messenger, Missoula.  
Glendive Independent, Glendive.  
The Neihart Herald.  
The Silver State.  
The Madison County Monitor.  
The Big Timber Express.  
The Libby News.  
The Missoulian.  
Montana Fruit Grower, Missoula.

The Chinook Opinion, Chinook.  
 The Montana Sentinel, Helena.  
 The Philipsburg Mail, Philipsburg.  
 Belt Valley Times, Belt.  
 Helena Independent, Helena.  
 The Citizens Call, Philipsburg.  
 Western Mining World, Butte.  
 The Inter-Lake, Kalispell.  
 The Tribune, Butte.  
 Weekly Tribune, Dillon.  
 The Northwest Tribune, Stevensville.  
 Rocky Mountain Husbandman, White Sulphur Springs.  
 Mining, Spokane.  
 The Mining and Railway Review, Butte.  
 The Dillon Examiner, Dillon.  
 The Townsend Messenger, Townsend.  
 The Jefferson County Sentinel, Boulder.  
 The Big Timber Pioneer.  
 The Forsyth Times.  
 The Sentinel, Boulder.  
 The Spokesman-Review, Spokane.  
 The Ravalli Republican, Hamilton.

The following shows the number of books, pamphlets and periodicals in the Library this year, and the increase over the last report:

|                              | Last Report. | Increase. | Total. |
|------------------------------|--------------|-----------|--------|
| Number of bound volumes....  | 2,889        | 2,446     | 5,335  |
| Number of unbound volumes... | 77           | 64        | 141    |
| Number of pamphlets .....    | 2,281        | 350       | 2,631  |
| Number of periodicals .....  | 106          | 5         | 111    |

## Department of Chemistry and Physics.

### THE CHEMICAL LABORATORIES.

The Department of Chemistry occupies the whole of the second floor of Science Hall, which contains six rooms and a hall. The student laboratories, two in number, are on the north side of the hall; the lecture room, store room, and office and private laboratory of the professor are on the south side. The balance room, also used for a library and reading room, is at the end of the hall, and opens into the quantitative laboratory only.

Of the two laboratories, the larger is for the work in general chemistry and quantitative analysis. This is fitted with two rows of desks, underneath which are arranged the drawers, forty in number, for the students' apparatus. Each desk is provided liberally with running water at the many sinks, with taps for water on the desk, and tips for gas. The laboratory will accommodate forty students in all, with the maximum number of twenty-four in one section. Each student is given a full set of apparatus, which is locked with a padlock, thus assuring safety.

The reagents are stored in large glass-stoppered, tubulated bottles, in one corner of the room. The ventilation for the laboratory is procured through five hoods, each connected with a separate steam-heated flue. Water and gas are brought into each hood.

The smaller quantitative laboratory will accommodate sixteen students at once. This room has northern and western exposures, and is therefore well lighted. The arrangement of hoods and flues is the same as in the other. The arrangement of drawers for the apparatus is much more complete than in the smaller laboratory. Eight separate drawers or closets, all locked by one padlock, are given each student. This insures perfect safety for the many pieces of apparatus and solutions in use. The desks are all fitted with stationary iron stands, of the universal type, which allows the desk to be used in all of the many ways necessary for analytical work. Each desk has also an iron plate heated by gas burners. The gas is furnished to the student either by the ordinary gas tip, with rubber connection, or by a stationary swinging gas jet, fitted with the Bunsen

burner. Water is brought to each desk in taps, or to the many sinks in the usual manner. Brass suction pumps are attached to the latter, and a good suction obtained for filtration processes. The reagents are provided at each desk and in more complete sets in a suitable case in one corner. The sets of apparatus issued to each student are very complete and consist of beakers, flasks, crucibles, burettes, pipettes, bottles, etc.

The balance and reading room opens into the quantitative laboratory. In it are one Becker balances, sensitive to .2 mg., for the beginners in quantitative analysis. Shelves are fastened to the solid wall, and independent of the floor, for four balances, when available.

The Department Library, placed in this room, is under the direction of the General Library and subject to such restrictions as will insure the safety of the books. The following books are placed here for the use of students: 125 volumes pertaining to Chemistry, analytical, organic, inorganic, physical, and industrial. This list includes many volumes of importance, as in Inorganic Chemistry, by Mendjeleff, Freer, and eight volumes by Roscoe and Schorlemmer; in Analytical Chemistry, works by Fresenius, Classen, Menschutkin, Crookes, Behrens, Blythe, and many others; in Organic Chemistry, by Remsen, Prescott, Gatterman, Bernthsen, Sadtler, Schorlemmer, and others; in Physical Chemistry, by Ostwald, Van't Hoff, Meyer, Eiloart, Ramsay. Besides these, the four volumes of Watts' Dictionary of Chemistry are here found. In Geology are 50 volumes, covering a great range of topics, including Mineralogy, Metallurgy, Glacial Geology, Economic Geology, and Paleontology. Of special note in this line is a complete set of the Mineral Industry, and the works of Dana, Le Conte, Shaler and others. The bulletins of the U. S. Geological Survey, that treat of subjects in Geology and Paleontology, are also placed in this library. In Physics are 35 volumes. Besides these, 12 of the scientific journals pertaining to Chemistry, Physics and Geology, in both English and foreign languages, are available to the student in this room.

The lecture room, on the south side of the hall will seat forty persons, and is provided with the usual accommodations for taking notes from lectures. The lecture table, 4 x 14 feet, is provided with water and gas, and is very convenient for lecture experiments. Over the lecture table is mounted a geologic chart, This chart is six feet wide and over 300 feet long, and so mounted by rings sliding on a cable that it can be easily moved along to show the designs thereon presented. It is made to



represent the succession of life throughout the different periods of geological history. The plant and animal life is faithfully depicted by paintings in oils, while many of the geological changes and processes, as sedimentation, erosion, volcanic eruptions, faulting, etc., are also depicted. The geological order is faithfully followed, and altogether this chart is a useful and valuable aid in presenting the subject of paleontology.

In the rear of this room four tables are provided for the use of the students in Determinative Mineralogy, Blowpipe Analysis, and in General Geology. Gas is brought to these tables for the blowpipe work.

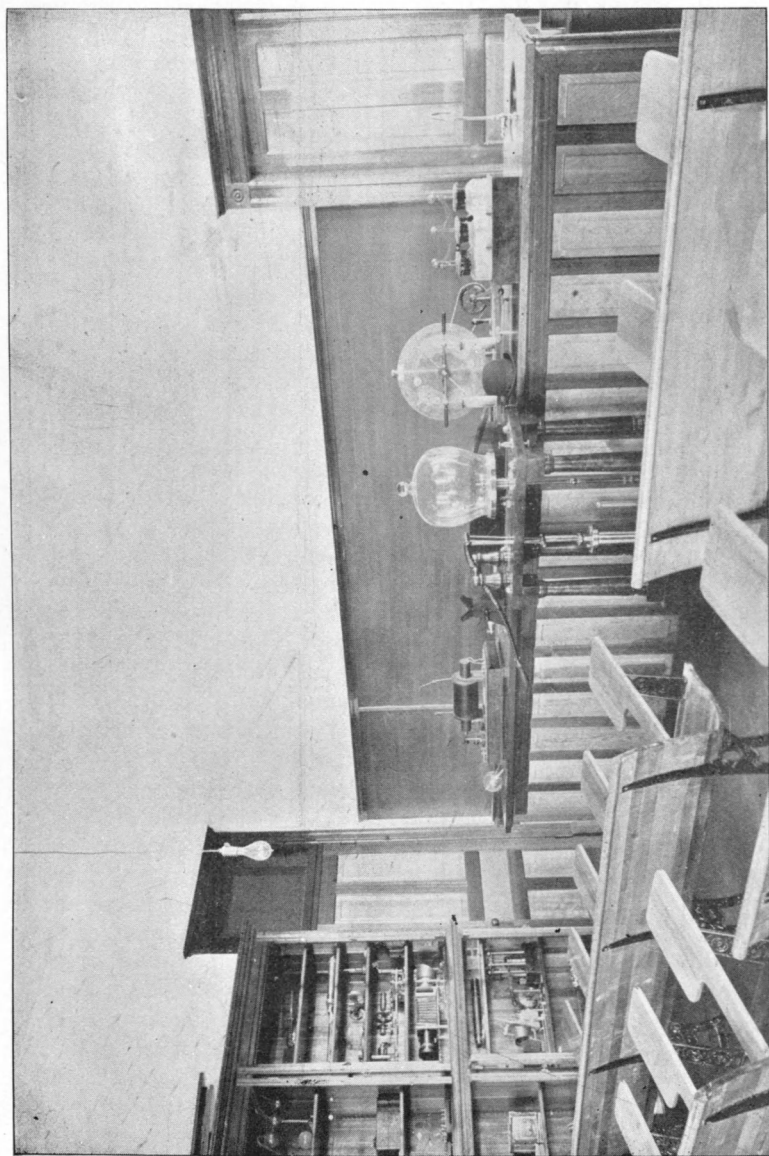
The private laboratory and office of the professor is a well-lighted room, 12 x 18 feet in size, located in the corner of the building. It opens into the lecture room and into the store room. It is fitted with all of the appliances for desk room, ventilation, water, gas, etc., that is found elsewhere in the laboratories.

The store room adjoins the office, and opens also into the lecture room. Students can obtain material from this room through a small window opening into the hall. In this way the room is easy of access to the students when working in the laboratories. The store room contains, besides the ample shelves and cases for storage, a desk provided with gas, water and suction. This is used for preparation work and is a great convenience. Ventilation is secured by means of a hood of ample size. The laboratories and rooms are all lighted by electricity, or by gas light from Welsbach burners.

Distilled water is made in a block tin still, placed in the attic above the laboratory, and is conducted to the large laboratory through block pipe tin. The still is connected with the steam heating system and is so arranged that it is impossible for any solid or other foreign substance to pass from the system into the condenser. The water is collected in a 20-gallon stone reservoir, thence conducted to the rooms below. The still is so connected as to require no attention, as it is connected with an overflow into the sewer. On the whole, this plant is a model of its kind for small laboratories.

The gas is made from gasoline by means of a machine from the Detroit Gas Machine Co., of Detroit, Mich. The capacity of the carburetter is 465 gallons of gasoline, and is ample for all uses of the present laboratories connected with it. The plant is provided with a combination mixer, furnished by this company, which is believed to be a valuable adjunct to the machine.





PHYSICAL LECTURE ROOM

## DESCRIPTION OF PHYSICAL LABORATORY.

The Department of Physics occupies one-half of the floor space on the ground floor of Science Hall. One lecture room and one laboratory are provided, which adjoin each other and are used to supplement each other in many ways. The lecture room has a seating capacity of fifty, with the usual arm-rests for the taking of lecture notes. Provision is made for darkening the room by means of rolling shutters, which are easy of manipulation and give a perfect exclusion of all light. A *porte lumiere* has been mounted in a window of southern exposure to furnish illumination in the daytime. The Colt's projection apparatus is used for projection, either by sunlight, electricity or by the lime light.

The lecture table is provided with gas, water, and suction. The laboratory is a room 24 feet square, lighted by windows of eastern and southern exposure. It is provided with two rows of tables in which are forty-six lockers for students' apparatus. Twenty-four students can work in this laboratory at one time. Each desk is provided with gas from taps in the center of the table. Water is brought to the laboratory at two places, where sinks are placed conveniently.

The apparatus is stored in cases, which line the sides of the laboratory and lecture room, and can be drawn out by the student as needed. All of the material necessary for a complete course of elementary physics, as outlined by the Science Department of the National Educational Association, is now available for student's use. Some special pieces for advanced work are also on hand, as, many forms of galvanometers, Atwood's machine for falling bodies, a 9" induction coil, a cylinder of liquid carbon dioxide, and an excellent air pump.

## GEOLOGY AND MINERALOGY.

The provisions made for laboratory work in these subjects have been much increased during the last year. The laboratory work in Determinative Mineralogy, Lithology, Blowpipe Analysis, etc., is done in the Chemical Lecture room at tables specially prepared therefor. The work in Paleontology is done in the research laboratory of Mr. Douglass in University Hall.

The collections have been differentiated during the year into nine distinct collections, as follows: 1. A complete set of minerals which is placed on exhibition in the Museum. 2. A duplicate set of minerals in cases in Science Hall for class work in Determinative Mineralogy. 3. The collection of ores and metal-

lurgical products in the Museum for work in Economic Geology. 4. The Invertebrate Fossils in drawers in the Museum, labelled and recorded. 5. The Vertebrate fossils, the property of Mr. Douglass, in the special research laboratory. 6. A set of type specimens of rocks, igneous, sedimentary and metamorphic, in Science Hall for class work in Lithology and Geology. 7. A set of rock specimens representing the formations of such parts of the State as has been exploited or studied. 8. One set of specimens to illustrate Structural Geology and the various phenomena of geological action as far as possible. 9. One set of crystal models of 108 figures for study in Crystallography.

A large chart has been prepared by Mr. Douglass for the purpose of illustrating the animal life during each of the past Geological epochs. This is mounted in the Chemical Lecture room where the class work is done. The apparatus for field work in Geology consists of a Gurley geologist's compass, an aneroid barometer reading to 16,000 feet, a 50 foot calibrated steel tape, drawing instruments etc.





BIOLOGICAL LABORATORY

## Department of Biology.

### THE BIOLOGICAL LABORATORY.

The Biological Laboratory is in University Hall. On the first floor are two rooms and the Museum. In the basement, reached by a private stairway, is the dark room for photography, a store room, a room for general work, and a room for museum and work, the last containing the collection of the Montana fossils. Across the hall is another room, 24 x 30, used as an unpacking room and room for general work.

On the first floor, the first door to the right as one enters from the front opens into the Biological Lecture Room. This room contains seats for 20, besides laboratory desks for advanced students. It contains one large case of books, one large case for apparatus, a hood case for fumes, a small storage case, a case containing a skeleton, and a sink with water.

The room adjoining is used for beginning laboratory work, and contains sixteen tables, besides a large case for material, a microscope case, and a sink with four compartments.

The tables are of a special pattern, planned by the professor, and are admirably adapted to the work. They are 28 inches high, 48 inches long, 28 inches wide. Each table contains on either side two drawers and a space below with a door. The drawers are locked by a wooden bar, and the door has a combination lock. One lock, therefore, locks the three compartments, and the student carries the combination in his head. The tops are of oak, 1 1-2 inches thick, stained and paraffined. Each student works individually at a table, and the tables are just high enough to permit use of a microscope vertically without discomfort. Each desk is fitted with gas, and when light is needed the rooms are well lighted by incandescents. The paraffine baths are kept in the fume hood, and by thermostats may be kept going night and day.

The microscope case is worthy of notice. This contains thirty-five compartments, each locked with a combination lock. Each microscope is placed in a compartment and locked up. When the students are assigned a microscope they are given the combination, and they alone have access to the instrument. In this way injury to the instruments is easily traced to the proper source.



The large sink is in four compartments, each with an overflow. Living material can thus be kept the year round.

The dark room for photography is nine feet square, contains a long table with sink, has water, gas and electric light. There are shelves and racks for storage of negatives, plates and other material.

The store room is about nine by twelve, with a rack built from floor to ceiling for storage of glassware, chemicals, and other material.

At the foot of the stairway, in the basement, a room twenty by twenty-four is used as a work room for the professor and advanced students. In this room is a small case for storage, a fume hood, several tables, and shelves. Here is done such work as preparing insects for the Museum, mounting botanical specimens, assorting material, and the like. The basement rooms are light, dry and airy, and as pleasant as any rooms in the building.

Adjoining the room before mentioned, is the room containing fossils, for description of which see under Museum.

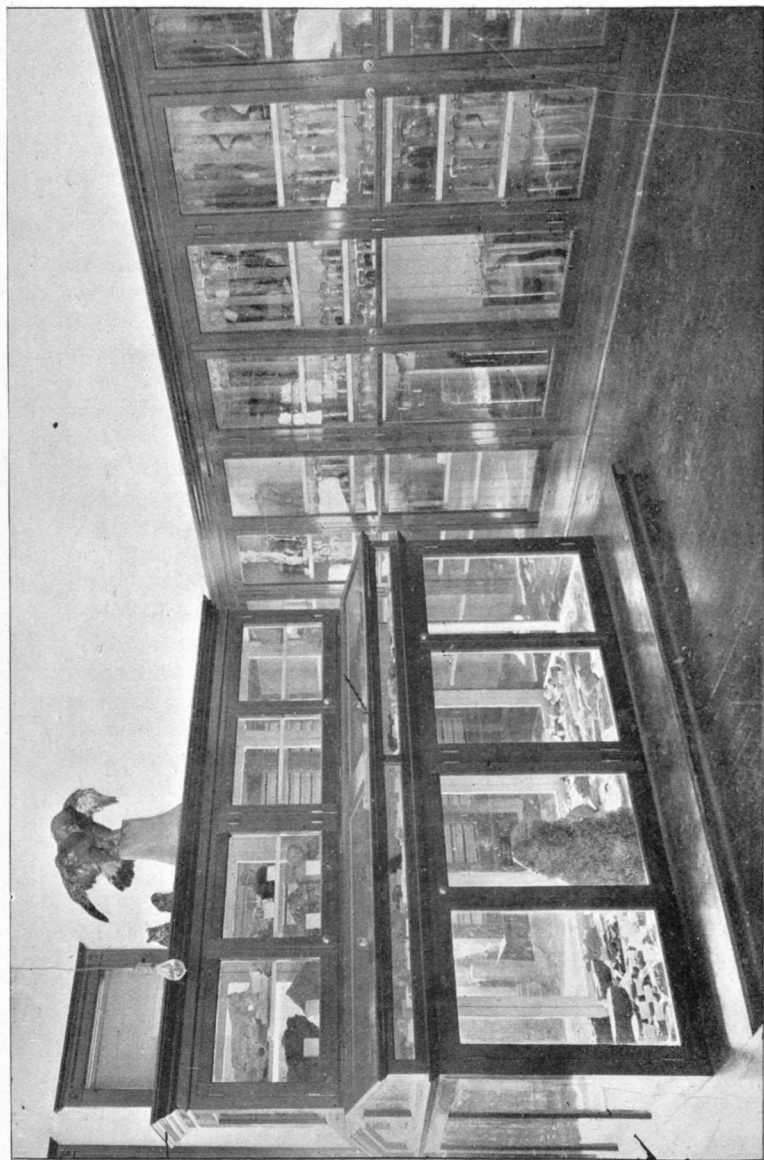
A large room across the hall is used for unpacking, chipping rock from fossils, cleaning up dirty material, and the like. This room is used conjointly by the departments of Biology, Chemistry and Geology.

The microscopical equipment is as follows: There are two compound microscopes by Leitz of Germany. One of these microscopes is the best made by this firm, and has the following accessories: Three eye pieces, a series of five objectives, one being a one-twelfth oil immersion. It has also a revolving stage, with sub-stage condenser after Abbe, and with the iris diaphragm. It has eye and stage micrometers, and accessory Nicol prisms for polarization, and also a camera lucida after Abbe.

The other Leitz instrument has two eye pieces and three objectives. There are sixteen microscopes by Bausch & Lomb Optical Co. Four of these have two eye pieces and two objectives, with sub-stage condenser for illumination. The other twelve have one eye piece and two objectives. There are also two dissecting microscopes by Bausch & Lomb Optical Co. and one by Leitz. In addition to the microscopes there is a battery of extra objectives, three inch, two inch, one inch, one-half inch, one-fourth inch, one-eighth inch, and one-tenth oil immersion, to give greater range of work.

In addition to the microscopes the department has a good supply of working apparatus, consisting of the following material: Anthony's copying, reducing and enlarging camera,





MUSEUM

with accessories for making lantern transparencies; a Leitz vertical camera for photomicrography; a pair of balances; a Miller paraffine bath and a Naples water bath, each with thermostat; an adjustable drawing board for camera lucida; an incubator, with thermostat, for use in bacteriology and embryology; a Minot microtome; a student microtome; three Abbe camera lucidas; insect cages; turn tables; hardware; glassware; chemicals, etc., for carrying on histological and general biological work.

