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1903-1904 Course Catalog

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The University of Montana

Register = 1903=4

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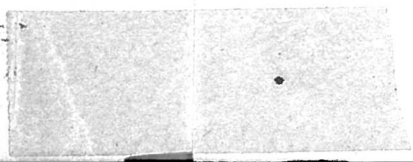

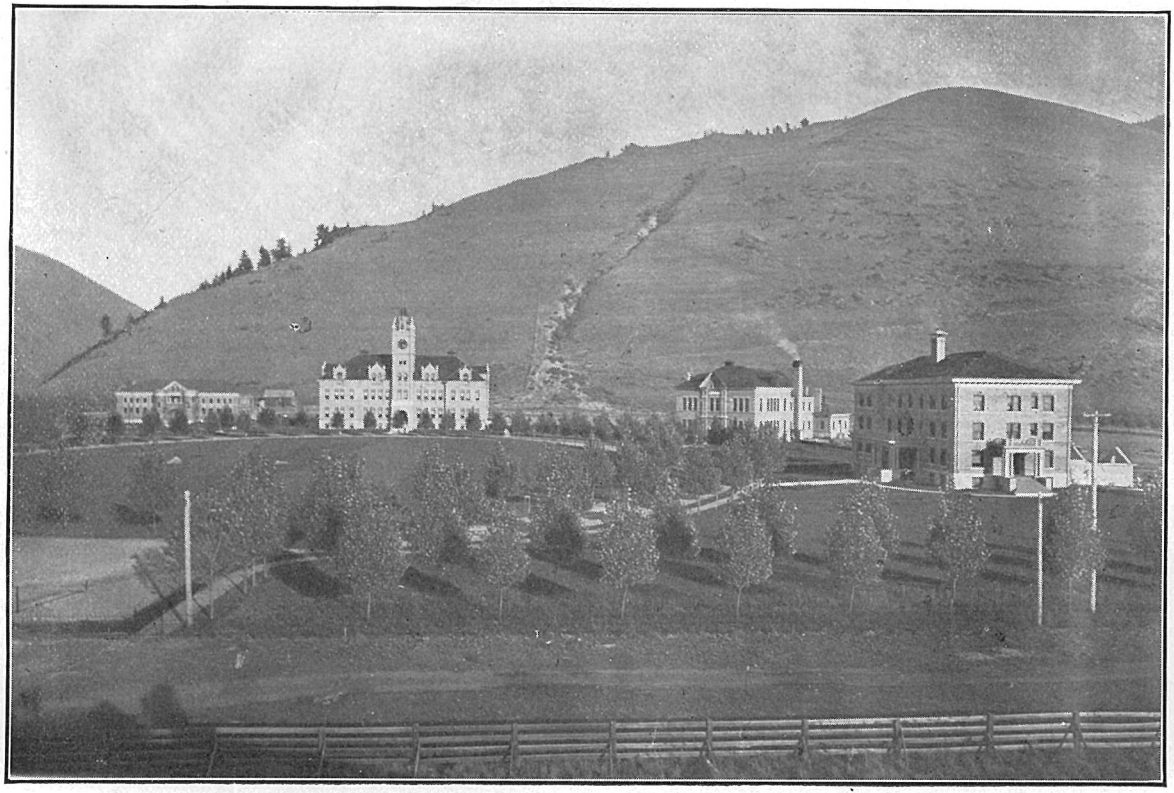

UNIVERSITY—FRONT VIEW.

THE

NINTH REGISTER

OF THE

UNIVERSITY OF MONTANA

MISSOULA, MONTANA.

1903-1904.

WITH AN OUTLINE OF THE COURSES OF STUDY AND THE DEPARTMENTS OF INSTRUCTION FOR 1904-1905.

HELENA, MONTANA
INDEPENDENT PUBLISHING COMPANY
1904

College Calendar for 1904-1905.

1904.

Entrance Examination, Tuesday, September 13.
Registration Day, Wednesday, September 14.
Instruction begins Thursday, September 15, 8:30 A. M.
Thanksgiving Vacation begins Wednesday, November 23, 12:30 P. M.
Thanksgiving Vacation ends Monday, November 28, 8:30 A. M.
Christmas Holidays begin Wednesday, December 21, 4:00 P. M.

1905.

Christmas Holidays end Tuesday, January 3, 8:30 A. M.
First Semester ends Friday, February 3.
Second Semester begins Wednesday, February 8.
Annual Entertainment of the Clarkia Society, Friday, March 3, 8:30 P. M.
Annual Entertainment of the Hawthorne Society, Friday, March 10, 8:30 P. M.
H. N. Buckley Oratorical Contest, Friday, April 7, 8:30 P. M.
Annual Recital, Department of Elocution and Physical Culture, Friday, April 28, 8:30 P. M.
Prize Contest in Declamation, Preparatory Students, Saturday, June 3, 8:30 P. M.
Baccalaureate Day, Sunday, June 4.
Instruction ends Monday, June 5, 4:00 P. M.
Annual Recital, School of Music, Monday, June 5, 8:30 P. M.
Class Day, Tuesday, June 6.
Annual Lecture before Literary Societies, Tuesday, June 6, 8:30 P. M.
Field Day, Wednesday, June 7.
Commencement, Thursday, June 8, 10:30 A. M.
Alumni Reunion, Thursday, June 8.

CALENDAR 1904 - 5

1904

JULY

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1905

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The Faculty.

OSCAR J. CRAIG, A. M., Ph. D.,
President.
University Place, University Avenue.

JAMES M. HAMILTON, M. S.,
Vice-President and Professor of Psychology and History.
No. 9 Union Block.

CYNTHIA ELIZABETH REILEY, B. S.,
Professor of Mathematics.
Woman's Hall, University Grounds.

W. M. ABER, A. B.,
Professor of Latin and Greek.
No. 26 Hammond Block.

FREDERICK C. SCHEUCH, B. M. E., A. C.,
Professor of Modern Languages and Secretary of the Faculty.
309 South 5th St., West.

MORTON J. ELROD, M. A., M. S.,
Professor of Biology.
205 South 5th St., East.

FRANCIS CORBIN, B. L.,
Professor of English Literature.
302 South 6th St., East.

WILLIAM D. HARKINS, A. B.,
Professor of Chemistry.
Stevens St., South Missoula.

JESSE P. ROWE, M. A.,
Professor of Physics and Geology.
118 South 4th Street, West.

ROBERT SIBLEY, B. S.,
Professor of Mechanical Engineering.
South Missoula, Stevens St.

ELOISE KNOWLES, Ph. B.,
Instructor in Drawing.
South 2nd St., West.

MRS. BLANCHE WHITAKER,
Director of Music School.
322 South 5th St., East.

LOUISE HATHEWAY, B. A.,
Instructor in English and Rhetoric.
521 East Pine St.

RUTH ELISE KELLOGG,
Instructor in Elocution and Physical Culture.
310 South 5th St., East.

H. B. CONIBEAR,
Director of the Gymnasium,
123 South 5th St., West.

NELLIE A. WHITNEY, B. L.,
Instructor in the Preparatory School, and Preceptress of Woman's Hall.
Woman's Hall, University Grounds.

ALLAN McPHAIL,
Violin.
Studio, corner of Pine and Pattee Sts.

MARTIN JONES, B. S.,
Assistant in Preparatory Department.
1122 Woodford St.

PAGE BUNKER,
Laboratory Assistant in Chemistry.
Prescott Cottage, 6th St., East.

CLAUDE SPAULDING,
Laboratory Assistant in Biology.
714 Locust St.

MONCURE COCKRELL,
Laboratory Assistant in Physics.
303 South 3rd St., West.

JOHN R. HAYWOOD,
Laboratory Assistant, Mechanical Engineering.
Stevens St., South Missoula.

GERTRUDE BUCKHOUSE, B. S.,
Librarian.
Woman's Hall, University Grounds.

STANDING COMMITTEES.

Committee on Graduate Work.—The President, Hamilton, Elrod, Reiley, Scheuch.

Committee on Discipline.—Hamilton, Rowe, Corbin.

Committee on Grading and Classification.—The President, Aber, Elrod, Reiley and Scheuch.

Committee on Examinations.—Aber, Knowles, Hatheway.

Committee on Student Affairs.—The President, Corbin, Scheuch.

Committee on Athletics.—Hamilton, Harkins, Kellogg.

The Montana State Board of Education.

Ex-Officio.

GOVERNOR JOSEPH K. TOOLE, President.

JAMES DONOVAN, Attorney General.

W. W. WELCH, Supt. Pub. Instruction, Secretary.

Appointed.

N. W. McCONNELL, Helena	Term Expires	February	1,	1907
W. M. JOHNSTON, Billings	"	"	" 1,	1907
O. P. CHISHOLM, Bozeman	"	"	" 1,	1908
S. D. LARGENT, Great Falls	"	"	" 1,	1908
N. B. HOLTER, Helena	"	"	" 1,	1905
G. T. PAUL, Dillon	"	"	" 1,	1905
JOHN M. EVANS, Missoula	"	"	" 1,	1906
CHARLES R. LEONARD, Butte	"	"	" 1,	1906
D. P. VAN HORNE	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 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.