The department has considerable photographic material, and in conjunction with the work in Geology a beginning has been made for a collection of photographs to be used in class work. Several hundred lantern slides have been made. It is the intention in the near future to make the stereopticon a valuable adjunct in the department through the medium of photography.

For working material there is a collection of alcoholic vertebrates and invertebrates, land, fresh water and marine, made by purchase and collecting; skins of several hundred species of North American birds; specimens representing several hundred species of North American shells; a collection of hundreds of mounted and unmounted insects; an herbarium of several thousand species of phanerograms; a collection of fishes; a series of a couple of thousand mounted slides.

#### BIOLOGICAL STATION.

The laboratory is a one story frame structure, 18 x 24, containing a small store room, a dark room, and tables for twelve students. It is substantially built, well lighted, and well suited to outdoor work.

A gasoline launch has been purchased. This launch is 16 feet long, 4 feet beam, and will carry eight persons. It is an absolute necessity for work on the lake. It has canopy top and side curtains, with lockers on the sides. The launch has been named the "Missoula" in honor of the generous citizens who have given such cordial support to the enterprise. A second boat—a row boat—will carry four people. These two boats will be at the disposal of those present, and will enable students and workers to get around very nicely. In addition to the boat, numerous smaller pieces of material have been procured, such as nets, dredges, and accoutrements for the building and for camp life.

#### THE MUSEUMS.

These are contained in two rooms—one on the first floor, one

in the basement—besides the room used by the different departments as an unpacking and storage room, and the material stored in the halls and in the rooms of the different departments.

The room on the first floor is in the southeast corner, is 24 x 30 feet, and is filled with cases and material. Owing to the small size of the room and the numerous collections, the cases have been shoved much closer together than they should be. Along the walls are the following cases: A case 19 feet long, for storing alcoholic specimens; a case containing 84 Comstock insect cases; a case 12 feet long and 7 feet high, divided into compartments, for botanical collections; a case for birds; a case for display of insects. In addition there are four other cases. One is 5 x 12, in two parts, the upper for display, the lower with interchangeable drawers, for storage. Another is 5 x 9, in three compartments, all for display. The other two are 5 x 9, on legs, the top for display.

The Museum room in the basement contains five large cases, all with glass doors, besides a rack for books and another for storage, and a sink with water. It contains the Douglass collection of Montana fossils, upon which much work and study is being put. All the cases are packed full of material, which is priceless in value, from the fact that it contains many species yet new to science.

The intention is to make the museum a depository of the material representing the natural, mineral and scientific wealth of the state.

It is most earnestly requested that all who are interested in the University, and especially in the preservation of valuable material for scientific work, should take special pains to contribute to the material in the museum. Time and circumstances are fatal to nearly all specimens, but being properly cared for and placed in the museum of the University they will be preserved.

Correspondence is solicited concerning material which may be donated. All donations will be properly acknowledged, and the articles properly labeled and the donor's name recorded.

The additions to the Museum the past year are as follows:

Theo. J. Hoover, Leland Stanford, Cal., some skins of California warblers.

Earl Douglass, University, two rattlesnakes.

C. E. Herrick, Lo Lo, a lizard.

Fred D. Smith, University, a collection of insects taken at Drummond.

H. K. Burrison, West Newton, Mass., by purchase, 140 species of Indian and South American butterflies.

T. D. A. Cockerell, Mesilla Park, N. M., two species of scale insects.

L. O. Howard, U. S. National Museum, six species of scale insects.

Robert Torrance, Billings, a very large tooth of fossil elephant (*Elephas primigenus*).

Biological Station at Flathead Lake, fish, bird skins, insects, plants and dredgings.

Dr. W. P. Mills, city, one sample of jasper from Pullar Springs, Mont.

Dr. W. P. Parsons, city, two skins of rattlesnakes from Texas.

John Jones, Ovando, Indian arrow tip and Indian club.

Herman Kohn, city, horned toad from Texas.

D. E. Bandmann, city, pear covered with San Jose scale.

Joe Waldbillg, Drummond, two rattlesnakes.

Mrs. Wm. Dickinson, geysers from Yellowstone National Park.

Rev. C. H. Linley, city, six bills of confederate money.

M. J. Elrod, University, coal from Youghogheny mine, Pennsylvania.

New York Botanical Gardens, 203 species of plants from Montana.

Mrs. J. H. Kennedy, city, miniature cotton bale from New Orleans Exposition.

Chas. F. Hedges, Miles City, a dozen skins of redpoll linnnet (*Acanthis linaria*).

Montana and Denver Reduction Co., Bearmouth, set of products of initial run of mill.

A. B. Brown, Bearmouth, sample of fluorite from Quigley; tetradymite from Garnet.

Mrs. John McCormick, Bonner, fossils and agates from Wyoming; shells from Victoria, B. C.; geodes and sinter from Yellowstone Park.

Lou Lyons, city, piece of the Plymouth Rock; piece of pipe of first water works in the United States; gold ore from Quigley.

Charles Smith, Bonita, copper ores from Copper Cliff country.

Great Falls Fire Brick Co., Great Falls, samples of brick and building stone.

Beaudette Bros., Anaconda, sample of Montana marble.

T. Kain & Sons, Helena, sample of granite.

Billings Sandstone Quarry, Billings, sample of building stone.

Kalispell Townsite Co., Kalispell, Libby ores.

Fred Buck, Stevensville, burrows of worms.

D. H. Ross, city, mounted owl; mounted deer head.

C. A. Stillinger, Superior, 125 arrow tips from Snake river; one pipe from Spokane Indians.

J. M. Keith, city, millstone from the first mill in western Montana; large piece of fossil wood.

Chas. J. Savage, Red Lodge, arrow tip; several old coins.

J. W. Dougherty, Corvallis, a potato of large size and curious growth.

A. L. Stone, city, complete make-up of a page of the Anaconda Standard, showing all stages, from original drawing to printed page.

Mrs. Fred D. Smith, city, cotton boll from Greenville, S. C.

Through the courtesy of Marcus Daly and the State Officers of Montana, another very important addition to the geological collections was sent from the Omaha Exposition to the University. This consisted principally of a large number of representative ores from the principal mining districts of Montana. The Basin, Ekhorn, Hassel, Castle, Garnet and Libby Districts especially are well represented. This material is in large pieces, much larger than necessary for exhibition in the Museum. It is contemplated to prepare several sets of these ores for exchange with other museums for ores or other valuable geological material. In this gift were several fine specimens of crystallized minerals and many sets of concentrates from the mills of the State.

Mr. R. M. Cobban, of Missoula, added to his previous gift a check of \$25.00, to be used for minerals needed in the course of Mineralogy. Nineteen minerals, including many of gold and silver, were purchased with this money and have been placed in the Museum.

The U. S. Geological Survey has added a set of rock chips for class study and for microscopic sections, to accompany the set of Educational Series which was added in 1898.

By collection by Professor F. D. Smith, additions were made as follows: A large number of rock sections, representing the formations between Missoula and Garrison. Several species in large numbers of fossils from the cretaceous and carboniferous near Bearmouth, Drummond and New Chicago. Ores from the Libby and Dunkelburg mining districts, invertebrate fossils from the neocene lake beds at New Chicago.

By purchase by the Department of Chemistry, a set of 53 minerals suitable for class work in Mineralogy. Also a set of the same 53 minerals in chips in bottles, for blowpipe analysis.

During the past year a great deal of work has been done on the Museum. The minerals and ores have been arranged in districts, and all carefully labeled. A collection of insects has been mounted and exhibited. The herbarium has been syste-

matically arranged and several thousand sheets mounted. The birds and other natural history specimens have been arranged and labeled so they may be easily referred to and studied. Two new cases have been added, completely filling the space allotted for museum purposes.

#### DEPARTMENT OF LATIN AND GREEK.

This department is supplied with a set of Kiepert's Classical Maps; with Cybulski's colored wall charts; and a carefully chosen collection of lantern slides and mounted photographs for the illustration of Greek and Roman Archaeology and Private Life.

The library is well supplied with the most important and essential works of reference for this department.

#### SCHOOL OF MECHANICAL ENGINEERING.

The quarters in Science Hall devoted to Mechanical Engineering consist of the following: Mechanical drawing room and office, on the first floor of the two-story front of the building; wood shop, machine shop, forge shop and foundry, located in the one-story extension of the building; and the engine room, located in the basement under this extension.

The drawing room is a well lighted room, 23 x 34 feet in size. The office of the Professor of Mechanical Engineering is adjacent to it. Nine drawing tables furnish accommodations for eighteen students. A library of over one hundred volumes of standard works, as well as a large number of engineering catalogues, pamphlets, etc., furnish the student with valuable references.

Passing from the hall of the front part of the building into the one-story extension above referred to, the wood, machine, and forge shops, and foundry, occupy rooms, in the order mentioned. The wood shop is 30 x 40 feet in size, and is well lighted on both the north and south sides. Work benches with vices and tool cupboards, furnish accommodations for ten students at bench work, while ten lathes of 11-inch swing enable an equal number to engage in wood turning. There is also an excellent wood turning lathe of 16-inch swing and 12-foot bed, with double-ended spindle, for turning large work. A double circular sawing machine, with cross-cutting and rip-saws, a scroll saw, a wood trimmer and a grindstone complete the equipment of this shop.

The machine shop is adjacent to the wood shop. It is 30 x 27 1-2 feet in size, and is lighted from both north and south sides.



Only a partial equipment has been placed in this shop. A 22-inch swing drill press, a 16-inch stroke shaper, a sensitive drill, a power hack saw, a tool grinder, emery wheels, and one bench with vise, constitute the list of machines. These machines are all well selected and of the best quality.

The forge shop opens off the machine shop. It is 30 x 30 feet in size. Eight Buffalo down draft forges are placed in this shop, and a Buffalo combination blower and exhaust fan furnishes blast and carries off the smoke. There is also a small portable forge with blower attached. A combination shearing and punching machine, and a complete outfit of anvils, hammers, tongs, and other necessary tools, complete the equipment of this shop.

The foundry also opens off the machine shop. Nothing has as yet been expended on this shop, and the room is used as a store room.

In the machine shop there is partitioned off a small tool room. Here are kept all the small tools, such as calipers, taps, scales, etc., for the machine shop, and also many tools for the wood shop. Also a complete stock of supplies, such as machine and wood screws, sand paper, etc., is conveniently stored. A checking system enables the instructor to give out these tools for students' use, without danger of their being lost or mislaid.

A 50-horse-power Automatic Atlas Engine, located in the basement, furnishes power for the shops. It is expected that this engine will be used in connection with work in steam engineering.

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### Department of Free-Hand Drawing.

This department has at its disposal two large, well-lighted rooms on the first and basement floors of the University Hall.

The upper room is one of the most attractive in the building, the walls are hung with casts so chosen as to afford gradual advancement for the student. They consist of leaves, flowers, and vase forms; parts of the body, as the eye, nose, mouth, hand, and foot; animal heads; and human masques, among which are the following: St. Francis, Voltaire, Cupid of Donatello, the Dying Alexander, Venus de Milos, and Michael Angelo's Slave.

In this room is done most of the charcoal and black and white work.

The lower room is used for painting in oils and water colors, and is well arranged for the purpose.

This department has in equipment in addition to the casts, a set of geometric solids; and papier mache reliefs of decorative designs, leaves, flowers, and heads.

## Collegiate Department of Instruction.

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Note.—Roman numerals indicate the number of the course; Arabic indicate the number of recitations per week. Courses extend through one semester.

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### COURSES OF STUDY IN THE DEPARTMENT OF HISTORY AND PHILOSOPHY.

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#### HISTORY.

- I. The History of England and the English Constitution. 4.
- II. American History, with especial reference to the development of Political, Social and Industrial Institutions. 4.
- III. Studies in Ancient History, including the Kingdoms of the East, Egyptian Civilization, the Grecian States, and the Roman Empire.
- IV. The History of Civilization in Mediaeval and Modern Europe.

#### PHILOSOPHY.

- I. The Elements of Psychology. Especial prominence will be given to the practical phases of the subject as relates to Mind Culture. 3.
- II. Ethics. Lectures and Recitations. An attempt will be made to apply the scientific method to the investigation of the right of human conduct and individual relation. 2.
- III. History of Philosophy, Text-Book and Lectures. 4.
- IV. An examination of the leading theories in Modern Philosophy, Lectures and Library Work. 4.

#### POLITICAL ECONOMY.

- I. The Elements of Political Economy. The subject will be treated from the historical standpoint, and especial attention will be given to those subjects which directly relate to the industrial, social and practical life of the people.
- II. Modern Economic and Social Questions. Rise of the Historical School, Modern Socialism, and recent tendencies in legislation.

## Department of Rhetoric and Literature.

### COURSES IN RHETORIC.

I. Class room work will be divided between theory and practice. Themes affording practice in narration, exposition, summarizing and argument will be required.

A portion of the time will be devoted to the analysis and study of the oration.

Lectures will be given upon the history of the English language. Four times per week, first semester.

II. Critical reading of selections from prose masterpieces, having in view the verifying of the principles of rhetoric. Essays and papers will be required throughout the course.

Lectures upon the formation and growth of English prose will be reinforced by collateral reading. Second semester.

Open to students who have taken Course I or its equivalent.

### COURSES IN LITERATURE.

I. Elizabethan Drama. A general study of the Miracle Plays and the pre-Elizabethan period is pursued to obtain an historical setting. Selected plays from Green, Peele, Lyly, Marlowe, Jonson, Beaumont and Fletcher, Webster, Massinger and Shirley.

Papers from time to time will be required upon assigned subjects. Must be preceded by Course I in Rhetoric. First semester.

II. Shakespearian Drama. The critical study of Macbeth and King Lear, in addition to the rapid reading of ten plays in which the attention is especially directed to plot analysis and character presentation.

One hour per week will be devoted to literary history in Courses II and III. Must be preceded by Course I. Second semester.

III. Nineteenth Century English Literature. Representative selections from the verse and prose of Wordsworth, Coleridge, Southey, Shelley, Keats, Byron, Lamb, DeQuincey, Arnold and Ruskin.

The preparation of papers will be required from time to time upon assigned subjects bearing directly upon the work as outlined. First Semester.

IV. Tennyson and Browning. The critical study of selections from Tennyson and Browning, comparing the style, philosophical ideas and theories of the authors. Papers will be required as designated in Course III. Second semester.

V. American Literature. For the most part the work of this course will be directed to the study of the verse of Longfellow and Bryant and the prose of Emerson and Lowell. First semester.

VI. English Epic Poetry. The following topics will be studied: The characteristics of Epic Poetry. The Classification of Epics; The Theory of Epic Growth; The Iliad as the model of Epic Poetry; The Boewulf (translation); Paradise Lost. Second Semester.

Courses III and IV will be offered as alternate Courses with V and VI. Courses V and VI being given in 1900-1901.

VII. The extended and critical study of the poems of Browning. Graduate Course.

VIII. Some department, subject, or figure in Literature will be selected as the basis of the work of this course. Graduate Course.

### ELOCUTION.

Special classes may be formed affording training in Voice Culture and Rendering.

The aim of the Vocal Culture is to strengthen, purify, and enrich the voice by acquiring a correct method of breathing, paying due regard to the hygiene of the voice, and by engaging in systematic drills to develop the flexibility, and to control the pitch, force and energy of the voice.

The initiative steps in Rendering will be followed by Thought, Conception and Analysis, Memory Work, Reading of Dramatic Literature, Study of Comedy and Study of Life.

When desired special lessons will be given in any of the work outlined above, also in Individual Recitals, Monologue Work and Impersonation.

## Department of Chemistry and Physics.

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### COURSES IN CHEMISTRY.

The courses in Chemistry are arranged as nearly as possible like those in the best chemical laboratories in the United States. As an introduction to all courses in this subject, and as a prerequisite for many others, a course extending over one semester is given in General Chemistry. This is presented by recitations and laboratory work, together with some lectures on points which involve the use of apparatus too complicated or too delicate for the average student. For the present this one course will be given to all students choosing it, instead of making separate classes for Mechanical Engineers, and for general course students. Remsen's Briefer Course and Foye's Chemical Problems are used as text books, and Kortright and Trevor's Laboratory Guide for the practices. In this term's work students gain a clear conception of chemical elements, chemical changes, and the philosophy of Chemistry in general—principles too often indistinctly learned, but absolutely essential for all future work in this Science.

One-half year in Qualitative Analysis follows this work. It is taught by recitations, but the larger proportion of the student's time is spent in the laboratory. It is expected that another semester will be devoted to Quantitative Analysis which involves the principles of analysis, by both gravimetric and volumetric methods.

These two years of work should be considered as essential for all other work in Chemistry and for advanced work in Mineralogy. It is recommended that Assaying be not taken up until after this amount of work has been finished, although only the first two semesters of work are required.

Advanced courses in Chemistry are taken up at the student's option. At present a course one Organic Chemistry involving lectures and laboratory work on the chemistry of the compounds of carbon is offered for those students fitted for the work. Additional courses in advanced Quantitative Analysis, Organic and Inorganic Chemistry, and Agricultural Chemistry will be given when sufficient demand is made by students properly prepared for the work.

Ample apparatus is at the disposal of the students (see equipment), and with the fine laboratories every inducement is offered to students to make themselves proficient in this interesting line of science.

Course I. General Inorganic Chemistry, required of all students Open to all students who have no entrance conditions in Mathematics. Five hours credit. Three recitations or lectures per week. Two laboratory practices (two and one-half hours of laboratory work count as one hour recitation.)

Text Books, Remsen's Briefer Course, Foye's Chemical Problems, Trevor and Kortright's Laboratory Guide.

Course II. Qualitative Analysis, required of all students specializing in Chemistry, and must be preceded by Course I, or its equivalent in some laboratory of acknowledged standing. First or second semester. Five hours credit. Two recitations and eight hours laboratory work.

Course III. Quantitative Analysis, Introductory. Must be preceded by Courses I and II. The principles of gravimetric and volumetric analysis are presented in this course. Five hours credit. Work is principally laboratory work in which eight gravimetric and six volumetric determinations will be required. Required of all students specializing in Chemistry, Mineralogy and Assaying.

Course IV. Assaying. Must be preceded by Course I, and if possible by II and III. Students specializing in Chemistry and Assaying will not be permitted to take this course unless preceded by Course II and Mineralogy and accompanied or preceded by Course III. Includes laboratory work in grinding and sampling ores, and the fire assay for gold, silver, lead and copper, and bullion assay. Determinations involving Volumetric methods, or the so-called wet methods, will be given as part of courses III or V, depending upon the needs of the student.

Lectures on occurrences of ores, methods of sampling and fluxing for the assays of all of the principal metals will be given. Students desiring to specialize in this work are required to precede the course by Mineralogy.

Text book, Brown's Manual of Assaying. Other standard works, as Ricketts and Miller, Hiorns, Mitchell, and Furman, are in the library. Hours dependent upon the needs of the student, but not less than three may be taken, of which one will be lecture and two laboratory work. Second semester only.

Course V. Quantitative Analysis, Advanced: Analyses of milk, butter and cheese, fodder and fertilizers, electrolysis of metals as copper, lead, silver, etc., by Classen's method, volumetric assays for lead, copper, antimony, etc., water analysis by sanitary

and microscopic methods, analysis of iron and steel. These analyses will be taken up as the student shows his preparation therefor. Must be preceded by Courses II and III. Hours to suit the needs of the student but not less than three may be taken, all of which will be laboratory work. Free use of reference books in library required for this work. Either semester.

Course VI. Organic Chemistry. The chemistry of the compounds of Carbon. Lectures, recitations and laboratory work. Six hours credit, of which three are laboratory practices. Must be preceded by Courses II and III. The laboratory work is mainly synthetic, by which the student prepares the compounds studied in the lectures. Required of all students specializing in Chemistry. First semester.

Text book, Remsen's Organic Chemistry, and Orndorff's Laboratory Guide. Deposit \$10.00.

Course VII. Continuation of Course VI. Six hours. Students electing Course VI are expected to carry the work during the whole year.

#### COURSES IN PHYSICS.

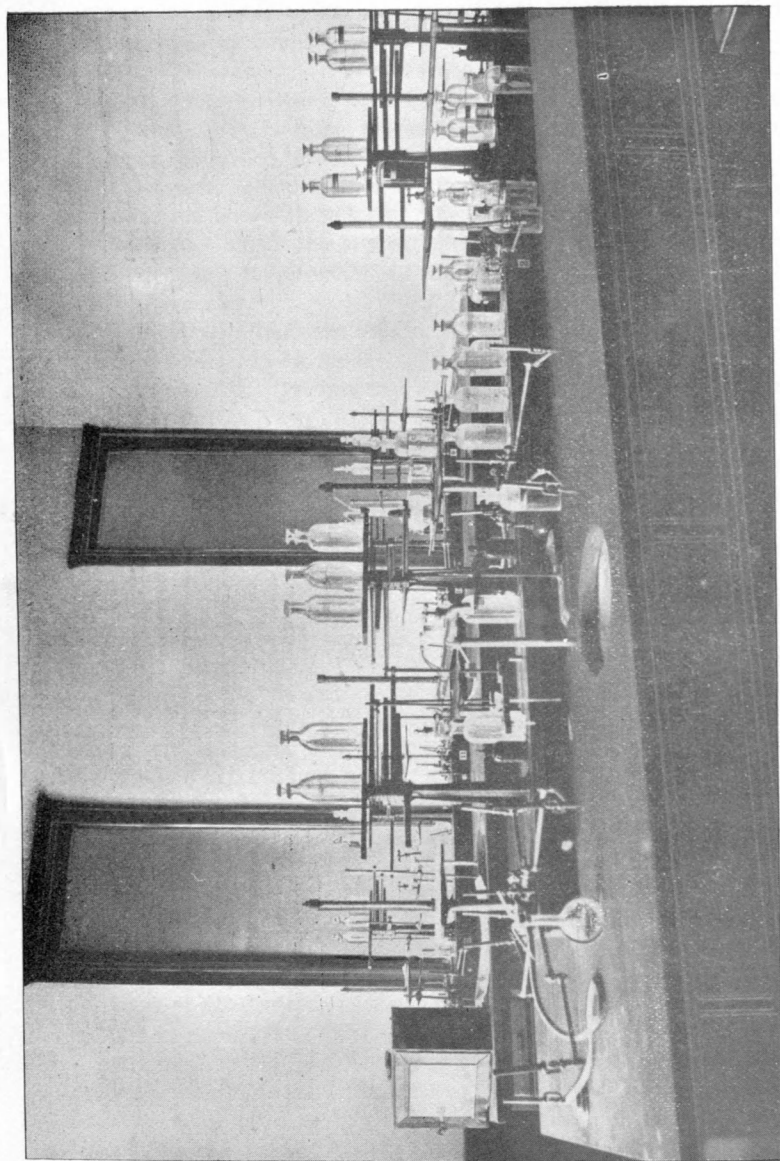
This subject is taught by both lectures and laboratory work. In the preparatory courses the students perform nearly all of the experiments after having had the subject presented and explained to them in the recitations.

For the advanced work the subject will be presented in two courses. One of the lectures and recitation work only, and one of laboratory work only, accompanying or following the lecture course. In this way the illustrative part of the subject is presented to the student by the lecturer, and the quantitative part is done by the student himself. This arrangement gives the greatest efficiency to the department both for the student and for the professor. The equipment in the way of apparatus is well arranged for both lecture experiments and for physical measurements, while the laboratories are equipped with the modern forms of tables, as described under Equipment.

Course I. College Physics. Mechanics, Sound and Light. Required of all students in Engineering, and in the Scientific Course. Must be preceded by Courses I and II, Preparatory, or their equivalents, and by Mathematics I and II. Not open to freshmen except by special permission. Students conditioned in the required Mathematics may not take this course. Four hours credit, two lectures and two recitations. Course begins in first semester. Lectures accompanied by experiments of illustrative rather than quantitative nature.







CHEMICAL LABORATORY

Course II. College Physics, Heat, Electricity and Magnetism. Second semester. A continuation of Course I, and cannot be taken independently of that course. Four hours.

Course III. Physical Experiments. Theory and Methods of Physical Measurements. Includes laboratory experiments illustrating general laws in all branches of Physics, and instruction in the use of the instruments of precision employed in Mechanics, Heat, Light and Electricity. Required of Engineers and will be found of value to Science students who expect to teach the subjects. Must be preceded by Courses I and II. Students electing this course are strongly advised to prepare themselves by first taking Mathematics III and IV, which will be required of the Mechanical Engineering students before taking this work. This course is expected to give laboratory work that usually accompanies Courses I and II.

Course IV. Laboratory Work Only. Hours to be taken, optional with the student, but not less than three hours may be taken. May be taken during either or both semesters. Must be preceded by Courses I and II.

### COURSES IN GEOLOGY AND MINERALOGY.

At present this work is included in one Department and all courses offered are elective. The subjects treated will be general work in Mineralogy and Petrography, and in Dynamic Geology and Physical Geography. Courses in Paleontology and Stratigraphic Geology will be given and the subjects will receive treatment as a part of Dynamic Geology.

This region offers unsurpassed opportunities for study of the many and varied processes and geological changes, and a wonderful diversity of different geological formations, while the State of Montana and neighboring states are noted for the large number of crystallized minerals found within their borders. As these states are distinctively mining states, all must realize the importance of a thorough knowledge of the principles of Mineralogy and Geology as applied to ores of economic importance. Special attention is given to Economic Geology after the students have prepared themselves in the fields of these two sciences.

The subjects are taught by lectures and laboratory work. For Mineralogy and Lithology the laboratory work is the examination of the minerals in museum (see museum), and the determination of minerals by megascopic and blow-pipe tests. For Geology the laboratory work is applied as field work and excur-

sions to the different exposures of characteristic rocks, and to localities where important geological changes have taken place and left their trace.

Course I. Mineralogy. A study of the minerals from their crystallographic and chemical properties. Subject of Crystallography thoroughly reviewed before the study of minerals is taken up. Must be preceded by Chemistry I and II. The following courses are recommended as precedents, or to accompany this work: Chemistry III, Mathematics I and II, and Physics I and II. Students deficient in preparatory Mathematics or Physics may not take this course. Four hours credit. Two lectures or recitations, and two laboratory practices. This latter work will include an introduction to blow-pipe analysis which will be studied during the latter portion of the term. Students electing this course should arrange work so as to have three lectures with one practice for the first part of the term, and extra laboratory work in the latter portion. First semester.

Course II. General Geology. Text book and lectures accompanied by field and laboratory work. Four hours distributed between lectures and field work like course in Mineralogy. Especial attention is given to Dynamic Geology, and Palaeontology, but Physical Geography is also fully treated. Must be preceded by one course of College work in Science. First semester.

Course III. General Geology. Continuation of Course II. Second semester. Four hours.

Course IV. Lithology. A study of rocks from their physical and chemical properties without the use of the microscope. Particular attention is paid to their mineralogical composition. Must be preceded by Courses I and II. Second semester. Four hours credit. Two lectures and two laboratory practices.

Course V. Economic Geology. Deals with the minerals of gold, silver, copper, lead, iron, zinc, antimony, etc., which occur in quantities of economic importance, modes of occurrence of same, and effect of different gangues on values of ores. Must be preceded by Courses I and II. First semester. Four hours, lectures and field work. Trips to mines and mills will be expected.

Course VI. Blowpipe Analysis. Second semester. A continuation of work in determinative mineralogy. Laboratory work only. Credit one hour.

## Department of Biology.

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This department offers elementary work in general Biology looking toward a specialization either in Botany, Zoology or Microscopy, with advanced work in some lines in either of these three subjects. The rooms for the use of the department are in the basement and on the first floor of University Hall, are commodious and well lighted, and offer ample facilities for present needs. The material equipment is given elsewhere in this catalogue under the head of equipment.

The collections of working material are being constantly augmented. In addition to those mentioned under the head Museum there is a good series of marine alcoholics, containing both vertebrates and invertebrates, and a good collection of alcoholics from this region. For comparison in elementary work there is a collection of several hundred mounted slides, additions being constantly made. The University is situated under the shadow of Sentinel Mountain, altitude 6,000 feet, is within a short distance of Missoula River, is but a few miles from the Bitter Root River, and is in the famous Missoula Valley, an agricultural region of great fertility. A few miles away Mt. Lo Lo rises to an altitude of 9,500 feet. The opportunities botanically and zoologically are excellent.

The aim of the department is to bring the student into direct contact with the truths of nature. To do this there are lectures and recitations to give broad and general views, while in the laboratory each student is taught to get the facts for himself first hand. The rich and new field in which the University is located gives students good opportunity for work.

It is the intention of the State Board of Education to make the work of the University as nearly free to residents of the State of Montana as possible. In carrying out this generous plan there are no laboratory fees. The student makes a deposit to cover breakage only. At the close of the semester the balance is returned.

To carry on the work of the department a knowledge of Latin or Greek will be found of great advantage. In all courses an ability to draw well free hand is anticipated, while a knowledge of German and French is very desirable, and for research work indispensable.

In all laboratory work of the department the students work individually at separate tables. Each student is supplied with microscope, glassware, and necessary apparatus, the material being kept in the drawer space of the table. The material is charged to the student and he is held accountable for it. At the close of the work when the material is returned, in good order, he is credited with the amount returned. Every facility is offered students for successful work in the courses outlined.

The tables have been planned specially for the work to be done upon them. The tops are of oak, stained and paraffined. They are low enough for students to work with microscope vertical, giving all the comfort possible with the least fatigue possible. There is abundant drawer space for drawings, notes, glassware, etc. The beginners and advanced students work in separate rooms.

A nucleus of a department library is at the service of the students in Biology. The professor has loaned for use a portion of his library, consisting of several hundred volumes and pamphlets, and several hundred others belonging to the library give good opportunity for references in general work. The literature in a few special lines is somewhat extensive.

The following courses are offered for the year 1900-1901; for the year of required Biology the student may take Courses I and II, or V and VI.

### COURSES IN BIOLOGY.

Course I. General Biology. An introduction to the study of living things. It is designed to illustrate by the study of a few organisms the fundamental structure and properties of living matter. A series of animal and vegetable forms is studied in the laboratory, to harmonize with the recitations. Two recitations and five hours of laboratory per week. First semester. Required, four hours credit.

In this course Parker's Biology was used the past year. The students have each a microscope and all necessary material for work. The dissections include Amoeba, Paramecium, Haematococcus, Diatom, Vorticella, Hydroid, Aurelia, Mucor, Penicillium, Yeast, Earthworm, Starfish, Lobster, Dogfish. Each student prepared and mounted a series of slides and was taught to embed in paraffine and use the microtome. To aid in the work reference was made to such works as Marshall and Hurst's Zoology, Brooks' Invertebrate Zoology, Bumpus's Invertebrate Zoology, Dodge's Elementary Biology, Colton's Zoology, Huxley and Martin's Biology, Howes' Atlas of Biology, etc.

At the close of the work of the semester a thesis is written on

some approved subject, and presented for criticism. Accurate drawings are required, which are handed in from time to time for inspection.

Course II. General Biology. Continuation of Course I, and necessary for the completion of the work therein indicated. Second semester. Required, four hours credit.

Course III. Invertebrate Zoology. A general course in the morphology and classification of Invertebrates. Laboratory and Class Work. Dissection of typical invertebrates, such as *Grantia*, *Leucosolenia*, *Metridium*, *Pennaria*, *Campanularia*, *Sea-Urchin*, *Sea-Cucumber*, *Star-fish*, *Squid*, *Lobster*, *Earthworm*, *Nereis*, *Phascolosoma*, *King Crab*, *Clam*, and *Insects*. In this as in other work in the department, accurate drawings are required. At the close of the semester a thesis is presented, written on some topic in connection with the work. During the study constant reference is made to such works as Packard, Claus and Sedgwick, Huxley, and Lang. The dissections are from the list of laboratory books referred to under Course I, with others. A fair portion of the time is devoted to the laboratory technique, and each student mounts a series of slides from some of the specimens as the work progresses. The course must be preceded by Courses I and II, but none of the work therein given is duplicated. First semester. Elective, four hours credit.

Course IV. A continuation of Course III. Vertebrate Zoology. The dissections include *Balanoglossus*, *Amphioxus*, *Trout*, *Frog*, *Cat*, etc. Second semester, elective.

Course V. Structural Botany. In this course the plan is to give an intelligent idea of the scope of modern Botany. Recitation twice and laboratory practice five hours per week. Bessey's Briefer Course is used, with reference to other works on the subject. In addition to the general exercises as given in the text the student studies such types as *Spirogyra*, *Diatoms*, *Protococcus*, *Mucor*, *Agaricus*, *Moss* and *Fern*, and a flowering plant, using such laboratory guides as Arthur, Barnes and Coulter's *Plant Dissection*, Dodge's *Elementary Biology*, Huxley's *Biology*, etc. Each student is supplied with a microscope and all necessary reagents, is taught to use the camera lucida and measure with a micrometer scale, and to prepare material for the microtome. First semester. Required, four hours credit.

Course VI. Systematic Botany. To be preceded by Course V. The region near the University has a rich flora, of great botanical interest. The valley has an altitude of 3,223 feet above the sea, and plants may be had from this height to 9,500 feet, the height of Mt. Lo Lo some miles distant. This Course and Course V may be

taken at any time without previous biological study. Laboratory and field work, with lectures. Second semester. Required, four hours credit.

Course VII. Microscopy. Laboratory work with occasional lectures. A course in microscopical technique, on histological subjects. Students entering must have taken sufficient chemistry to work intelligently with various stains, reagents, and other chemicals. Different methods of hardening, sectioning, and staining histological material will be studied. This course will be given either semester, and may be taken for either a two or four hour credit. Elective.

Courses VIII and IX. Special Work. Under this heading additional study along biological lines will be outlined for students desiring it, considering both the demands of the students and the capacity of the department for carrying on the work. Special subjects will be assigned under the following heads: Entomology or ornithology within certain limits, physiology with special reference to the histology of the human body, or investigative work on limited groups of animals or plants. Those entering this work must have finished four of the preceding courses, and must have a reading knowledge of French or German. Laboratory work, ten hours per week for four hours credit, or twelve and one-half hours for five hours credit, with work in Seminary. Only students of special fitness will be admitted. They will be encouraged to take up some of the problems which the new field of work about the University presents, and will be offered every facility which the laboratory can afford, and will be given free use of the material collected from the region. Elective, either semester.

Course X. Photography. The camera is such an invaluable aid in all lines of scientific work that a course of work has been laid out which will be carried on conjointly by the departments of Chemistry and Physics and Biology. The former will take the theoretical side, with lectures on lenses, developers, and chemicals, the latter the practical work in the field and dark room. The course will consist of one lecture and one laboratory practice per week, with two hours credit. Elective, first semester.

Course XI. A continuation of course ten, devoted to the practical use of the camera in scientific work. Instruction will be given in enlarging, making lantern slides, and other kindred subjects. Negatives will be made of scientific objects and groups of objects. Photomicrography will be a prominent feature. Laboratory, two hours credit. Elective.

Seminary. Advanced students will meet once per week at an hour to be agreed upon, to make reports of work or investigations.

Occasional themes will be presented for discussion, as also reports on current literature.

In addition to the courses here offered students are referred to the description of the work of the Biological Station, carried on under the direction of the Professor of Biology. The courses of summer work are open to all who may choose to attend, and credit on the university record is given for the amount of work satisfactorily completed during the summer.

#### DEPARTMENT LIBRARY.

In addition to the publications mentioned under equipment, the following publications are at the disposal of the student:

Nature.

Popular Science Monthly.

Psyche.

Entomological News.

American Monthly Microscopical Journal.

Journal of Applied Microscopy.

Zoologischer Anzeiger.

Annals and Magazine of Natural History.

American Naturalist.

Botanical Gazette.

Zeitschrift fur Microscopie.

Science.

Journal of Morphology.

Journal of Neurology.

Bird Lore.



## The Department of Latin and Greek.

### GENERAL INFORMATION.

1. The primary aims of this department are the acquisition of such a mastery of the languages as to enable the student to read them with some degree of facility, to read the greatest possible amount of the best Greek and Roman literature, and to make the work subservient to general culture in the English language and literature.

The scope of this department is conceived to include, not only the study of the language and literature of the ancient Greeks and Romans, as narrowly defined, but also some attention to all phases of their civilization. Without this broader view, some of the most important results of classical studies cannot be attained. For this reason, the study of the arts, institutions, and life of the Greeks and Romans will be given due prominence; and provision has been made for this part of the work.

2. In the required courses, the study of grammar will be pursued in connection with the reading, not as an end in itself, but as a means of intelligently reading the language, with or without translation. The more systematic and scientific study of grammar will be provided for in elective courses.

3. In connection with the prose reading, exercises in writing Latin and Greek will be used. The training in syntax will be largely given in connection with this work.

4. There will be almost daily practice in reading and translating at sight, generally from that portion of the text assigned for the next day's reading.

5. "Bennett's Latin Grammar" and "Hadley-Allen's Greek Grammar" will be used for the ordinary class room work. Editions of the texts will be chosen as far as possible from those which have references to these grammars. Students are advised to bring with them any Latin and Greek text books they may have, but not to purchase books before definite directions are given. The most essential aids for study, such as maps, charts, and works of reference, are provided by the University.

6. The work of the college courses outlined below will be advanced as fast as it seems practicable to advance the requirements for admission, and should not be regarded as presenting the ultimate standard or ideal.

### COURSES IN LATIN.

- I. Vergil's Aeneid—First three books. Elements of prosody. 4.
- II. Vergil's Aeneid—Books IV., V., and VI. 4.
- III. Horace—First half, selected Odes. 4.  
Cicero—Second half, Essays, Letters.
- IV. Livy and Tacitus—Selections. 4.
- V. Plautus and Terence—One play from each.
- VI. Private Life of the Romans. Descriptive, no knowledge of Latin required for this course, open to all students. 4.  
This course is given in the second semester and should be preceded by the course in Greek life.
- VII. Rapid Reading Course, selected from Latin Poetry. 4.
- VIII. Rapid Reading Course, selected from Latin Prose. 4.

### COURSES IN GREEK.

- I. A First Greek Book; elements of Greek Grammar. 4.
- II. First Book of Anabasis; sight reading, writing Greek; study of Grammar in connection with the reading and writing. 4.
- III. Anabasis continued; sight reading; writing Greek; Grammar with topical outlines. 4.
- IV. Homer's Iliad, selections. 4.
- V. Homer continued—First half, selections from Odyssey. 4.  
Herodotus and Thucydides—Second half, selections.
- VI. Plato—First half, selections. 4.  
Demosthenes—Second half, selections.
- VII. Greek Dramatists—One play each from Aeschylus, Sophocles, and Euripides, selections from Aristophanes. 4.
- VIII. Greek Archaeology, elective in first semester of Senior Year, open to all students. 3.
- IX. Private Life of Greeks—Descriptive, no knowledge of Greek required for this course, open to all students, given in first semester.

## Department of Mathematics.

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### DEPARTMENT OF MATHEMATICS.

All students are required to take one course in Mathematics. Students in Scientific Course must take Courses I and II. In addition to these, students in Engineering Course are required to take Courses III, IV, and V. Students in Classical or the Philosophical Course may choose between Courses I and II.

Courses not required are open to all students as electives, but must be taken in the order prescribed under Courses in Mathematics.