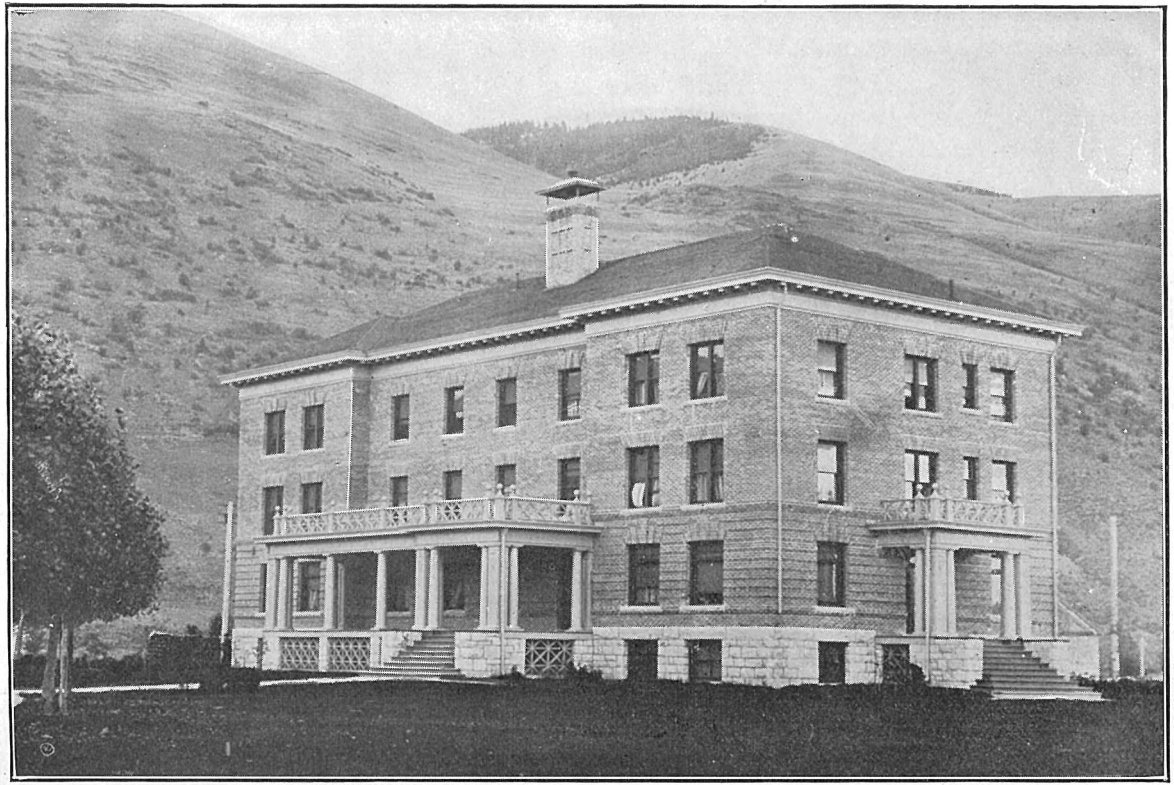
Second—A Department of Literature, Science and the Arts.

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



WOMAN'S HALL

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 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 designatd 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 and 1902 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.

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 seven 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 the 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 and the lawns started around the building and within the oval have made an excellent growth and already present a beautiful appearance.

BUILDINGS.

University Hall, the largest 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, whch 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.

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 the 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 half contains two small storerooms, 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 southeastern corner of the floor 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 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 accomodate 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 a large room for the Art department, 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 passageway 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 these rooms in University Hall are the Assembly Room, Library, Museum, Literary Society Hall, Offices, Biological Laboratary and seven lecture rooms of uniform size, for the departments of History, Drawing, Biology, Mathematices, Literature, Modern Languages and Ancient Languages.

Science Hall contains in the first floor eight rooms: a lecture room and laboratory for the Department of Physics, and an office, a drawing room, a wood working shop, a machine shop, a forge room and a foundry room for the Department of Mechanical Engineering.

On the second floor are eight rooms for the Department of Chemistry, a lecture room, an office and private laboratory, a department library and balance room, a laboratory for advanced chemical work and one for elementary chemical work, and two rooms devoted to the Department of Geology and Mineralogy.

In the basement are the boilers for the heating plant of all the buildings and the engine which runs the machinery of the shops.

The Woman's Hall stands on the south side of the oval. This building was constructed to furnish a home for students. It is 136 by 46 feet in its ground dimensions and has four floors, in-

cluding the basement, which is so largely above ground as to be well lighted and fit for any use.

In the basement are the dining room, laundry room, storage rooms, etc. The first floor contains the office, parlors and some students'rooms. The second and third floors are entirely devoted to students' rooms. On each floor are closets and bath rooms. The entire building is well furnished and amply supplied with electric lights, steam heat and every sanitary convenience. It is designed to accomodate 72 students.

The Gymnasium, north of University Hall, is 114 by 58 feet in its ground dimensions. The main, unbroken gymnasium floor is 114 by 43 feet. In the rear of this are the dressing and bath rooms for men and for women. These are supplied with hot and cold water, and the building is lighted by electric lights and heated with steam radiators. In the rear of the building, facing the track and athletic grounds, is a commodious and comfortable grand stand.

THE LIBRARY.

The general library and reading room occupies a large, well lighted room on the first floor of University Hall. Special collections are shelved in separate rooms.

The system of department libraries prevails to a limited extent. Small collections of books specially needed in connection with laboratory and class room work being deposited in several departmenst.

The Library is open six days in the week. From Monday until Friday, the hours are from 8:30 a. m. to 4:30 p. m.; Saturday from 9 a. m. to 12:30 p. m.

Students are allowed free access to the shelves. 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 redrawn 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. The maximum number of books which any student may have in possession from the Library at any one time in any one line of work shall be two; except that the Librarian may in special cases allow additional volumes to be drawn on the recommendation of the professor in charge.

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

The following is a list of the periodicals on file for the use of members of the University.

American Architect.
American Chemical Journal.
American Electrician.
American Geologist.
American Journal of Science.
American Journal of Physiology.
American Machinist.
American Naturalist.
Analyst.
American School Board Journal.
Analytische Chemie Zeitschrift fur.
Annals & Magazine of Natural History.
Anorganische Chemie, Zeitschrfit fur.
Anorganischer Chemie.
Archaeology.
Art Interchange.
Assoc. Engineering Societies, Journal of.
Athenaeum.
Atlantic Monthly.