### COURSES IN MATHEMATICS.

- I. Trigonometry. First semester. 4.  
Theorem; Arithmetic, Geometric, and Harmonic Progressions; Permutations and Combinations; Undetermined Coefficients; Summations of Series; Higher Equations. 4.
- II. Higher Algebra. Ratio; Proportion; Variation; Binomial
- III. Analytical Geometry. First Semester. 4. Must be preceded by Courses I and II.
- IV. Differential and Integral Calculus. Second Semester. 3.  
When required, must be preceded by Courses I, II, and III. If elected, may be taken after Courses I and II.
- V. Differential and Integral Calculus. First semester. 3. Must be preceded by Course IV.
- VI. Elective Geometry. Devoted entirely to original work. Either Semester. 1. May be taken by any one who has passed the entrance requirements in Mathematics.
- VII. Elective Geometry. Devoted entirely to original work. Either semester. 1. Must be preceded by Course VI or its equivalent.
- VIII. Plane Surveying. Second semester. 4. Must be preceded by Courses I and II.

## Department of Modern Languages.

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The aim of the beginning year of the Modern Language Courses is to give the student a thorough knowledge of grammar; to this is added reading of easy prose; this is followed in the second year with syntax and intermediate readings, the translation of scientific (biological, chemical), and technical monographs. Writing short essays in the languages will be required during the year, and some conversation will be given. In the third year, which is elective, more difficult readers will be used, such as "Faust" or Wallenstein" in German; "Esther Athalie," Moliere in French, and Cervantes in Spanish.

During the third year conversation and composition will be made one of the chief aims of instruction.

If time permits classes will be organized purely conversational.

### GERMAN.

A course of three years has been planned. During the first and second, Course I, II, III, IV, Joyne's Meissner's Grammar will be used and Joyne's Reader, followed by a course of reading. "Peter Schlemihl," Wilhelm Tell, etc.

The third year (Courses V and VI) will be devoted to a study of the classics, some of Schiller's and Goethe's works, as Schiller's Ballads, and Goethe's Faust. Part I and scientific monographs. These latter will be given to those students taking the Scientific Course. Essays will be required in the various subjects which students are pursuing, such as chemical, etc.

### FRENCH.

Courses I and II devoted to the study of Chardenal's Complete French Course. Reading (Daudet, 3 contes), followed by Courses III and IV, consisting of intermediate readings, such as Colomba, translations of various selections from modern writers, with exercises in composition and conversation, followed by Courses V and VI (Elective), which will be devoted to a study of the French classics and scientific writings.

Duval's *Histoire de la Litterature Francaise*.

## SPANISH.

A three years elective course will be given if called for. The first year, or Courses I and II, will be taken up with the study of Grammar and very easy readings from modern prose, followed by Courses III and IV, which will be devoted to readings of Spanish classics and literature; Syntax, Idwin's. Exercises in composition and conversation will be given.

A third year, or Courses V and VI, will be continuation of Courses III and IV. Conversation and composition, recitations will be held in Spanish.

Tests will be given in the different classes from time to time. Elective classes will be organized only upon the application of three or more students for the work.

Recitations are held four times per week.

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## Department of Free Hand Drawing.

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The purpose of this department is not only to give thorough and systematic instruction in Drawing and Painting, but also to instill the aesthetic taste and refinement that attend a true appreciation of art.

The arrangement of the courses follows the general trend of the best art schools. Care is taken that the work does not become narrow and mechanical, the desire being to attain freedom and breadth of understanding and execution.

One year of Free-hand Drawing is required of all students. Two and a half hours, twice per week, are devoted to the work.

The first semester's work serves as an introduction into the subject. A variety of exercises are given to develop correct seeing and facility of execution. The fundamental principles of perspective are taught, not theoretically, but from groups of objects and room interiors; value in light and shade is obtained from still life studies; and niceness of line from pen and ink work.

In the second semester charcoal work is taken up. The student begins drawing from simple casts of plant life and fragments of the human body and gradually advances to antique heads. Sketching in pen and ink and sepia is also done.

For those that wish to devote more time to the subject two more years of work have been added as free electives. Two and a half

hours, four times per week are given to each course. It is the desire to afford as much freedom and exercise of individual taste as is consistent with thorough work.

In courses II and III (taken in the first elective year) some charcoal work and the antique is required. Besides this a choice of three lines of work is offered; watercolor, oil, and black and white work. In the black and white work, crayon sauce, pen and ink, and wash blacks are the mediums used, and the work leads to illustration. Occasionally quick sketches are made from the draped figure, the models being members of the class. This year's work is accompanied with lectures on the History of Ancient Art.

In courses IV and V (taken in the second elective year) the student pursues more advanced work in any of the lines mentioned above. He draws and paints from the draped figure, models being furnished by members of the class, studies composition, and sketches and paints from landscape, when the weather permits. This year's work is accompanied with lectures on the History of Mediaeval and Modern Art.

## COURSES IN DRAWING AND PAINTING.

### I. Required,—4.

First Semester. 1. Drawing in outline and light and shade from geometric solids.

2. Drawing in outline from reliefs of decorative designs, leaves, flowers, and heads.

3. Drawing in pen and ink.

4. Drawing in outline from single pieces of furniture, and from interiors of rooms.

Second Semester. 1. Drawing in charcoal from the cast; hands, feet, heads, etc.

2. Drawing in sepia from the interiors of rooms.

3. Drawing in pen and ink.

II. and III. Elective. 4 each.

1. Drawing in charcoal from the cast.

2. Painting in oil or water colors, or black and white work.

3. Quick sketching from life.

4. Lectures on the History of Ancient Art.

IV. and V. Elective. 4 each.

1. More advanced work in oil painting, water colors, or black and white work.

2. Drawing and painting from the draped model.

3. Sketching and painting from landscape.

4. Lectures on the History of Mediaeval and Modern Art.

## School of Mechanical Engineering.

It is the purpose of this department to give the student a thorough training in those branches of science that underlie the profession of Mechanical Engineering, as well as technical instruction in the practical lines of shop practice, mechanical drawing, and machine design.

Below is given the special work required in this department. For the general work, and for the arrangement of the work according to years, see the Course of Study of the Mechanical Engineering Course. *The hours per week given are the number of hours credit, each one of which requires one hour's work in recitation or lecture, or two and one-half hours in laboratory, shop or drawing room.*

### SHOP WORK.

Instruction in shop work is given in the afternoon throughout the Freshman and Sophomore years. There are three shop periods per week of three hours each.

**Freshman Wood Work.** During the first semester attention is given to acquiring a knowledge of the use and care of the tools in this shop. A systematic course of exercises has been laid out to accomplish this, involving the use of the tools at the disposal of the student. On the bench, the exercises in carpentry consist of sawing, planing, joining, splicing, mortising, dovetailing, framing and paneling. On the lathes exercise is given in turning of cylinders, cones, beads, ogee curves, etc., and in chucking and face turning.

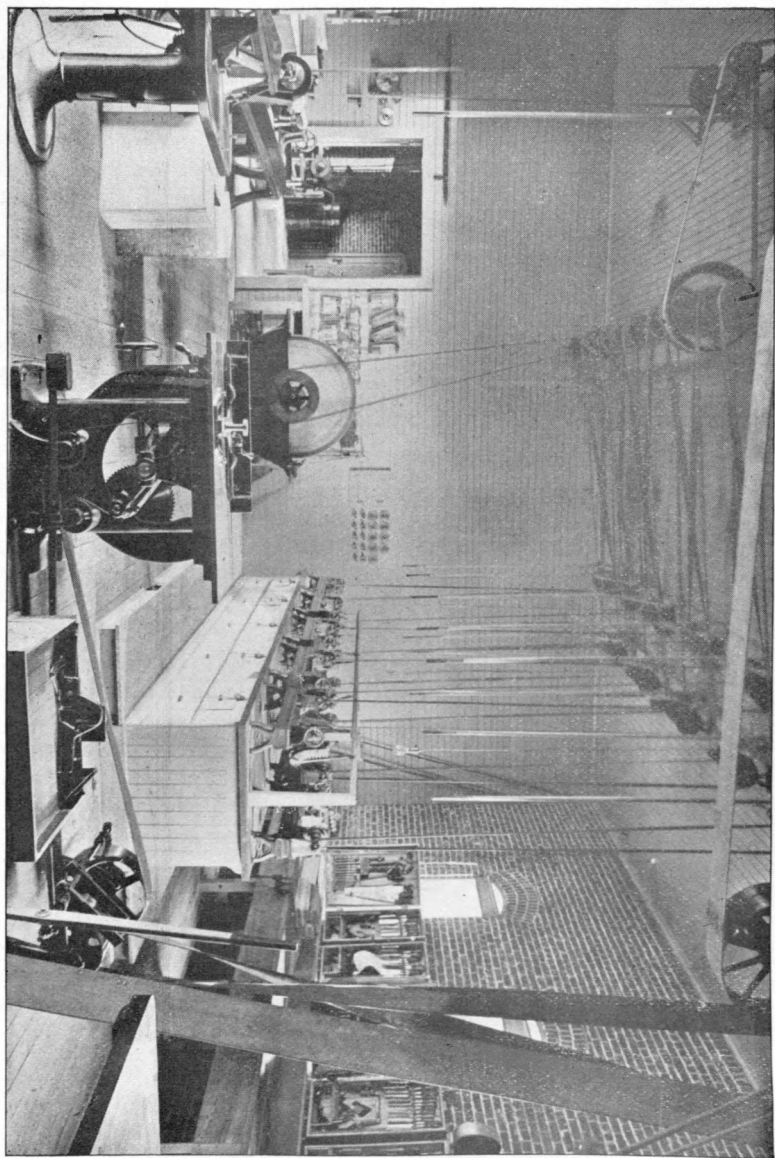
During the latter part of the semester some cabinet making is done that the student may apply the principles already learned.

In the second semester attention is given to pattern making. This work consists in making patterns of machine parts, and also core boxes for the same should they be required. The making of patterns involves a knowledge of both lathe and carpentry work and requires careful and accurate workmanship.

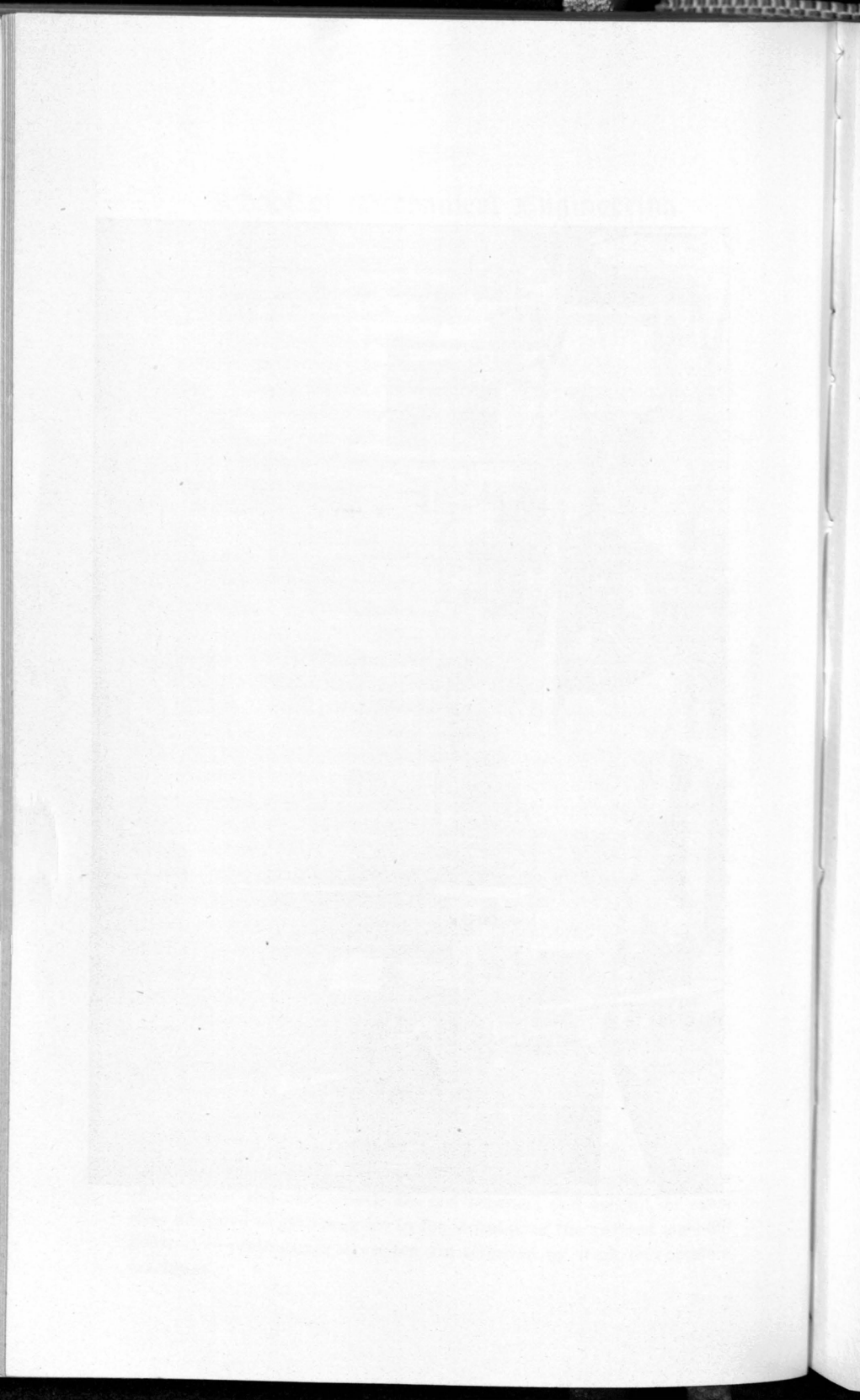
**Sophomore Iron Work.** The first semester is devoted to work in iron and steel forging. This work consists in drawing out, upsetting, welding, punching, and forming. After a thorough knowledge is gained of the various manipulations, steel tools are made for use in the machine shop.

The second semester's work is in the machine shop. The work consists, first, of exercises in vise work, involving practice in the use of hammers and cold chisel, file and scraper; and second, of exercises designed to give practice in the working of the various machine tools. The preliminary exercises are followed by work on complete machines.

WOOD SHOP







## DRAWING.

Freshmen Drawing. Throughout the year instruction is given in free-hand drawing from models and objects and also in mechanical drawing. The work in the latter during the first semester (Course I) includes lettering, symbolic cross-hatching, line shading, drawing from copy, and orthographic projection. In the second semester (Course II) drawings to scale are made of simple machines and machine parts.

Sophomore Drawing. The work in Mechanical Drawing is continued throughout the year. Complete sets of working drawings are made of existing machines. The necessary sketches and measurements are first made thus gaining additional training in free-hand drawing, and from these sketches the finished drawing is made. Two hours per week.

Problems in Descriptive Geometry. One semester, two hours per week.

Junior Drawing. Elementary Machine Design. This work consists of the designing of such elementary machine parts as fastenings, riveted joints, keys, journals, bearings, etc. Both rational and empirical formulas are used, and standard authorities are consulted. In the latter part of the year the work in steam engine design is commenced. A series of ideal indicator diagrams are drawn, and combined with diagrams of acceleration force, so as to give diagrams of actual force transmitted to crosshead and crank pin. Two semesters, four hours per week.

Senior Drawing. Steam Engine Design. The construction of the preliminary diagrams described under Junior Drawing, is followed by calculations as to weight of reciprocating parts, counter balance weight, and flywheel. The valve gear, shaft governor and other parts are designed, and complete working drawings prepared. One semester.

Advanced Machine Design. The design of various machines, such as machine tools, boilers, etc., the same general methods being pursued as described in the preceding paragraph. One Semester.

## RECITATION AND LECTURE ROOM.

Descriptive Geometry. One semester, four hours per week, recitation and drawing. Woolf's Descriptive Geometry is used. The correct representation of the point, line, plane and solid in space; sections and intersections of various geometrical figures.

Steam Boilers. One semester, two hours per week. Wilson and Flather's Steam Boilers is used as a text, and the steam boiler is studied, first, as regards correct design for strength, efficiency and

durability, second, boiler management and inspection, the prevention and removal of scale, firing, appliances for convenience and safety; third, wear and tear, corrosion, steam boiler explosions.

**Kinematics.** One semester, four hours per week. Recitation and drawing. Stahl and Woods Elements of Mechanism is used. A study is made of the motions transmitted by chains of mechanism, velocity ratios in link work, curves of gear teeth, cams, straight line motions, and various mechanical movements.

**Analytical Mechanics.** Bowser's Analytical Mechanics is used. One semester, three times per week.

**Valve Gears.** One semester, twice per week.

Special attention will be given to study of the plain slide valve, Zeuner's valve diagram being used in the solution of problems. Work of the class room will be supplemented by work in the drawing room.

**Theory of the Steam Engine.** Two semesters, three hours per week. Holmes' Steam Engine will form the basis for this work. The mechanics of the steam engine is studied. Also, the thermodynamics of the subject. Indicator diagrams, and the theory of compounding, receive attention.

**Strength of Materials.** One semester, four hours per week. Merriman's Mechanics of Materials is the text used. The work consists of a study of the stresses existing in engineering structures, and of the proper stresses allowable under various conditions. Simple and continuous beams are analyzed, and numerous practical problems are solved.

**Graphical Statics.** One semester, three times per week. The text used will be Volume I of Greene's Graphics. Work in recitation and drawing room, consisting of the analysis by graphical means of the stresses in the various members of framed structures, such as roof trusses.

**Transmission of Power.** Lectures, twice per week, one semester. Discussion of the various methods of transmitting power over long and short distances, and the efficiencies of different systems.

**Engineering Laboratory.** One semester, twice per week. Work in engine or boiler room, or in shop, performing various experiments with such apparatus as is available.

**Electrical Engineering.** One semester, three times per week. This course is designed to give an insight into the principles upon which are based the construction and operation of dynamo-electric machinery,

**Hydraulics.** One semester, two hours per week. Merriman's Hydraulics is used as text book.

## Department of Music.

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MRS. BLANCHE WHITAKER, DIRECTOR

The Department of Music of the University of Montana provides instruction in vocal and instrumental music and opportunities for the study of chorus work.

One of the principal features is the Pianoforte School, which is in a very satisfactory and encouraging condition, both as regards number of students and their proficiency. The school is divided into Upper and Lower, and each of these again into two grades, Senior and Junior. The Juniors of the Lower School use as studies the New England Conservatory Method, Bertini's, Czerny's or Heller's Easier Exercises, little pieces by Bach, Reincke, Gurlitt and others.

The Seniors continue the above with scales in similar and contrary motion, and major arpeggios of the common chord. More advanced pieces given.

In the Upper School the work of the Junior Grade comprises scales in thirds, sixths and tenths, similar and contrary motion, major and minor common chord arpeggios Cramer's Etudes, Czerny's Virtuosen Schule, and Clementi's Gradus ad Parnasum. The Senior Grade, in addition to the above, takes Arpeggios of the Dominant and Diminished Sevenths and studies by Chopin, Henself, Moscheles and others.

There will be classes formed for sight reading, elementary harmony, musical form and literature.

The standard set is both high and conscientious, and the students are already showing in a very gratifying manner the result of the training received.

Public recitals are given at least three times during the University year, and are of great benefit to the students, both in encouraging exactness and overcoming nervousness.

The piano used in the assembly room of University Hall is the gift of the manufacturer, Mr. George P. Bent, of Chicago, Ill.

When possible, artists of distinction will be brought to the University, to give a stimulus and example to the students. During the past year Mr. Godowsky, Mr. Max Benedix, Miss Jeanne Scott and Miss Jennie Osborne have been introduced to Missoula by the management, students receiving tickets at reduced rates.

TERMS.

The fees for this department are payable monthly, and no deductions are made for lessons missed unless due notice has been received and a reasonable excuse tendered.

Lower School, two lessons weekly.....\$4.00 per month  
Upper School, two lessons weekly.....\$6.00 per month

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**Vocal Department.**

MISS GRACE HERNDON, INSTRUCTOR.

Voice placing and development of the method of M. Sabrilia.

The studies used are Concone's Fifty Lessons, and Twenty Vocalises by Marchesi. The latter are sung in Italian, in which language instruction is given.

Songs are studied as soon as it is thought advisable, and the frequent musicales afford opportunity for public appearance.

TERMS.

The fees are payable monthly and no deduction is made for lessons missed.

Upper School, two lessons per week.....\$6.00  
Lower School two lessons per week.....\$4.00  
Single lessons.....\$1.00

## COLLEGIATE COURSES OF STUDY.

The University offers the following general courses of instruction:

A.—A classical course, leading to the degree of A. B.

B.—A Philosophical course, leading to the degree of B. Ph.

C.—A Science course, leading to the degree of B. S.

A course in Mechanical Engineering leading to the degree of B. M. E.

The work of the year is divided into two equal semesters. For convenience in classification, the work of each department of study is divided into courses and fractional courses. One course means the equivalent of one hour's lecture or recitation four times a week for one semester. Two and one-half hours of laboratory work, shop work, or drawing counts the same as one of the lecture or of recitation. At least thirty-two full courses as here defined are required for graduation. A student's choice of elective work is subject to the approval of the Faculty, which reserves the right of refusing to give any elective course for which there are less than three approved applicants.

## ADMISSION TO COLLEGIATE COURSES.

Candidates for admission to the Freshman class in any of the collegiate courses of the University, must be at least sixteen years old and present evidences of good moral character.

Students coming from other colleges and universities must bring certificates of honorable dismissal.

Admission may be made:

(a)—By Certificate.

1. Graduates of the accredited High Schools of Montana are admitted to the Collegiate Departments of the University on presentation of their Diplomas accompanied by a certificate from the Superintendent of their respective schools.

2. Students coming from any other school or college are requested to bring all grade cards, certificates or diplomas that they may possess, together with written statements from teachers, superintendents or principals, in order that a proper estimate may be had of their past work.

(b)—By examination.

Examinations for entrance will be given on days set in calendar of this catalogue.

Preparation is required or may be presented on the following subjects:

I. Algebra. Fundamental operations (including special rules for Multiplication and Division); Factoring; Highest Common Factor; Lowest Common Multiple; Equations of the First Degree containing one or more unknown quantities (including problems in the same); Involution and Evolution; Fractional and Negative Exponents; Radicals; Quadratic Equations of one or two unknown quantities. The equivalent of Chapters I, XVII, XIX and XX of Wentworth's New School Algebra.

II. Geometry. Plane and Solid. Demonstrations, constructions and the solution of numerical problems involving the metric system and logarithms. The equivalent of Wentworth's text and Estill's Numerical Problems in Plane Geometry.

III. English Language and Literature.

The requirements are:—

1. Grammar. A good knowledge of the elements of grammar, including the parts and properties of speech, the various kinds of sentences as to form and meaning, parsing, sentential analysis, and the classification of the elements of sentences.

2. Composition and Rhetoric. Ability to write clear and idiomatic English, and make practical use of the essentials of Rhetoric, not only form, construction, syntax and punctuation, but also the principles of good style and rhetorical figures.

3. Literature. Applicants will be expected to be familiar with the form and substance of the works in group (a), and to possess a general knowledge of the subject matter in group (b).

For 1900. (a) Shakespeare's Merchant of Venice and Macbeth, Milton's Paradise Lost, Books I and II, Burke's Speech on Conciliation with America, Macaulay's Essay on Milton, Macaulay's Essay on Addison. (b) Tennyson's The Princess. DeQuincey's Flight of a Tartar Tribe. The Sir Roger de Coverley Papers, Pope's Translation of the Iliad, Dryden's Palamon and Arcite.

For 1901. (a). Shakespeare's Macbeth and Merchant of Venice, Milton's Minor Poems, Burke's Speech on Conciliation with America, Carlyle's Essay on Burns, Macaulay's Essay on Milton and Macaulay's Essay on Addison.

(b). Tennyson's The Princess, DeQuincey's Flight of a Tartar Tribe, Addison's Sir Roger de Coverley Papers, Pope's Translation of the Iliad. Scott's Ivanhoe and Goldsmith's Vicar of Wakefield.

IV. History. General History, the equivalent of one year's work, with special reference to Rome, England, France, and the United States of America.

V. Physics. One year of Elementary Physics, the equivalent of Carhart and Chute's Elementary Physics, Gage's Principles of

Physics, or Avery's Elements, one-half of the time having been devoted to laboratory work. The student's note book in laboratory practice will be considered evidence of having done this work.

VI. Latin. The reading of four books of Caesar, and four orations of Cicero, or their equivalents, with the grammatical knowledge which must be acquired in the preparation for and performance in a thorough manner of this reading. Practice in writing Latin to the extent presented in Bennett's or Jones' Latin Composition or similar works.

VII. German, Grammar, Joynes Meissner, Whitney's or their equivalents. Ability to read easy prose fluently, and to translate at sight such a work as "Hauffs Maerchen" (Goold).

VIII. French. Grammar, Chardenal's Complete, Edgren's or their equivalents. Ability to read easy prose fluently and to translate at sight such work as "La Pierre de Touche" (Harper).

IX. Biology. One year's work in Biological Science, with half the time given to laboratory work.

X. Chemistry. One year's work, the equivalent of Remsen's Beginning Course. One-half of the time must be given to laboratory work, as certified by student's note book.

XI. Physical Geography. One-half year, the equivalent of Tarr's Elementary Physical Geography.

XII. Physiology. A half year. Martin's Human Body, Briefer Course, or its equivalent.

XIII. Mechanical Drawing and Shop Work, one year.

The subjects required for admission to the various courses are as follows:

Classical Course, I, II, III, IV, V, and VI.

Scientific Course, I, II, III, IV, V, either IX or X, and two years of study in either ancient or modern languages, or one year of Ancient or Modern language with XI, and XII.

Philosophical Course, I, II, III, IV, V, VI. For VI, wholly or in part, the student may make substitutions from VII, VIII, IX, XI, and XII.

Mechanical Engineering Course. I, II, III, IV, V, with any one of the following: VI, which may be substituted by VII or VIII, wholly or in part, or by either IX or X with XI, XII and XIII.

## GRADUATION AND DEGREES.

In order to secure the recommendation of the Faculty for graduation from the University in any of the respective lines of work that have been outlined, it is necessary for the student to complete the equivalent of at least thirty-two full courses, as already defined in the section concerning collegiate courses, in-



cluding an acceptable thesis. The thesis may represent a minimum of one course and a maximum of three courses, or such proportion thereof as in the judgment of the professor in charge it may merit.

That the needs and special inclinations of the different students may be consulted as far as possible, certain of these courses are required for each of the respective degrees and the rest are left for the student's selection.

The work required for the completion of the three courses in the College of Letters and Science shows at a glance the difference in the courses. Certain subjects are required of all students, others are required in special courses, others must be elected from definite lines of work, and still others are free electives. It is understood that the choice in free electives must in part be governed by the arrangement of subjects on the daily program, and that precedence will always be given to required work for the different degrees and the number of elective courses allowed.

**GENERAL WORK REQUIRED FOR DEGREES, EXCEPTING  
B. M. E.**

|   |            |
|---|------------|
| Drawing, twice per week for one year..... | 1 course   |
| Rhetoric .....                            | 1 "        |
| Political Economy .....                   | 1 "        |
| Psychology and Ethics .....               | 1¼ "       |
| Literature .....                          | 2 courses  |
| Biology .....                             | 2 "        |
| Chemistry .....                           | 1¼ "       |
| Gymnasium practice .....                  | ½ "        |
| <hr/>                                     |            |
| General required work .....               | 10 courses |

**WORK REQUIRED FOR DEGREE B. A.**

|   |            |
|---|------------|
| General required work (given above).....                | 10 courses |
| Special required work, Latin .....                      | 5 "        |
| Special required work, Greek Life.....                  | 1 course   |
| Special required work, Roman Life.....                  | 1 "        |
| Partial Electives, in Greek, Latin, Modern Languages... | 6 courses  |
| Partial Electives, Trigonometry or Higher Algebra.....  | 1 course   |
| Free Electives .....                                    | 8 courses  |
| <hr/>   |            |
| Total .....   | 32 courses |

WORK REQUIRED FOR DEGREE B. S.

|   |            |
|---|------------|
| General required work (given above).....        | 10 courses |
| Special required work, Trigonometry .....       | 1 course   |
| Special required work, Higher Algebra .....     | 1 “        |
| Special required work, Physics .....            | 2 courses  |
| Partial Electives, Modern Languages.....        | 4 “        |
| Partial Electives, Science and Mathematics..... | 6 “        |
| Free Electives .....                            | 8 “        |
| <hr/>   |            |
| Total .....                                     | 32 courses |

WORK REQUIRED FOR DEGREE PH. B.

|   |            |
|---|------------|
| General required work (given above).....                    | 10 courses |
| Partial Electives, Ancient and Modern Languages.....        | 6 “        |
| Partial Electives, History, Literature and Philosophy... .. | 8 “        |
| Partial Electives, Trigonometry or Higher Algebra.....      | 1 course   |
| Free Electives .....  | 7 courses  |
| <hr/>   |            |
| Total .....   | 32 courses |

FOR THE DEGREE OF B. M. E.

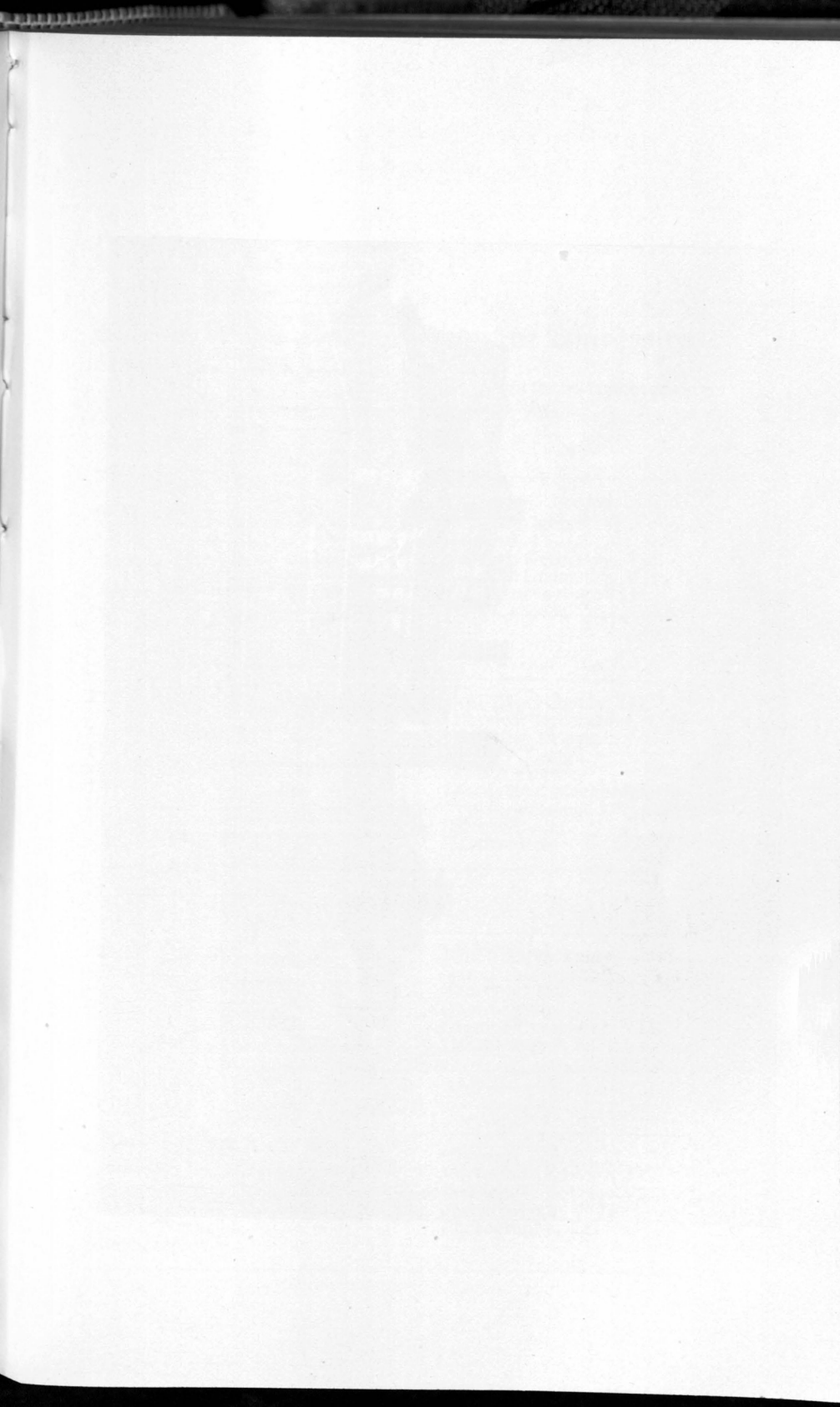
|  |            |
|--|------------|
| In Mathematics, I., II., III., IV., V..... | 4½ courses |
| Model and Object Drawing, I., II.....      | 1 course   |
| Physics, I., II.....                       | 2 courses  |
| Political Economy, I.....                  | ¾ course   |
| German, I., II.....                        | 2 courses  |
| Chemistry, I.....                          | 1¼ courses |
| Literature .....                           | 1 course   |
| Heat .....                                 | 1 “        |
| Gymnasium Practice .....                   | ½ “        |

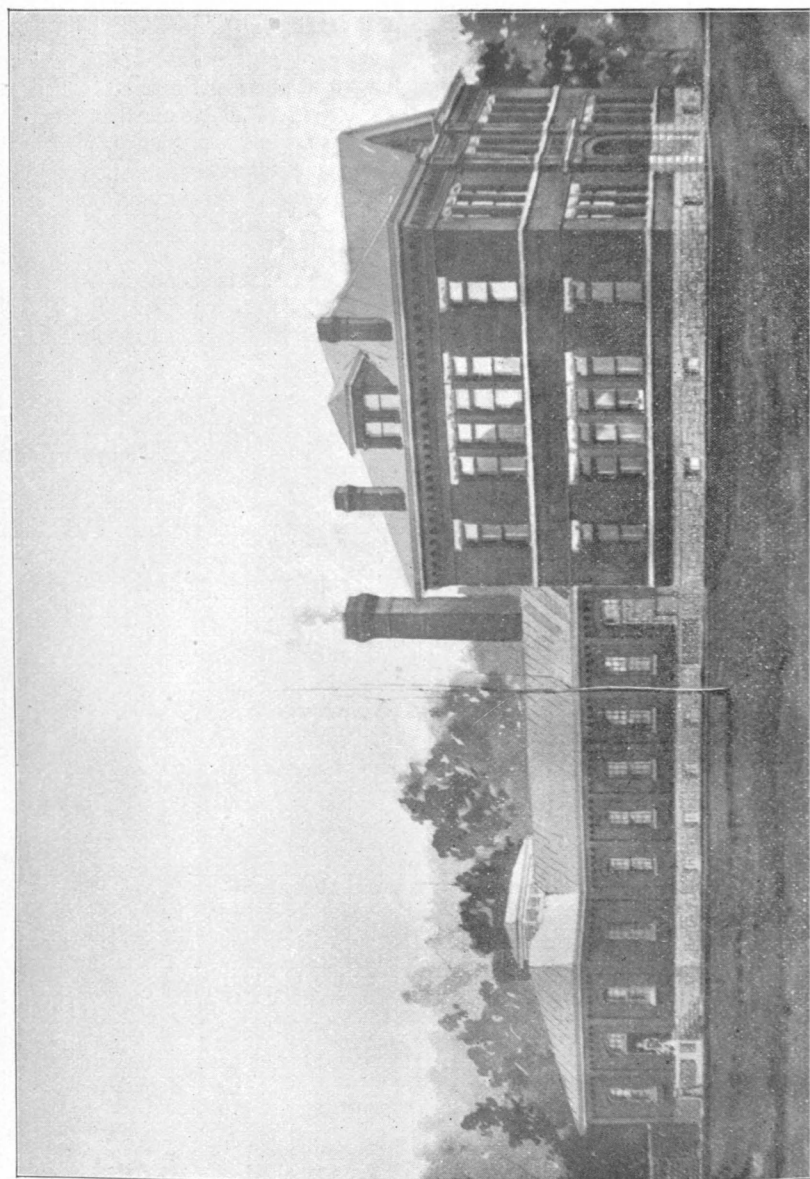
For the technical work required in the Mechanical Engineering course see tabular statement following.

DEGREES.

The University grants the following degrees: For the completion of the Scientific Course the degree of B. S.; Philosophical Course, Ph. B.; Classical Course, A. B. Graduates from the School of Mechanical Engineering are given the degree B. M. E.

The University does not grant the degrees M. A. and M. S. pro honore or in cursu. These degrees will be given graduates of this institution, or other institutions of good standing, on the completion of two years of resident work or three years of non-resident work, and the presentation of an acceptable thesis. In case the student can spend but one year at the University, a fair equation will be made. Courses leading to the degrees M. A. and M. S. will be outlined for candidates when they present themselves for work.





SCIENCE HALL.

## Scheme of Courses Offered by the University.

\*These courses are the general requirements for college courses.

†Technical courses in Mechanical Engineering.

### MATHEMATICS.

| <i>First Semester.</i>    | <i>Second Semester.</i> |
|---------------------------|-------------------------|
| Trigonometry, I.          | Higher Algebra, II.     |
| Analytical Geometry, III. | Calculus, IV.           |
| Calculus, V.              | Elective Geometry, VI.  |
| Elective Geometry, VII.   | Elective Geometry, VII. |
| †Descriptive Geometry.    | Plane Surveying, VIII.  |

### PHYSICS.

|                            |                            |
|----------------------------|----------------------------|
| Physics, I.                | Physical Experiments, III. |
| Physical Experiments, III. | †Physical Laboratory.      |
| †Graphical Statics.        | †Machine Design.           |
| †Machine Design.           | †Engine Design.            |
| †Steam Engine.             | †Steam Engine.             |
| †Kinematics.               | †Analytical Mechanics.     |
| †Strength of Materials.    | †Valve Gearing.            |
| †Transmission of Power.    | †Steam Boiler.             |
| Physics, II.               | †Hydraulics.               |

### CHEMISTRY.

|                             |                             |
|-----------------------------|-----------------------------|
| *General Inorganic, I.      | †Qualitative Analysis, II.  |
| Qualitative Analysis, II.   | Quantitative Analysis, III. |
| Quantitative Analysis, III. | Assaying, IV.               |
| Quantitative Analysis, V.   | Quantitative, V.            |
| Organic Chemistry, VI.      | Organic Chemistry, VII.     |
| †Metallurgy.                | †Metallurgy.                |

### BIOLOGY.

|                            |                         |
|----------------------------|-------------------------|
| *General Biology, I.       | *General Biology, II.   |
| Invertebrate Zoology, III. | Vertebrate Zoology, IV. |
| Structural Botany, V.      | Systematic Botany, VI.  |
| Microscopy, VII.           | Special Work, VIII.     |
| Special Work, IX.          | Photography, XI.        |
| Photography, X.            |                         |

MODERN LANGUAGE.

|               |              |
|---------------|--------------|
| German, I.    | German, II.  |
| German, III.  | German, IV.  |
| German, V.    | German, VI.  |
| French, I.    | French, II.  |
| French, III.  | French, IV.  |
| French, V.    | French, VI.  |
| Spanish, I.   | Spanish, II. |
| Spanish, III. | Spanish, IV. |

ANCIENT LANGUAGE.

|   |                                |
|---|--------------------------------|
| Latin, I. Virgil.                         | Latin, II. Virgil.             |
| Latin, III. Horace and Cicero's Essays.   | Latin, IV. Livy and Tacitus.   |
| Latin, V. Comedy.                         | Roman Life, VI.                |
| Greek, I. Grammar and Lessons.            | Greek, II. Anabasis.           |
| Greek, III. Anabasis.                     | Greek, IV. Iliad.              |
| Greek, V. Odyssey, Herodotus, Thucydides. | Greek, VI. Plato, Demosthenes. |
| Greek, VII. Dramatists.                   | Greek Archaeology, VIII.       |
| Private Life of the Greeks IX.            |                                |

HISTORY

|                        |                          |
|------------------------|--------------------------|
| History of England, I. | American History, II.    |
| Ancient History, III.  | History of Civilization. |

PHILOSOPHY.

|                             |                                    |
|-----------------------------|------------------------------------|
| *Psychology, I.             | *Ethics, II.                       |
| History of Philosophy, III. | Theories in Modern Philosophy, IV. |

POLITICAL ECONOMY.

|                        |                                    |
|------------------------|------------------------------------|
| Political Economy, II. | *Elements of Political Economy, I. |
|------------------------|------------------------------------|

RHETORIC AND LITERATURE.

|                  |                   |
|------------------|-------------------|
| *Rhetoric, I.    | Rhetoric, II.     |
| *Literature, I.  | *Literature, II.  |
| Literature, III. | Literature, IV.   |
| Literature, V.   | Literature, VI.   |
| Literature, VII. | Literature, VIII. |

GEOLOGY AND MINERALOGY.