Bird-lore.
Bookman.
Botanical Gazette.
Brick.
Brush and Pencil.
Bulletin de la Societe Chemique.
Cassier's Magazine.
Century.
Chautauquan.
Chemiches Central Blatt.
Classical Review.
Contemporary Review.
Cosmopolitan.
Craftsman.
Critic.
Cumulative Book Index.
Current Literature.
Deutsche Rundschau.
Dial.
Education.
Educational Review.
Electrical World and Engineer.
Engineering (London).
Engineering Magazine.
Engineering News and American Railway Journal.
Engineering and Mining Journal.
Entomological News.
Felz zum Meer.
Fliegende Blaetter.
Forest and Stream.
Forum.
Foundry.
Genera Insectorum.
Harper's Magazine.
Harper's Weekly.
Independent.
International Studio.
Journal American Chemical Society.
Journal of Applied Microscopy.
Journal of Chemical Society (London.)
Ladies' Home Journal.
Lamp.
Library Journal.
Literary Digest.
Literary World.
Living Age.
McClure's.
Masters of Art.
Mathematics.

Merck's Report.
Miners and Minerals.
Mining World.
Monist.
National Geographical Magazine.
Nature.
Die Naturlichen Pflanzfamilien.
Nautilus.
Neurology, Comparative.
N. Y. Botanical Garden.
Nineteenth Century.
North American Review.
Ornithology, American.
Outing.
Outlook.
Photographic Times (Bulletin.)
Physical Review.
Plant World.
Poet Lore.
Political Science Quarterly.
Power.
Popular Science Monthly.
Psychology.
Public Libraries.
Public Opinion.
Public Library Quarterly.
Public School Journal.
Publisher's Weekly.
Railway & Locomotive Engineering.
Reader's Guide to Periodical Literature.
Review of Reviews.
School and Home Education.
School of Mines Quarterly.
School Review.
Science.
Scientific American and Supplement.
Scribner's.
Success.
Torrey Botanical Club.
Torreya.
Uber Land und Meer.
Western Mining World.
Western Society of Engineers, Journal.
World's Fair Bulletin.
World's Work.
Zeitschrift fur Wissenschaftliche Mikroskopische.
Zoologischer Anzeiger.
Zoologist.
Anaconda Standard.

PARLORS, WOMAN'S HALL

Butte Miner.
Montana Daily Record.

The following papers are donated by their respective publishers:

The Belt Valley Times.
The Big Timber Pioneer.
The Yellowstone Leader, Big Timber.
The Billings Times.
The Sentinel, Boulder.
The Avant-Courier, Bozeman.
The Tribune-Review, Butte.
The Chinook Opinion.
The Dillon Examiner.
The Weekly Tribune, Dillon.
The Forsyth Times.
The Glendive Independent.
The Western News, Hamilton.
The Missoula Democrat.
The Montana Daily Record.
The Inter-Lake.
The Madison County Monitor.
Madisonian.
The Philipsburg Call.
The Rocky Mountain Husbandman.
The Ravalli Republican.
The Stevensville Register.
The Silver State.
The Northwest Tribune, Stevensville.
Rosebud County News.
Seattle News-Letter.
Kalispell Bee.

STATEMENT.

Number of volumes in Library	12,000
Number of pamphlets	6,600
Number of periodicals	136

The Museum.

The Rooms—The Museum proper is on the first floor of the main building. One room in the basement is allotted for storage of the collections, and is packed full. The Museum is filled with cases, along the walls and in the interior. The cases are made after the best patterns, of native lumber, and display the collections to advantage. The walls are covered with insect cases containing mounted insects. Above the cases toward the ceiling are arranged the agricultural exhibits received from the Omaha Exposition, the large mounted fishes, collected and donated by Mr. R. A. Eddy, and the mounted birds of large size.

The Geological and Biological storeroom, in connection with the Museum, is located in the basement of University Hall and has for the storing of specimens shelves built on the four walls. These shelves are almost entirely filled with a number of new and beautiful Cretaceous and Tertiary leaves. Part of this valuable storeroom collection has been named and catalogued, but owing to lack of space in the Museum proper, but very little has been put out. However, as soon as more room is offered, the Museum will have a showing second to none in the Northwest.

The Museum material not stored in the room set apart for the collections is housed in the different departments. Indeed much of it is indispensable to departmental work. As a result, much of the Museum is scattered. Considering the time during which material has been gathered and the amount expended, the collections have made remarkable growth.

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

THE COLLECTIONS.

The collections of the Museum, from various sources, are as follows: A collection of over a thousand bird skins, almost entirely from the state; a collection of shells, partly collected in the state, and partly through donations from several sources; a collection of plants, embracing about 3,000 species, with many thousand duplicates, received largely through donations; a collection of ores and minerals, received through donations, by collecting, and from the exhibit at Omaha; a collection of insects, partly through purchase, but largely by collecting; a collection of fos-

sils, almost entirely from the state, partly donated and for the remainder collected; a collection embracing money, historical relics, souvenirs and promiscuous articles; a collection of fishes, partly from the U. S. Fish Commission, the remainder collected in the state; a collection of fresh water entomostraca from the lakes and rivers of Montana; a collection embracing coals, rocks, concentrate samples, building stones, brick, tile and pottery, developed and produced in the state; a set of the series of educational rocks prepared by the U. S. Geological Survey. The Wiley collection of over a thousand species of lepidoptera.