†Mineralogy, I,  
Geology, II.  
Economic Geology, V.

Geology, III.  
Economic Geology, V.  
Lithology, IV.  
Blow Pipe Analysis, VI.

DRAWING.

Free Hand, 1.  
Drawing and Painting, III.  
Drawing and Painting, V.  
†Mechanical Drawing, I.  
†Mechanical Drawing, III.  
†Machine Design, I.  
†Machine Design, III.

Freehand, II.  
Drawing and Painting, IV.  
Drawing and Painting, VI.  
†Mechanical Drawing, II.  
†Mechanical Drawing, IV.  
†Machine Design, II.  
†Machine Design, IV.

WOOD AND IRON SHOP PRACTICE.

†Wood Shop.  
†Iron and Steel Forging.

†Pattern Making.  
†Machine Work.

MECHANICAL ENGINEERING COURSE.

Roman numerals indicate courses; Arabic, hours credit.

FRESHMAN YEAR.

*First Semester.*

Trigonometry, I, 4.  
German, I, 4.  
Model and Object Drawing, I, 2.

**TECHNICAL INSTRUCTION:**

Wood Working Tools, I.  
Mechanical Drawing, I, 3.  
Wood Shop Practice, I, 4.

*Second Semester.*

Higher Algebra, II, 4.  
German, II, 4.  
Model and Object Drawing, II, 2.

**TECHNICAL INSTRUCTION:**

Lectures in Pattern Making and  
Foundry Practice, 1.  
Mechanical Drawing, II, 3.  
Pattern Making, II, 4.

SOPHOMORE YEAR.

Analytical Geometry, III, 4.  
Descriptive Geometry, 4.  
Chemistry, I, 5.

**TECHNICAL INSTRUCTION:**

Mechanical Drawing, III, 2.  
Forging, III, 4.

Calculus, IV, 3.  
Steam Boilers, 2.  
Qualitative Analytical  
Chemistry, 3.  
Literature, 4.

**TECHNICAL INSTRUCTION:**

Lectures in Machine Shop  
Practice, 1.  
Mechanical Drawing, IV, 2.  
Machine Shop Practice, 3.



JUNIOR YEAR.

Calculus, V, 3.  
Kinematics, 4.  
Physics, I, 4.  
Metallurgy, 3.

DRAWING ROOM:  
Machine Design, V, 4.

Analytical Mechanics, 3.  
Valve Gears, 2.  
Theory of the Steam Engine, 3.  
Physics, II, 4.  
Physical Laboratory, 2.

DRAWING ROOM:  
Machine Design, 4.

SENIOR YEAR.

Strength of Materials, 4.  
Theory of the Steam Engine, 3.  
Graphical Statics, 3.  
Transmission of Power, 2.  
Engineering Laboratory, 2.

DRAWING ROOM:  
Steam Engine Design, 3.

Political Economy, 4.  
Hydraulics, 2.  
Electrical Engineering, 3.

DRAWING ROOM:  
Advanced Machine Design, 5.  
Thesis, 5.

## The Preparatory Department.

The Preparatory Course covers a period of three years, outlined in semesters, after the plan employed in the College Courses. It is expected students will take subjects in the order given.

Applicants for admission to the Preparatory Course should be at least fourteen years of age, and well grounded in the elements of an English education.

Admission may be made—

(a) By Certificate.

(1) Certificates or certified statements from superintendents, or from any graded school of good standing, showing completion of 8th grade work will be accepted in lieu of examination.

(2) Teachers' certificates given by County Superintendents will admit student to Preparatory Department without examination.

(3) Students are urged to bring when possible all record cards, certificates and diplomas, together with a written statement from superintendent, principal or teacher, on which the standing of the student is stated.

(b) By Examination.

Examinations in Arithmetic, Grammar, U. S. History, Reading, Spelling, and Geography will be given on days stated in the calendar of this catalogue.

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### PREPARATORY DEPARTMENTS OF INSTRUCTION.

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#### MATHEMATICS.

I. Elementary Algebra. First Semester. 4. Unless admitted on certificate, applicants for admission to this course must pass a satisfactory examination in Arithmetic. This examination will consist of an oral and a written test. Subjects covered will be Factoring, Common and Decimal Fractions, Percentage (including simple applications), elements of Involution and Evolution, and the Metric System.

II. Algebra continued. Second semester. 4.

III. Algebra continued. First semester. 4. With the work of this semester a thorough review of Factoring, Fractions, and other

important subjects will be given. In addition to the mastery of principles much drill work will be required, thus enabling the student to fix those principles and to gain that facility in Algebraic calculation that comes only by practice.

IV. Geometry, Plane. Second semester. 4.

V. Geometry, Plane. First semester. 4.

VI. Geometry, Solid. Second semester. 4.

Throughout the courses in Geometry much original work will be required. This original work will consist of demonstrations, constructions, and the solution of numerical problems involving the metric system and logarithms. In addition to the regular text, Estill's Numerical Problems in Plane Geometry, or its equivalent, will be used.

### ENGLISH.

The aims of this work as pursued in the Preparatory Department are to enable the student to write good English with creditable facility, to develop a taste for the best literature, and to give the student a general knowledge of the history of the English language and the great periods in the development of English literature.

Composition and Rhetoric. The work as outlined will include drill in sentence building, a consideration of the principles of punctuation, paragraphing and outlining of Essays, a knowledge of the requisites of style and a familiarity with the figures of speech. The required written exercises will afford the means of applying the principles introduced, enlarging the vocabulary of the student, and enriching his forms of expression.

Literature. The student is directed in the careful study of form, structure and subject matter of the works included in list (a).

Written tests or papers will determine the value of the knowledge gained by the cursory reading of the works included in list (b).

Literary History will receive special attention and the student's attention is directed to the relations existing between the periods of literature.

A considerable amount of prose and poetry will be committed to memory.

(a) The following list of works has been selected for critical study:

Milton's Paradise Lost, Books I, and II, Burke's Speech on Conciliation with America, Shakespeare's Macbeth and Merchant of

Venice, Carlyle's Essay on Burns, Macaulay's Essay on Milton, and Macaulay's Essay on Addison.

(b). List for reading: Tennyson's *The Princess*, DeQuincey's *Flight of a Tartar Tribe*, Addison's *Sir Roger de Coverley Papers*, Pope's *Translation of the Iliad*, Dryden's *Palamon and Arcite*, Lowell's *Vision of Sir Launfal*, Goldsmith's *Vicar of Wakefield*, Scott's *Ivanhoe*, and Cooper's *Last of the Mohicans*.

## SCIENCE.

**PHYSICS I and II.** A year's work in Elementary Physics, required of all students. The text of Carhart and Chute will be used. Two recitations per week, five hours of laboratory work. Each student works individually the experiments, and records the results, with drawings, in a note book, which is submitted from time to time for examination. A good equipment of material is supplied, and every facility will be offered to produce the most successful work.

**BIOLOGY I. and II.** Students preparing for Scientific Course must present a year of Biology, or in its stead a year of Chemistry. At present Biology alone is taught in the preparatory. This comes the first year, and consists of two recitations per week and two laboratory practices of two and one-half hours each. The work will be Elementary Botany and Elementary Zoology. Special attention will be given to manipulation of material, to the formation of correct habits of work and study, and to the development of the powers of observation. The students receive instruction from the professor of Biology, and work under the same conditions and surroundings as the college students. For the year 1900-1901 Kingsley's *Elementary Zoology* will be used as the basis for work, and the dissections as therein indicated will be made. Much additional collateral reading will be given from time to time.

**BIOLOGY, III. PHYSIOLOGY.** This course is open to all students except those taking the classical course. The work will not be a mere digest of text books, but will be given for the purpose of broadening the view and enlarging the powers as well as gaining information. One-half of the time will be spent in the laboratory, where a series of valuable experiments and examinations will be made. The guide for the laboratory experiments will be Peabody's *Laboratory Exercises in Anatomy and Physiology*. Students will work in the biological laboratory, and will be given the same attention as college students.

## LATIN.

The following general remarks are here made to avoid unnecessary repetitions under the courses outlined below.

1. The Roman pronunciation will be used. Pains will be taken to form habits of correct pronunciation. In this connection, the points to be especially emphasized are that long vowels shall be pronounced as long; also that every consonant shall be distinctly enunciated. For preparatory work it is very desirable to use texts which have long vowels marked.

2. Bennett's grammar will be used and pupils are expected to master the elements of Latin grammar, at least as presented in the coarser print of this book.

3. In the preparation of pupils for the University courses, teachers throughout the state are earnestly requested to take pains to form habits of correct pronunciation; and to have almost daily some exercise in reading and translating at sight and in writing Latin. The importance of these points can scarcely be overestimated.

#### FIRST YEAR—

##### First Semester:

Collar & Daniell's "First Latin Book" accompanied by Collar's "Gradatim" as a reading book.

##### Second Semester:

Collar & Daniell's book finished and reading in Gradatim continued.

#### SECOND YEAR—

##### First Semester:

Reading from "The Junior Latin Book" of Rolfe and Denison, which comprises "Roman History," "Nepos' Lives," and Books I and II of Caesar.

Review and extension of the study of Latin Syntax in connection with this reading, composition exercises and grammar lessons.

##### Second Semester:

The work of the first semester is continued. During the year the equivalent of four books of Caesar is read.

#### THIRD YEAR—

Cicero's Orations begun, composition exercises, and grammatical drill.

##### Second Semester:

The work of the first semester is continued. Four orations and some letters of Cicero will usually be read.

#### GERMAN.

Two years of German will be given in the Preparatory Classes. First Year. Will be devoted to a thorough study of Grammar

(Joyne's Meissner or Whitney's) with some easy prose reading, such as Hauff's Maerchen.

Second Year. Study of Syntax, dictation, and prose reading, such as Schiller's "Der Neffe als Onkel."

If students having finished this work wish to elect German in college that will begin with Course IV as shown on page —

#### HISTORY.

First Year. The work will deal principally with Grecian and Roman History. The aim of the instruction will be not the memorizing of dates and facts, but the understanding of the relation of the events to each other. The Library of the University contains many excellent reference books, and the work will be carried on by the library method rather than by the use of texts.

Second Year. The second year will be given to the study of Mediaeval and Modern History, with especial reference to the development of France and England. Abstracts and theses on historical themes will continue to be a marked feature of the instruction.

#### MECHANICAL DRAWING AND SHOP WORK.

Second and third year preparatory students intending to enter the Mechanical Engineering Course may take work in Mechanical Drawing and Wood Shop Work.

Mechanical Drawing. Five hours per week is devoted to this subject throughout the first and second semesters. Attention is given to lettering (including free hand lettering), cross-hatching, and drawing from copy.

Wood Shop Work. The same amount of time as that given to Mechanical Drawing is given to Shop Work. The student during the year learns the use of the bench and lathe tools by pursuing a systematic course of bench and lathe exercises. In the latter part of the year work is given in the more difficult problems of turning and carpentry.

## Course of Study.

### FIRST YEAR.

| <i>First Semester.</i>  | <i>Second Semester.</i>   |
|---|---|
| Algebra, 4.<br>Composition and Literature, 4.<br>History, 4.<br>*Latin, Biology or Physical Geography, 4. | Algebra, 4.<br>Composition and Literature, 4.<br>General History, 4.<br>*Latin, Biology or Physiology, 4. |

### SECOND YEAR.

|   |  |
|---|--|
| Algebra, 4.<br>Rhetoric and Literature, 4.<br>General History, 4.<br>**Latin, German, Physical Geography, Biology or Mechanical Drawing and Shop Work, 4. | Plane Geometry, 4.<br>Rhetoric and Literature, 4.<br>History, 4.<br>**Latin, German, Physiology, Biology or Mechanical Drawing and Shop Work, 4. |
|---|--|

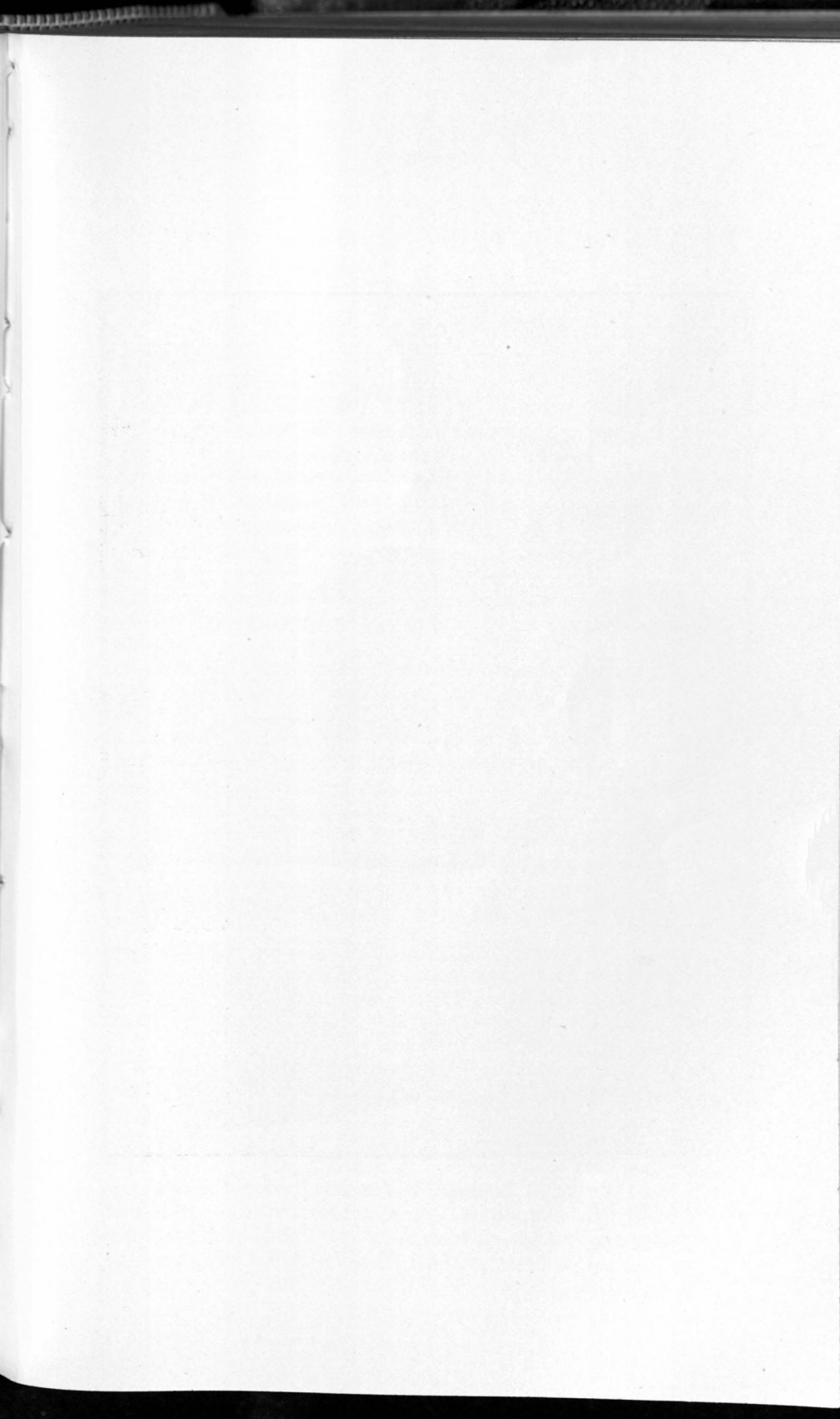
### THIRD YEAR.

|  |  |
|--|--|
| Geometry, Plane, 4.<br>Literature, 4.<br>Physics, 4.<br>***Latin, German or Mechanical Drawing and Shop Work, 4. | Geometry, Solid, 4.<br>Literature, 4.<br>Physics, 4.<br>***Latin, German or Mechanical Drawing and Shop Work, 4. |
|--|--|

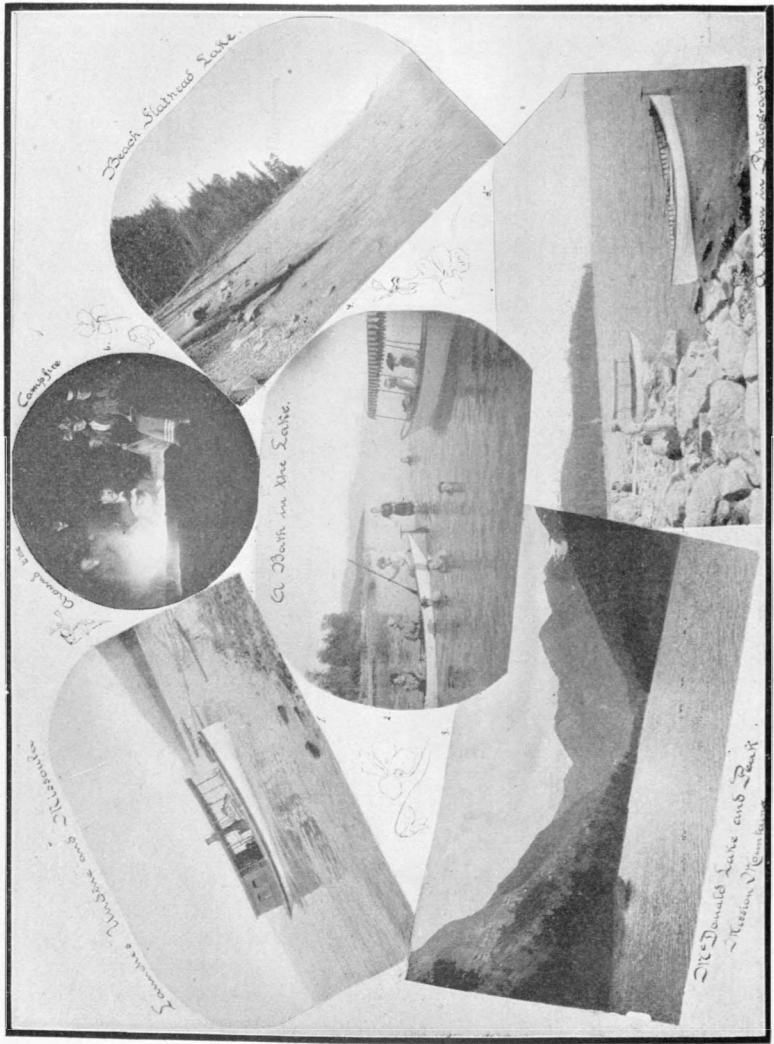
\* Latin for the Classical Course; Latin, Biology or Physical Geography and Physiology for other Courses.

\*\* Latin for the Classical Course; Latin, German, Biology or Physical Geography and Physiology for the Philosophical and Scientific Courses; Latin, German, Biology, Physical Geography and Physiology or Mechanical Drawing and Shop Work for the Mechanical Engineering Course. Students in Scientific Course who do not elect Biology the first year must do so the second.