During the past year much work has been done on the Museum collections. Many hundreds of insects have been arranged permanently in Comstock insect cases, more than a hundred of these cases being now required to house the collection, with a large number as yet in papers.

Drawer space has been arranged for the collection of bird skins, now numbering more than a thousand, and the collection is now systematized so as to be easily accessible for any species.

Many hundreds of botanical specimens have been mounted, and all the identified Montana specimens have been systematically arranged in the case made especially for the collection and are easily accessible. This work is being continued as fast as possible.

A shipment of glassware has been received from a German firm for displaying the alcoholic material that has accumulated and is not placed on exhibition. The containers are square boxes, with lids ground to fit. The boxes display the material to the best adavange, without the distortion so noticeable in round containers. The material already placed in these boxes makes a handsome exhibit.

A supply of paper-lined paste-board trays is kept on hand, and the various collections as they come in are placed in these neat trays, are properly labelled, and are shown to the best advantage.

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 labelled and the donor's name recorded.

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

T. L. Lewis, specimens of volcanic rocks from Idaho. Also beautiful specimens of iron pyrite crystals, limonite Xls, quartzite, native arsenic, etc. Donated.

Martin Jones, several specimens of Chalcocite and Bornite from Butte. Donated.

Rev. Mr. Sawyer, vertebra of mammoth from California. Donated.

Mrs. Smurr of Deer Lodge, Montana, many perfect fossil Carboniferous leaves from Indiana and several crinoid heads and trilobites. Donated.

D. D. Nicholson, Darby, Montana, Lignite samples.

E. C. Garrett, Chouteau, Montana, specimens of lignite and building stone. Donated.

H. W. Gardiner. Augusta, Montana, specimens of coal.

Homer Syfuyer, Wibaux, Montana Xls. of Barite and Anhydrite. Donated.

Miss Ella Orr, Butte, Montana, a large and beautiful collection of shells, fossils, agates, ores, rocks, minerals, etc. Loaned.

Summer Geological Survey, many first-class Fox Hill, Fort Pierre and Laramie invertebrate fossils. Three or four hundred Laramie fossil leaves. Part of a Mososaur skeleton, including some of the dentition. Parts of several Dinosaur skeletons. Several coal and lignite specimens from eastern Montana. In this collection much new and undescribed material is found.

The Wiley Collection of Insects. The university has come into possession of the insect collection of the late C. A. Wiley of Miles City. It embraces over a thousand species, many thousand specimens of Lepidoptera. Most of these are from the eastern end of the state, but many obtained by exchange. It is thus rich in native species from the state, and at the same time has many of the showy forms from Europe and the Orient. This is a great addition to the entomological collection of the University, and together with those gathered from other sources gives the University an excellent exhibition of Lepitoptera, as well as a fine series for student study.

Collegiate Departments of Instruction.

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

Department of History and Economics.

GENERAL INFORMATION.

The aim of this department is to give (1) a thorough knowledge of the life and institutions of the nations studied; (2) to make the student familiar with the best literature of the epochs treated as embodied in the works of the great historians; (3) to furnish a training in historical method and research through the study of sources. The library method of teaching history, supplemented by lectures and tests, is followed in all classes. Daily use is made of standard histories for reference. The thesis work is done mainly by the study of such sources as the original documents of treaties, laws and proclamations, speeches and debates of contemporaries, personal memoirs and journals, official reports, museum collections, pictures, etc. The material in the University Library is ample for all courses offered. Much source material is available, including collections of documents, personal journals, etc. The government and other official publications are catalogued and easily accessible. Such standard works are provided in American history as those of Bancroft, Winsor, Parkman, Von Holst, Fiske, MacMaster, the Elliot Debates, the Johns Hopkins Studies, etc. In European history are found the complete works of Grote, Gibbon, Duruy, Hume, Macaulay, Froude, Stubbs, Hallam, Guizot, Thiers, Lamartine, Taine, Carlye, Motley, Menzel, Rambaud, etc. Economics is taught by the historical method and especial attention is given to those subjects which directly relate to the social and industrial life of the people. Instruction is made practical by the application of theories to specific examples in history and present day problems. The library facilities in economics are sufficient for thorough work.

COURSES IN HISTORY.

I. HISTORY OF ENGLAND.—The development of the English Constitution is traced from Anglo-Saxon institutions and the contributions of the Normans. Prominence is given to the study of Magna Charta, the king, barons and commons, the English church, the Stuarts and parlia-

mentary government, the commonwealth, financial policies, taxation, colonization and similar questions.—4.

II. AMERICAN CONSTITUTIONAL HISTORY.—The evolution and development of the American Government is followed from the Mayflower compact to the present time. From copies of the original documents are studied the charters and important laws of the colonies and their influence on local government. The beginnings of the American Republic are traced from the colonial compacts looking toward union, the acts of the continental congress, the articles of confederation and the northwest ordinance. The history of the making of the constitution of the United States is studied from the journals of the convention, the Madison papers, the Elliott Debates and the Federalist. The interpretation of the constitution is gathered from executive messages and proclamations, treaties, laws of congress and decisions of the supreme court.—4.

III. STUDIES IN ANCIENT HISTORY.—Including the Kingdoms of the East, Egyptian Civilization, the Grecian States and the Roman States. The aim is to investigate the social, aesthetic, religious, domestic and political life of these peoples; to discover the motif and their educational, family, ecclesiastical, military and political institutions.—4.

IV. MEDIAEVAL HISTORY.—A study of a few of the great movements of the Middle Ages. The migration and settlement of the Teutonic tribes, Mohammed and Saracen Civilization, the Empire of Charlemagne, the Byzantine Empire, rise of the Papal Power, Feudalism, Monasticism, the Crusades, the beginnings of modern European Governments, the growth of cities, etc.—4.

V. MODERN EUROPEAN HISTORY.—Era of discovery and conquest, the Reformation, rise of the Dutch Republic, thirty years war, Peter the Great and Russia, Frederick the Great and Prussia, the French Revolution and Napoleon, disturbances of 1830 and 1848, Crimean war, present status of the church and society, constitutions of modern European nations, current problems of trade, the army, finances and Balance of Power. —4.

VI. INTERNATIONAL LAW.—Woolsey's International Law is used as a basis. Lectures and library work supplement the text. The laboratory or source of method of study is pursued so far as possible by an investigation of treaties and the findings of international congresses and conventions.—4.

COURSES IN ECONOMICS.

I. ELEMENTS OF POLITICAL ECONOMY.—This course includes the consideration of such topics as wealth, capital, land, labor, value, money, coinage, banking, rent, interest, wages, profit, population and taxation. It comprises the study of the Mercantile System, the Natural Liberty System and the Historical School. The views of such economists as Adam Smith, Malthus, Ricardo, John Stuart Mill, Cairnes, Say, Dunoyer, Carey, Roscher, Jevons, Marx, Walker and Henry George are examined. —4.

II. MODERN ECONOMICS.—This course will consist of the discussion of some of the most important questions in economics of the present

time and the trend of recent legislation. Among these questions may be mentioned Trusts and Combinations of Capital, Labor Unions, Government Subsidies, Taxation and the Single Tax Theory, Government Ownership of Public Utilities, Recent Currency, Legislation, Banking Functions and Laws, Franchises, Socialistic Settlements and Co-operation.—4.

Department of Philosophy and Education.

GENERAL INFORMATION.

The subject of Psychology is studied largely from the experimental and physiological standpoint. The work is made concrete and practical. In general psychology an examination is made of the works of James, Ladd, Baldwin, Jastrow, Munsterberg, Sully, Dalton, Foster, Romanes, Carpenter, Wundt, Fechner, Hoffding, Weber, Ribot and others. These studies are supplemented by lectures and class demonstrations.

In experimental psychology Scripture, Sandford and Titchener are followed. A completely equipped laboratory is provided for experimental psychology. In addition to glassware, chemicals, desks, etc., sufficient apparatus is at hand to perform the most valuable experiments in the manuals of the above named psychologists. These include Pseudoptics, apparatus for testing sight, hearing and temperature, Aesthesiometer, Stop Watch, Vernier Chronoscope, Touch Weights, Suggestion Blocks, Color Wheel and Disks, Metronome, Tuning Fork, induction Coil, Kymograph, Dynamometer, Pneumograph, Olfactometer, Mosso's Ergograph modified by Lombard, Jastrow's Automatograph, Marey's Sphygmograph and Jastrow's Memory Apparatus.

COURSES IN PSYCHOLOGY.

I. DESCRIPTIVE PSYCHOLOGY.—This course presents a systematic view of modern psychology. Attention is given to such topics as the province of psychology, methods of psychological research, the growth of the central nervous system, the relation of mind and body, the nature of consciousness, the phenomena of sensation, etc., as well as a study of the higher intellectual faculties and will.—4.

II. EXPERIMENTAL PSYCHOLOGY.—This course is open to students who have a knowledge of general psychology. It furnishes a practical exposition of the materials and methods of psychological investigation. The lectures are accompanied by class demonstrations. An opportunity is afforded for individual work in the laboratory which trains the student to carry on original research work. The more valuable experiments are given in visual, auditory, dermal and muscular sensations;

color, time and space perceptions; motor reactions and fatigue; tests in attention, memory, association, discrimination, emotion and the will.—4.

COURSES IN THEORY AND ART OF EDUCATION.

I. HISTORY OF EDUCATION.—The aim is to give a comprehensive review of the rise and progress of education. Methods, materials, organization, principles and ideals of education are studied chiefly under the following heads: Athenian and Spartan Education together with the views of Plato and Aristotle. Roman Education. The Monasteries, Scholasticism and the rise of the Universities. The Renaissance, Humanism and Sturm. The educational system of the Jesuits. The rise of Realism, Comenius and Bacon. Rosseau and education according to nature. The Kindergarten. Pestalozzi and Froebel. Hegel and Herbert Spencer and Spencerism. Education in the United States and Horace Mann.—4.