\*\*\*Latin for the Classical Course; Latin or German for the Philosophical and Scientific Courses; Latin, German or Mechanical Drawing and Shop Work for the Mechanical Engineering Course.







BIOLOGICAL STATION VIEWS

## University of Montana Biological Station and Summer School of Science.

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### STATION STAFF.

OSCAR J. CRAIG, A. M., Ph. D.

President.

MORTON J. ELROD, A. M.

Director.

JAMES M. HAMILTON, A. M.,

Sup't. Missoula Schools. Nature Study and Botany. (1899).

FRED. D. SMITH, B. S.

Prof. of Chemistry and Physics, University of Montana.

Geology and the Hydrography of the Lake. (1899).

L. A. YOUTZ, A. M.

Prof. of Science, Montana Wesleyan University.

Botany and Geology. (1900).

P. M. SILLOWAY,

Principal Fergus Co. High School.

Ornithology.

The Summer School of Science and Biological Station has been opened for the purpose of extending some of the privileges of the University to the public school teachers of the state and to such others as choose to do some work in biological lines, and to make a beginning of the study of the life of the state. The state is rich in resources that are practically untouched. There are many who desire such an opportunity as the summer school and station will offer, and who cannot afford a trip to eastern summer schools of science.

The site chosen for the station is on the bank of Swan or Big Fork River, near the outlet, on land adjoining the Flathead Club grounds, at the northern end of Flathead Lake. A piece of ground of some five acres has been leased for a number of years, and a small laboratory, 18x24, containing a small store room, a dark room, and tables for twelve students, was built on the bank

of the river and close to a large spring of pure water. The ground is well adapted for camping, and board of excellent quality may be had at private families if desired. As the work progressed the wisdom of the choice of location became apparent. At this point the river offers a perfect harbor for boats. Fishing is excellent. Birds are exceedingly abundant. A few hours walk and one can reach Swan Lake, Echo Lake, Mud Lake, and in the region of Kalispell many other lakes are to be found. The Lewis and Clarke Forest Reserve extends almost to the Station, offering special inducements in some lines of work. It is but two miles to Flathead River, and the region north of the Station is a rich agricultural and fruit country, whose merits are very imperfectly known. The river immediately above the station is a series of cataracts for a distance of two miles, the water a sheet of foam coming down with a roar heard day and night for miles.

The location of the station at Flathead Lake is ideal. The lake is thirty-two miles long, and at its widest part fifteen miles wide. A steamer runs from Demersville on the north to the foot of the lake on the south three times a week. The altitude is about 4,000 feet. Flathead and Swan rivers flow into the lake from the north, the Pend O'Reille flows out of the southern arm. Numerous creeks, arms of the lake, swamps, forests and valleys are close to the station, which is on the northern shore, offering abundant opportunity for littoral, land, and aerial faunas. Flanking it all the Mission mountains, with snow clad summits and living glaciers, the home of the goat and the sheep, extend the entire length of the lake and valley. The Mission mountains have become famous for their beautiful scenery, charming Alpine lakes, rugged and jagged peaks and beautiful falls.

The work of the station and summer school of science is part of the University work, the station being considered as a department. Those in attendance may, if they desire, have credit on the University record for such an amount of work as may be done at the station. By working daily upon one line a great deal may be accomplished during the month, and if one should join the collecting expedition in July the amount accomplished would be doubled.

The station and school will be opened for work Monday, August 6th, and continue four weeks. If desired, arrangements may be made for continuing work two weeks longer. This is certainly a good opportunity for studying, collecting and camping, combined, with very moderate expense, under the best guidance and with the best facilities the state can afford.

How to Reach the Station.—Those on the line of the Great Northern should get off at Kalispell. Demersville is four miles from Kalispell. Take the steamer at Demersville for the station. On the Northern Pacific stop at (Ravalli) Selish, stage to Polson at the foot of the lake, steamer across the lake to the station. Those contemplating attendance should write the director early and make arrangements. The facilities of the station are limited, and those first applying will be first accommodated.

Courses. The work offered this summer will be as follows: Teachers in High Schools or in Nature Study will be given every facility in collecting and preserving material for class use. A general course may be pursued in either Botany or Zoology, involving a study of the life in the immediate vicinity. A course in Entomology will be given, including instruction in collecting and preserving. A similar course will be offered in Ornithology, including instruction in preparing skins. There will be a course in systematic Botany. To those prepared for it, a course in Geology will be offered, as the region presents exceptional opportunities in this line. In all cases the work will be largely practical and in the field.

For those who are ready to take up special work in particular lines the following fields are open: A study of the effect of environment on life; the life history of the mosquito; the fish and fish food of the lake and its tributaries; work on particular groups of insects, birds, and microscopic forms; the history of the lake; the glaciation of the region; Flathead Lake, its contour, depth, utility, etc. The region affords abundant opportunity for work with a camera, both for recreation and as an aid to scientific work. For those wishing to use a camera necessary chemicals will be provided, but students must provide their own dry plates.

A few tables will be set apart for investigators, supplied with microscopes and the usual stains and reagents. A number of microscopes will be supplied for use in the general work. Every opportunity and facility will be given students attending to make and prepare collections of specimens in any quantity, either for their own use or, if teachers, for the use of their classes.

Material for actual use will be provided free of charge. Attending students will be charged for material consumed, for breakage, and for the necessary expenses, such as hired help, gasoline, etc. Students may adopt one of three plans. They may take tents and do their own cooking, in regular camp style; or they may tent and take meals; or they may secure meals and

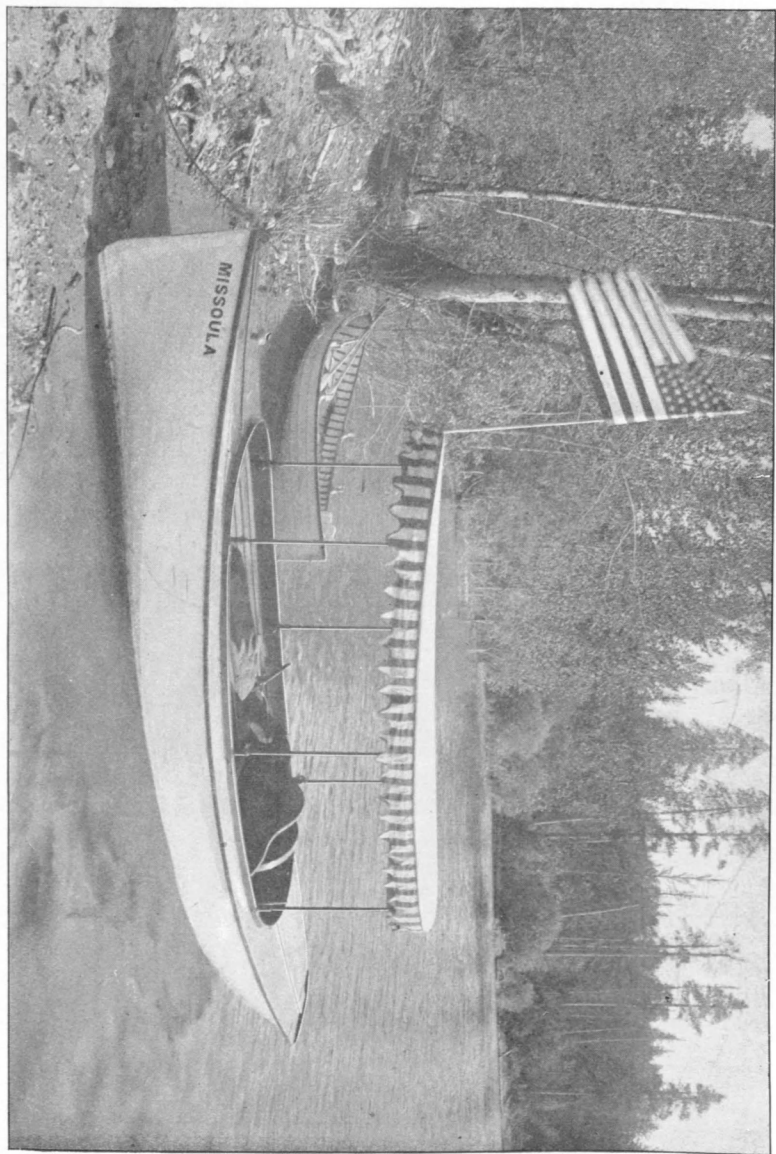
lodging. Meals may be had at \$5.00 per week. Camping at this season will be a delight. The nights are cool and pleasant, the days warm. Rains seldom occur. Those not wishing to attend the entire time should state when and how long they may wish to attend.

A collecting trip in July, before the opening of the Station. A trip of several weeks' duration has been planned by the director. Opportunity will be given to a limited number to join the expedition. The time will be spent among the Mission Mountains and along the lake. About a week will be spent at St. Mary's Lake; another at McDonald's Lake; the ascent of McDonald's peak, with its living glacier, will be made; a week will be spent near the foot of the lake, giving opportunity for study of the buffalo herd, the largest in America; if any time remains it will be spent along the lake banks. Those wishing to join should write the director for itinerary of the trip and expense. It is a rare chance for naturalists in the state.

Recreation. A month of hard work will at the same time afford rest if there is opportunity for recreation. The Station officers look to the possibilities of recreation as well as work, for a combination of the two gives the best results. The lake near the station affords fine bathing, with a beautiful, sandy beach. Swan river is one of the finest trout streams in the world. The magnificent scenery will tempt any one who has a camera to take a stroll, and there is never disappointment. There are numerous row boats to be had when the station boats are in use. There is good hunting for birds and large game in season. Deer have been seen within a mile of the station in summer. A croquet ground has been made near the laboratory. The large launch, Undine, may be chartered any time for a long ride and will carry 25 people. The immediate neighborhood has an abundance of fine fruit. Bicycles may be used over any of the roads, and it is only about two hours' ride with a wheel to Kalispell.

Those wishing to attend at the station and who desire further information should address the director, Morton J. Elrod.

HOLOGICAL STATION BOATS





## Accredited High Schools.

The State Board of Education in a meeting held June 1, 1896, took the following action:

1. Candidates seeking admission to any of the regular courses in any State Educational Institution must be at least sixteen years of age and must possess a good moral character and good bodily health.

8. Accredited Schools. Any high school or academy whose course of instruction covers the branches requisite for admission to one or more of the courses of any State Educational Institution may be admitted to its accredited list of preparatory schools, after a satisfactory examination by a committee appointed by the State Board of Education. Application for such examination may be made by any school board to the Secretary of the State Board of Education, whereupon a committee appointed by the State Board of Education will examine the course of study and methods of instruction of the school, and on the committee's favorable recommendation, and the concurrence of the State Board of Education, it will be entered upon the accredited list of the State Educational Institution for which it applied. Any graduate of such an approved school will be received by the President of the State Educational Institution wherein said graduate is entitled to enter, on presentation of proper diploma and certificate from the Superintendent of said school, into any of the courses of said institution for which said graduate has been fitted.

Students of any accredited school who are not graduates must expect examinations as other candidates.

A school once entered upon the accredited list will remain there until its administration is changed, or until notice is given by the State Board of Education of unsatisfactory results. Upon a change of administration application for continuation upon the list, if desired, must be made. If the work of the principal coming into charge has been recently examined in connection with some other school, a new examination may not be required, but such examination should in all cases be invited.

Annual reports will be asked for by the State Board of Education from all accredited schools.



## COURSE OF STUDY FOR ACCREDITED HIGH SCHOOLS.

The State Board of Education in its December meeting appointed a committee, "To formulate a uniform plan for accredited High Schools." This committee met in Helena, December 28th, 1897. The following extract from the committee's report contains the Course of Study recommended for accredited schools. "This committee decided to recommend to the Board that the work of the eight grades, when arranged shall be the standard for entrance to the High Schools. The following is the outline of the work recommended by the committee, which shall be required of all accredited High Schools."

### MATHEMATICS.

Algebra through quadratics, which shall be equivalent to the work as outlined in Milne's High School or Wentworth's School Algebra, or text-books of similar grade.

Geometry, plane and solid, equivalent to the work as outlined in Wentworth and text-books of similar grade.

The science of Arithmetic shall be studied for one-half a year after the completion of the work in Geometry.

### ENGLISH.

As a part of the work in English ten pieces of the following fifteen pieces of Literature shall be selected for critical study, and ten of the following fifteen pieces shall be selected for reading, the work to be distributed throughout the entire High School course.

### CRITICAL STUDY.

Julius Caesar.  
Macbeth.  
The Princess.  
The Ancient Mariner.  
The Vision of Sir Launfal.  
The Sir Roger de Coverly Papers.  
Burke's Speech on the Conciliation with America.  
Paradise Lost.  
The Flight of a Tartar Tribe.  
Essays on Milton and Addison.  
Evangeline.  
Gray's Elegy in a Country Churchyard.  
Il Penseroso.  
Ivanhoe.  
The Vicar of Wakefield.

LIST FOR READING.

David Copperfield.  
Vicar of Wakefield.  
Last of the Mohicans.  
Autocrat at the Breakfast Table.  
First Bunker Hill Oration.  
Life of Samuel Johnson.  
Sketch Book.  
Gulliver's Travels.  
Pope's Iliad, Books I, VI, XXII.  
Prisoner of Chillon.  
Marmion.  
Franklin's Autobiography.  
Courtship of Miles Standish.  
Enoch Arden.  
Heroes and Hero Worship.

GRAMMAR, COMPOSITION AND RHETORIC.

Grammar and the fundamental principles of practical Composition and Rhetoric, with illustrative exercises and essays, shall be required for the first two years of the course.

LITERATURE.

One year of Literature shall follow the work in Rhetoric, which shall give a general knowledge of the life and growth of the English Language and Literature.

CHEMISTRY AND BIOLOGY.

Either one year in Chemistry or one year in Biology shall be required. One year in Physics shall be required, following Chemistry or Biology. In all Science work, one-half the time shall be devoted to Laboratory work.

GENERAL HISTORY.

General History shall be studied for one year, the work to be confined principally to Grecian, Roman and English History.

UNITED STATES HISTORY AND CIVICS.

The last half-year of the High School Course, U. S. History and Civics shall be studied.

LATIN.

Latin shall be required as follows: Grammar and Prose Composition, four books of Caesar, and four orations of Cicero or equivalent.

MODERN LANGUAGES.

Three years work in Modern Languages, other than English, shall be accepted in lieu of the work in Latin for admission to any course except the classical.

LIST OF ACCREDITED SCHOOLS.

| City.            | Superintendent.  |
|------------------|------------------|
| Helena.....      | J. E. KLOCK.     |
| Butte.....       | J. P. HENDRICKS. |
| Great Falls..... | S. D. LARGENT.   |
| Anaconda.....    | M. A. STAPLETON. |
| Missoula.....    | J. M. HAMILTON.  |
| Dillon.....      | SUPT. TYREE.     |
| Kalispell.....   | E. A. STEERE.    |
| Bozeman.....     | W. E. HARMON.    |
| Miles City.....  | N. C. TITUS.     |

## Degrees Conferred.

### COMMENCEMENT, 1900.

#### The Degree of Bachelor of Arts, upon—

Eben Hugh Murray..... Wolf Creek

#### The Degree of Bachelor of Science, upon—

Gertrude Buckhouse..... Fort Missoula  
 Caroline Harrington Cronkrite..... Missoula  
 Lu Knowles..... Missoula  
 Sidney Elery Walker..... Hillsboro, Ore.

#### The Degree of Bachelor of Philosophy, upon—

Charles Earle Avery..... Missoula  
 Percy Shelley Rennick..... Missoula

### CATALOGUE OF STUDENTS.

Zoe Bellew, M. A..... Missoula  
 Anna Louise Hatheway, M. A..... Missoula.

### COLLEGIATE STUDENTS.

| Name                       | Course   | Credit         | Residence       |
|----------------------------|----------|----------------|-----------------|
| Frederick Anderson.....    | B. M. E. | Sophomore..... | Missoula        |
| Charles Avery.....         | P. H. B. | 129.....       | Missoula        |
| Oral Berry.....            | B. S.    | 35.....        | Drummond        |
| Estelle Bovee.....         | B. Ph.   | 99.....        | Glendive        |
| Mary Gertrude Buckhouse.   | B. S.    | 134.....       | Fort Missoula   |
| William Oscar Craig.....   | B. S.    | 71.....        | Missoula        |
| Caroline H. Cronkrite..... | B. S.    | 139.....       | Missoula        |
| Henry Dion.....            | B. M. E. | Freshman.....  | Glendive        |
| Laurence Ebert.....        | B. S.    | 91.....        | Vancouver, Wash |
| Hugh Graham.....           | B. S.    | 91.....        | Missoula        |
| Nina Graham.....           | B. Ph.   | 33.....        | Missoula        |
| Miriam Hatheway.....       | B. A.    | 73.....        | Missoula        |
| William Jameson.....       | B. M. E. | Sophomore..... | Victor          |
| Martin Jones.....          | B. S.    | 36.....        | Galloway, Mo.   |
| Mabel Emily Jones.....     | B. Ph.   | 33.....        | Missoula        |
| Helene Kennett.....        | B. Ph.   | 78.....        | Missoula        |
| Lu Knowles.....            | B. S.    | 136.....       | Missoula        |
| Helen La Caffe.....        | B. Ph.   | 64.....        | Carlton         |
| Sue Lewis.....             | B. A.    | 93.....        | Missoula        |
| Mary Lewis.....            | B. A.    | 93.....        | Missoula        |
| Rella Likes.....           | B. Ph.   | 30.....        | Missoula        |
| Lucy Likes.....            | B. Ph.   | 36.....        | Missoula        |
| Frances Maley.....         | B. Ph.   | 77.....        | Missoula        |

| Name                     | Course             | Credit | Residence           |
|--------------------------|--------------------|--------|---------------------|
| Albert Homer McDonald    | B. S.              | 64     | Ovando              |
| Agnes McDonald           | B. S.              | 64     | Anaconda            |
| Alexander Grant McGregor | B. M. E. Sophomore |        | Stevensville        |
| Helen McPhail            | B. A.              | 60     | New Chicago         |
| Lydia Mills              | B. S.              | 83     | Missoula            |
| Hugh Murray              | B. A.              | 129    | Wolf Creek          |
| Harriet Rankin           | B. A.              | 36     | Missoula            |
| Jeannette Rankin         | B. S.              | 72     | Missoula            |
| Wellington Rankin        | B. S.              | 32     | Missoula            |
| Paul Reinhard            | B. M. E. Freshman  |        | Missoula            |
| James G. Reinhard        | B. S.              | 12     | Missoula            |
| Percy Shelley Rennick    | B. Ph.             | 128    | Missoula            |
| Emory Rheim              | B. Ph.             | 112    | Beaversville, S. C. |
| Eloise Rigby             | B. Ph.             | 34     | Carlton             |
| Ida Rigby                | B. Ph.             | 33     | Carlton             |
| Katherine Ronan          | B. A.              | 69     | Missoula            |
| Margaret Ronan           | B. A.              | 69     | Missoula            |
| Charles Savage           | B. M. E. Freshman  |        | Red Lodge           |
| Pearl Scott              | B. A.              | 68     | Philipsburg         |
| Guy Sheridan             | B. A.              | 82     | Missoula            |
| Leslie Sheridan          | B. M. E. Freshman  |        | Missoula            |
| Bertha Simpson           | B. Ph.             | 34     | Stevensville        |
| Hugh Sloane              | B. M. E. Freshman  |        | Missoula            |
| Benjamin Stewart         | B. Ph.             | 64     | Missoula            |
| Bessie Totman            | B. Ph.             | 16     | Hamilton            |
| Josephine Wagstaff       | B. A.              | 34     | Missoula            |
| Sidney Ward              | B. Ph.             | 74     | Hamilton            |
| Edith Watson             | B. A.              | 45     | Red Lodge           |
| Sidney Ellery Walker     | B. S.              | 128    | Missoula            |
| George Westby            | B. M. E. Junior    |        | Missoula            |
| Kathryne Wilson          | B. Ph.             | 97     | Helena              |
| Leslie Wood              | B. M. E. Sophomore |        | Missoula            |
| Horace Worden            | B. M. E. Freshman  |        | Missoula            |

### THIRD PREPARATORY.

|                   |                |
|-------------------|----------------|
| Cora Bovee        | Glendive.      |
| Belle Buker       | Missoula.      |
| Joseph Buckhouse  | Fort Missoula. |
| William Dickinson | Missoula.      |
| Gilbert Heyfron   | Missoula.      |
| Lillian Jordan    | Glendive.      |
| Claude Marcyes    | Forsythe.      |
| Fred I. Wagstaff  | Missoula.      |

### SECOND PREPARATORY.

|               |                 |
|---------------|-----------------|
| Retta Barnes  | Thompson Falls. |
| Winnie Barnes | Thompson Falls. |

|                              |               |
|------------------------------|---------------|
| Saidee Beckwith.....         | Missoula.     |
| Grace Buker.....             | Missoula.     |
| James Flynn.....             | Missoula.     |
| Isabel Hamilton.....         | Missoula.     |
| Walter Hay.....              | Missoula.     |
| Lawrence Lynde Hechler.....  | Hamilton.     |
| Gilbert Heyfron.....         | Missoula.     |
| Herbert Hughes.....          | Missoula.     |
| Sarah Jones.....             | Corvallis.    |
| John Jones.....              | Ovando.       |
| John Reuben Latimer.....     | Grass Valley. |
| Mary Livingston.....         | Garnett.      |
| George Lyon.....             | Drummond.     |
| Avery May.....               | Missoula.     |
| Ray McAllister.....          | Missoula.     |
| Washington J. McCormick..... | Missoula.     |
| Beulah Morgan.....           | Missoula.     |
| Avriel Morse.....            | New Chicago.  |
| Fay Murray.....              | Missoula.     |
| Ivy Ranche.....              | Missoula.     |
| Warde Rathbun.....           | Missoula.     |
| Clarence Raymond.....        | Missoula.     |
| Forrest Rheim.....           | Missoula.     |
| Charles Robinson.....        | Missoula.     |
| Sadie Schmalhausen.....      | Missoula.     |
| Charles Simons.....          | Missoula.     |
| Blanche Simpson.....         | Stevensville. |
| Mary Slaughter.....          | Missoula.     |
| Ona Sloane.....              | Missoula.     |
| Marguerite Stevens.....      | Missoula.     |
| Martin Tucker.....           | Victor.       |
| Ray Walters.....             | Missoula.     |
| Gertrude Watson.....         | Red Lodge.    |
| Essie Whitesitt.....         | Stevensville. |
| Edward Williams.....         | Missoula.     |
| Elmer Woodman.....           | Helena.       |
| Winifred Woods.....          | Stevensville. |
| Vincent Woods.....           | Stevensville. |

FIRST PREPARATORY.

|                       |                |
|-----------------------|----------------|
| Fred Buck.....        | Stevensville.  |
| George Buckhouse..... | Fort Missoula. |
| Pearl Clayton.....    | Missoula.      |
| Roy Cross.....        | Missoula.      |

|                       |                |
|-----------------------|----------------|
| Edward Dorman.....    | Missoula.      |
| Thomas Greenough..... | Missoula.      |
| Sadie Harris.....     | Martina.       |
| Alice Herr.....       | Bannack.       |
| William Hodson.....   | Missoula.      |
| Jennie M. Manson..... | Livingston.    |
| William Manson.....   | Livingston.    |
| Roy McPhail.....      | New Chicago.   |
| Nelson Morgan.....    | Missoula.      |
| Olga Preusse.....     | Spokane, Wash. |
| Florence Preusse..... | Spokane, Wash. |
| William Reed.....     | Missoula.      |
| Mae Tabor.....        | Como.          |
| Caroline Wells.....   | Stevensville.  |
| Flora Yerrick.....    | Missoula.      |

SPECIAL STUDENTS.

|                     |           |
|---------------------|-----------|
| Alice Bardwell..... | Missoula. |
| Grace Lambert.....  | Missoula. |

SCHOOL OF MUSIC.

|                         |              |
|-------------------------|--------------|
| Birdie Abbott.....      | Missoula.    |
| Lucy Arnett.....        | Missoula     |
| Willie Beck.....        | Missoula     |
| Sadie Beckwith.....     | Missoula     |
| Coral Blaisdell.....    | Missoula     |
| Fred Buck.....          | Stevensville |
| Elmer Carter.....       | Missoula     |
| Bessie Clynick.....     | Bonner       |
| Bertha Cushing.....     | Missoula     |
| Mary Elrod.....         | Missoula     |
| Mrs. Esmay.....         | Missoula.    |
| Hattie Fenwick.....     | Missoula     |
| Annie Fenwick.....      | Missoula     |
| Edna Greenough.....     | Missoula     |
| Alice Hatheway.....     | Missoula     |
| Frances Hatheway.....   | Missoula     |
| Anna Hollensteiner..... | Lo Lo        |
| Ethel Hughes.....       | Missoula     |
| Lillian Jordan.....     | Glendive     |
| Clara Keith.....        | Missoula     |
| Gertrude Kohn.....      | Missoula     |
| Helen LaCaff.....       | Carlton      |

|                        |             |
|------------------------|-------------|
| Pearl Leedy.....       | Missoula.   |
| R. W. McKay.....       | Missoula    |
| Walter McLeod.....     | Missoula    |
| Nettie McPhail.....    | New Chicago |
| Roy McPhail.....       | New Chicago |
| Victoria Menard.....   | Missoula    |
| Edna Mentrum.....      | Missoula    |
| Fay Murray.....        | Missoula    |
| Fannie Odell.....      | Corvallis   |
| Jessie Osborne.....    | Missoula    |
| Hattie Rankin.....     | Missoula    |
| Lulu Rathbun.....      | Missoula    |
| Lulu Reynolds.....     | Missoula    |
| Annabel Ross.....      | Missoula    |
| Marjory Ross.....      | Missoula    |
| Jeannette Ross.....    | Missoula    |
| Mamie Ross.....        | Missoula    |
| Anna Schmalhausen..... | Missoula    |
| Geneva Simons.....     | Missoula    |
| Mrs. John Smith.....   | Missoula    |
| Dorothy Sterling.....  | Missoula    |
| Maggie Stevens.....    | Missoula    |
| Vida Williams.....     | Missoula    |
| Leslie Wood.....       | Missoula    |
| Winfred Wood.....      | Missoula    |
| Florence Nord.....     | Missoula    |
| Zetta Yerrick.....     | Missoula    |

SUMMARY.

|                               |       |
|-------------------------------|-------|
| Graduate Students.....        | 2     |
| Collegiate Courses.....       | 56    |
| Special .....                 | 2     |
| Third Preparatory.....        | 8     |
| Second Preparatory.....       | 40    |
| First Preparatory.....        | 19    |
| Summer School of Science..... | 8     |
| Music .....                   | 49    |
|                               | <hr/> |
|                               | 184   |
| Counted Twice.....            | 11    |
|                               | <hr/> |
| Net Total.....                | 173   |



## Miscellaneous.

### CONVOCATIONS.

All students are required to attend the regular weekly convocations which are held on Wednesday at 10:30 A. M. Special convocations may be held from time to time as the interests of the University demand.

### SOCIETIES.

Two literary societies, the Hawthorne and Clarkia, are open to students. The first-named Society is composed of young men and the second of young women. Both societies are alive and a credit to the University. Students attending the University will find membership in either of these societies most helpful and pleasant. The Athletic Association is well organized and has a large membership of both young men and women.

### PRIZES.

#### THE H. N. BUCKLEY ORATORICAL PRIZE.

Through the generosity of Dr. J. J. Buckley, of Missoula, this prize has been founded in memory of his father, H. N. Buckley.

The amount of the prize is twenty dollars and this amount is derived from a permanent investment made to secure its endowment. The conditions of the oratorical contest at which the prize is bestowed are subject to the control of the Faculty.

This prize was awarded in 1896 to Miss Anna Gray; in 1897 to Charles Pixley; in 1898 to Louise Hatheway; in 1899 to Guy H. Sheridan; and in 1900 to Eben Hugh Murray.

#### PRIZE CONTEST IN DECLAMATION.

This is open only to preparatory students. The first prize is twenty dollars and the second ten dollars. The winner of the first prize in 1898 was Miss Nina Thibault. In 1899 the first prize was won by Gilbert Heyfron, and the second by William Dickinson. In 1900 the first prize was won by Lawrence Heckler, and the second by Washington J. McCormick.

The friend of the University who so liberally donates this prize desires his name to be withheld.

#### THE COBBAN PRIZES.

Mr. R. M. Cobban, of Missoula, has offered prizes for scientific research in Geology and Physical Geography. In each

case the first prize is fifteen dollars and the second five. Papers are to be prepared on assigned subjects. These papers are submitted to a committee consisting of the donor and two members of the Faculty.

#### THE STATE ORATORICAL ASSOCIATION.

This association has been organized within the current year. The institutions represented are the Montana Wesleyan University at Helena, the Montana College of Agriculture and Mechanics Arts at Bozeman, and the University of Montana at Missoula.

The contest was held May 4, 1900, and the first honor awarded to Lawrence Heckler, a student in the University of Montana.

#### THE JOHN M. EVANS HALL.

Through the liberality of Hon. J. M. Evans and other citizens of Missoula, the Literary Society Hall has been elegantly furnished. The dedication was held March 18, and was attended by a large number of students and citizens.

Mr. Evans having taken the initiative in the effort to furnish the room it was considered proper to name the hall after the principal donor and so it was christened the John M. Evans Hall.

#### SCIENTIFIC LECTURES.

Two lectures of especial interest have been given this year in the University Assembly Hall. The first by Professor Bailey Willis, of the Geological Survey on "The Growth and Decay of Mountains," the second by Prof. W. W. Wylie, of Bozeman, on the "Yellowstone Park." Both lectures were illustrated, the apparatus of the University being used for that purpose.

#### THE UNIVERSITY SILVER CORNET AND ORCHESTRAL BAND.

The University is in possession of a full set of musical instruments which were donated by the Garden City Cornet Band.

A permanent organization has been effected and the band is doing most excellent work. The instruments are used on the same basis as other University material and are thus accessible to any who desire to take up this kind of work.

#### THE UNIVERSITY PAPER.

The Kaimin, through the effective efforts of its corps of editors, has become a permanent factor in the University life. The

various difficulties, incident to the launching of a new enterprise, have been met, and the success of the University paper is assured.

The Board of Editors elected the past year was as follows:

|                       |                    |
|-----------------------|--------------------|
| Editor in Chief.....  | Kathryne Wilson    |
| Literary Editor.....  | Estella Bovee      |
| “.....                | George Westby      |
| Local Editor.....     | Caroline Gronkrite |
| Exchange Editor.....  | Katherine Ronan    |
| Business Manager..... | Ben Stewart        |

### THE WEATHER SERVICE.

On the departure of the 25th U. S. Infantry from Fort Missoula, the instruments belonging to the Weather Bureau were placed in the keeping of the University. The instruments consist of a set of maximum and minimum thermometers, a standard thermometer, instrument shelter and rain gauge. A pair of wet and dry bulb thermometers for determining the dew point has been added, and also a standard barometer of the Fortin pattern.

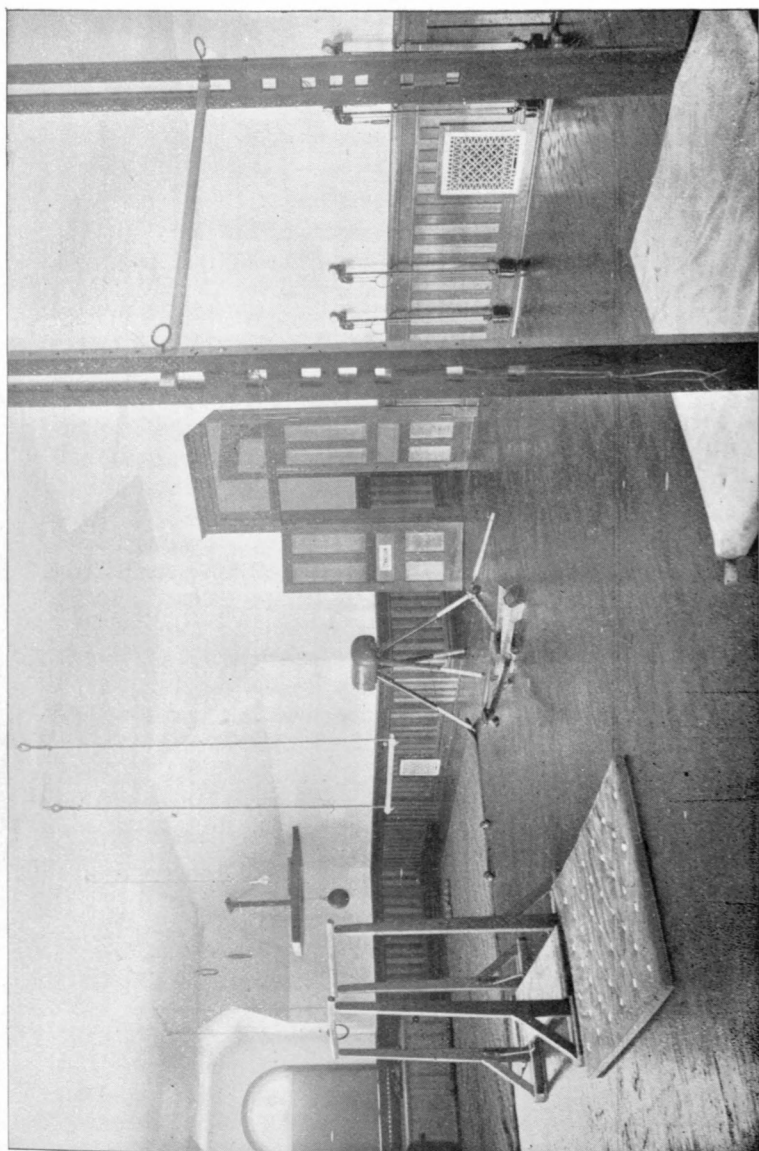
The records at Fort Missoula had been taken continuously for nineteen years. As the University is but four miles from the Fort in practically the same climatic conditions, the continuation of the observations is very desirable.

The work has been placed in charge of Prof. M. J. Elrod of the Department of Biology.

### THE UNITED STATES GEOLOGICAL SURVEY.

A topographical map of a portion of the state having Missoula as the center is being prepared by the government. This region is later to be worked up geologically, and will be given in the series of geological maps now being issued by the U. S. Geological Survey. The University is aiding in this work in every way possible, and will be very much benefitted by the results reached by the survey. At the present writing a bench mark for altitude has been placed in the stone at the left entrance to the main building, the altitude being 3,212 feet above sea level. This has now been corrected by the survey brought in from the Pacific Ocean whereby the corrected height of 3,223 feet is established. The triangulation party has established a bench mark on the campus, with stone piers marking the meridian line, giving the latitude and longitude. The University





GYMNASIUM

therefore has altitude, latitude and longitude accurately determined, and these marks will no doubt be starting points for future work.

## HYDROGRAPHIC INVESTIGATIONS.

U. S. GEOLOGICAL SURVEY, DIV. OF HYDROGRAPHY.

PROF. FRED. D. SMITH, Resident Hydrographer.

The Missoula section of this work under the direction of Prof. F. D. Smith has become an important one in Western Montana. The stations are as follows: Missoula River at Missoula, Blackfoot River at Bonner, Bitter Root River at Fort Missoula and Rattlesnake Creek at Missoula. During the past year the gauging station on the Missoula river has been changed from the rod under the Higgins Avenue bridge to a weight and cable gauge on the banks of the river near the N. P. R. R. bridge. Regulation bench marks have been established and the accurate elevations of the gauges determined. The final rating of the Blackfoot and Bitter Root rivers has been done and the curves established. During the year the rerating of the Missoula and Rattlesnake will be finished. A plan has been adopted lately to report weekly to the newspapers the comparative flows of each stream during the years past since the beginning of the work, and also the flow of the streams during the current year. The public is thus furnished with accurate information regarding the streams for the periods covering the study by the station.

The observers for this work are as follows: Mr. George C. Westby for Missoula River and Rattlesnake Creek; Mr. Jno. McCormick for Blackfoot River and Henry Buckhouse for the Bitter Root River.

Students desiring instruction in this line of important engineering work are requested and urged to apply for assistance in order that the Division of Hydrography may extend its assistance and benefits to the greatest number possible.

An important work started this spring is an investigation of the fluctuation of the Flathead Lake levels. This work was undertaken in response to a request on the part of the citizens of Flathead valley and is to be considered as one of the most important pieces of study yet taken up by this station.

## ATHLETICS AND GYMNASIUM WORK.

A committee from the Faculty, entitled the Committee on Athletics and Gymnasium Work, has general oversight of the

athletic sports and gymnasium practice. The details of the management are in the hands of the Board of Directors of the Athletic Association. Regular gymnasium practice has been organized, and is required of all students to the extent of one hour each week. This has been made possible by one of Mis-soula's foremost citizens, Mr. C. H. McLeod, who has very kindly equipped the gymnasium with parallel and horizontal bars, trapeze and swinging ring, chest weight machines, and Whiteley exerciser, vaulting horse, punching bag, boxing gloves, fencing foils, Indian clubs, dumb bells, wrist and finger machines, and rowing machine. Besides these there are two small mats for the bars, and a large gymnasium rug, sixteen feet square, for wrestling and boxing.

The gymnasium is open to the students every afternoon after four o'clock, under the charge of a competent and responsible person.

The athletic field, located in the northeast corner of the campus, is being put in shape. A quarter of a mile bicycle track is surveyed and partially graded. Within this track there will be a running track, the base ball diamond, the foot ball field, and the tennis courts.

The Faculty have established the following important regulations:

First. The foot ball season will extend from September 1st to Thanksgiving Day.

Second. Only bona fide students in the University, taking at least eight hours per week of recitation or lecture, can represent the University in any of its games with other college teams. Teams representing the University will not be permitted to play teams representing other schools or colleges unless the latter conform to the same requirement for study.

#### FEES AND DEPOSITS.

|   |         |
|---|---------|
| Preparatory, or any College Course, per year (Matriculation fee)..... | \$10.00 |
| Physical apparatus (deposit) per semester.....                        | 3.00    |
| Chemistry I—Chemical apparatus (deposit) per semester                 | 7.50    |
| Chemistry II—Qualitative apparatus (deposit) per semester .....       | 6.00    |
| Chemistry III—Quantitative apparatus (deposit) per semester .....     | 6.00    |
| Chemistry IV and V—5 hours, \$10.00; each additional hour .....       | 2.00    |

|  |       |
|--|-------|
| Chemistry VI, VII—Organic Chemistry (deposit) per semester ..... | 10.00 |
| Assaying apparatus (deposit) per semester.....                   | 10.00 |
| Deposit, Biological Laboratory, per semester.....                | 3.00  |
| Deposit, Mechanical Engineering Laboratory, per semester .....   | 5.00  |

#### EXPENSES.

There are no dormitories connected with the University, and students are expected to find rooms and board in private families. Good homes can thus be provided for all and at very reasonable rates. Expenses may be very materially lessened by the formation of boarding clubs. Students will not be allowed to board at places not approved by the Faculty.

#### UNIVERSITY SURROUNDINGS.

Missoula is located in Western Montana, on the main line of the Northern Pacific Railroad, and at its junction with the Bitter Root Valley and Coeur d'Alene branches, thus affording easy railroad connections with all parts of the State and the Northwest.

The City of Missoula is noted as being one of the most beautiful in the west; and is unexcelled as regards pure water, healthful surroundings, beautiful scenery, and all of those things that contribute to make student life pleasant and agreeable.

Situated at the head of the Missoula valley and near the outlet of the Bitter Root valley, it is within the limits of the great agricultural and fruit growing regions of the state.



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