II. THEORY AND PRACTICE OF EDUCATION.—The statutes of Montana provide that graduates of the University shall be given a life diploma to teach in the state after two years' successful experience of teaching. The aim of this course is to give a practical training in the theory and art of teaching. Opportunity is given for observation of actual work. The scope of the work is indicated by the following topics: Qualification and equipment of the teacher. Methods of teaching the various subjects. School management. Supervision and discipline. Programmes, courses of study and school organization. School sanitation. The relation of the school and society. Duties of the teacher and her relation to the parents. The course embraces a study of the work of such contemporary educators as Hinsdale, Col. Parker, Pres. Eliot, the McMurry's, Pres. Butler, Dr. Dewey, Arnold Tompkins, etc.—4.

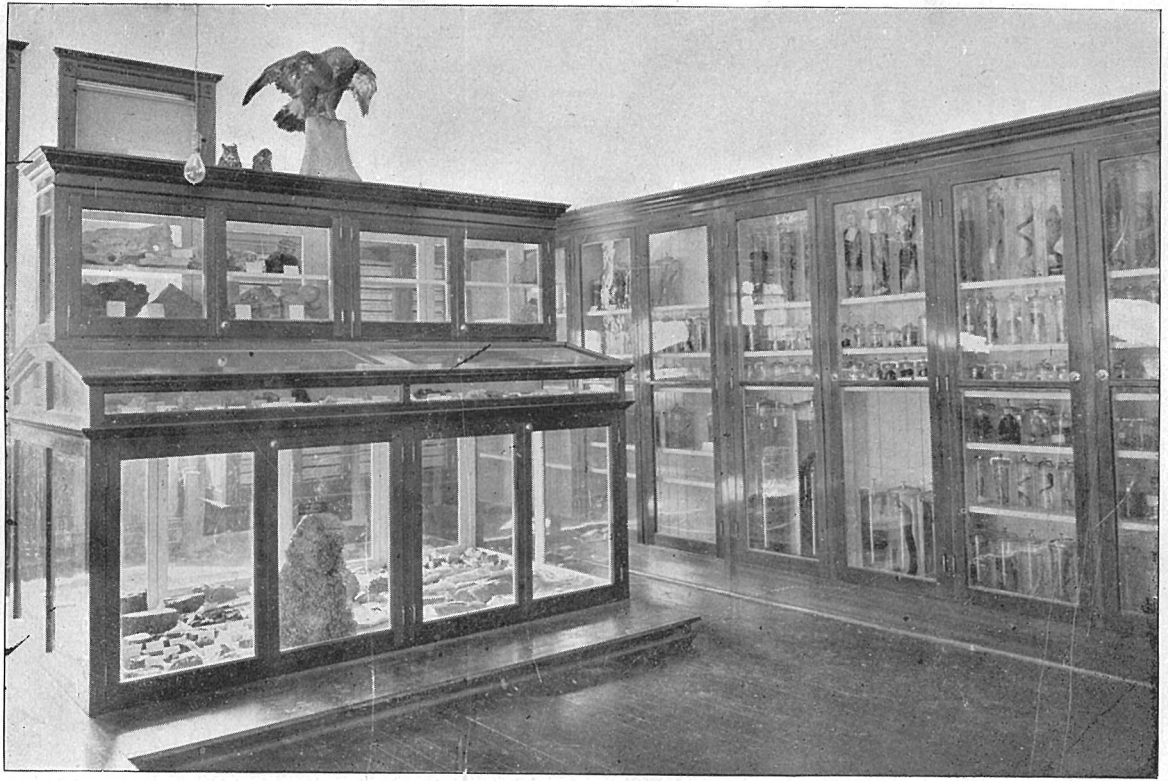
COURSES IN PHILOSOPHY.

I. ETHICS.—The course includes the study of the scope of ethics, relation of ethics to other sciences, moral standards, the standard of the law, the evolution of conduct, the development of ethical thought, the social and individual life, the progress and trend of ethics. The scientific method of investigating the right in human conduct is used.—2.

II. HISTORY OF PHILOSOPHY.—A review of the leading schools of philosophy from the Greeks to the present day. The thought of the various periods is associated with the life and philosophy of such central figures as Plato and Aristotle of the Ancients, Descartes, Spinoza, Leibnitz, Kant and Hegel among the moderns. Especial attention is given to such questions as Epicureanism and Stoicism, the influence of Christianity, Neo-Platonism, Scholasticism, Idealism and Realism, etc.—4.

III. MODERN PHILOSOPHY.—An examination of the leading theories of Modern Philosophy with special reference to recent German and French writers. The Library method with lectures and thesis work is used. Open to students who have taken course II.—4.

IV. LOGIC.—A course in Deductive Logis. All theoretical work is followed by practical exercises in which theories and definitions are applied.—2.



CORNER OF MUSEUM

Department of English and Rhetoric.

COURSES IN RHETORIC.

The work in this department has two purposes: (1) a thorough knowledge of the principles of prose and verse; (2) proficiency and skill in the writing of English. It is necsesary that the student have thorough preparation in English before entering upon this work; and the entire work in Rhetoric as outlined in the preparatory department (or its equivalent) is a prerequisite.

I. ENGLISH COMPOSITION.—Classroom work will be divided between theory and practice. Special attention will be given to style and diction. Themes affording practice in the principles of composition will be required from time to time. Selections of prose masterpieces will be carefully studied with a view to verifying the principles of rhetoric. First Semester.—4.

II. ADVANCED COMPOSITION.—Theoretical and practical work in description, narration, exposition, argumentation and persuasion. A portion of the time will be devoted to the analysis and study of the oration. The class-room work will be reinforced by collateral reading. As much library work as possible will be included in this course. Second Semester.—4.

In addition to the regular written work in Courses I and II, two themes of not less than 1,500 words each will be required of all students in each course. These papers will be due on the following dates: First Semester, December 2, 1904, and February 2, 1905; Second Semester, April 5, 1905, and June 1, 1905.

III. PRINCIPLES OF ENGLISH VERSIFICATION.—In this course the work will be considered from an aesthetic as well as from a structural point of view, the chief aim being to instill in the student a love for good poetry as well as to give a thorough knowledge of the principles and mechanism of verse. Lectures on poetics will be given throughout the course, and a critical study will be made of poetic style. From time to time, the student will be assigned exercises in scansion and the composition of verse. First Semester.—2.

This course is open to students who have had Courses I and II.

IV. HISTORY OF ENGLISH PROSE STYLE.—A study of the works of the best prose writers from the middle of the sixteenth century to the middle of the nineteenth, with reference to the development of English prose style. Second Semester.—2.

This course is open to students who have had Courses I and II.

Department of Literature.

COURSES IN LITERATURE.

1. PRE-SHAKESPEREAN WRITERS OF THE ELIZABETHAN PERIOD.—This course is the study of Spencer, Marlowe, and Bacon.

A brief history of the pre-Shakespearian drama in lectures.

Occasional papers. Open to students who have completed Course I in Rhetoric. First Semester.—4.

II. SHAKESPEAREAN DRAMA.—Special preparation for this course is gained by the study of Course I. The critical study of eight plays, so selected as to illustrate the author's range and the variations of his art in the successive periods of his life. Open to students who have completed Course I. Second Semester.—4.

III. ENGLISH LITERATURE OF THE EIGHTEENTH CENTURY.—Lectures and written papers. Special attention will be given to the works of Pope, Goldsmith, Gray, Addison and Swift. First Semseter.—4.

IV. ENGLISH LITERATURE OF THE NINETEENTH CENTURY.—Prose—Carlyle, George Eliot, Arnold, Lamb, and Ruskin. Lectures on the literature of the nineteenth century. Second Semester.—4.

V. WORDSWORTH AND HIS CONTEMPORARIES.—This course is intended to cultivate a catholic appreciation of the poetry of Wordsworth, Shelly, and Byron. Many of the more notable works of these poets are read; their biographies are studied for light upon their art and thought, and the great social and literary movement which they exemplify and interpret is discussed. This course is intended primarily for the more advanced undergraduates ,but is open to others who may satisfy the instructor of their fitness. First Semester.—4.

V. TENNYSON AND BROWNING.—The critical study of selections from Tennyson and Browning, comparing the style, philosophical ideas and theories of the authors. Second Semester.—4.

VII. AMERICAN LITERATURE.—A survey of American literary history and the discussion of notable works in prose. First Semester.—4.

VIII. AMERICAN LITERATURE.—Selections from the verse of the greatest American poets. Second Semester.—4.

IX. THE EXTENDED AND CRITICAL STUDY OF THE POEMS OF BROWNING.—Graduate Course.

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

Department of Elocution.

This department offers an opportunity for culture invaluable to all students in the University. It combines the study of the best literature with the art of interpretation and expression. It gives the student control of his own powers and gives him easy, simple, and effective delivery.

Special attention is given to the placing and building of the voice by means of conscious control of the breath.

Course I is required of all students except those in the School of Mechanical Engineering.

Course I. ELEMENTS OF PRACTICAL ELOCUTION.—Pantomimic action recitation and oration.—4.

Course II. PRACTICAL ELOCUTION.—Recitations from classical writers, Shakespeare, Tennyson, Browning and others.—4.

Course III. PRACTICAL ELOCUTION.—Program construction and production. Program to consist of five or more numbers from varied sources or the works of single writer.—4.

Course IV. PROGRAM WORK CONTINUED.—Attention will be given to a one-theme program.—4.

Course V. ORATION AND DEBATE.—This course is entirely for the production of oration and debate, with special work in extemporaneous speaking.

PREPARATORY ELOCUTION.—This course is offered to preparatory students. The work is suited to the needs of students in this department.

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 of admission, and should not be regarded as presenting the ultimate standard or ideal.

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

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

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.

IV. LIVY AND TACITUS.—Selections.—4.

V. PLATUS 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 outline.—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 of 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.—4.

Department of Modern Languages.

GENERAL INFORMATION.

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. Extracts from modern authors will be read, and the study of the literatures will be made a special topic.

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.

GERMAN.

A course of three years has been planned. During the first and second years Courses 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, Bernhart's German Composition, Drei Kleine Lustspiele.

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, Goethe's Faust, Part I and scientific monographs. These latter will be given to those students taking the Scientific course. Essays will be re-

quired in the various subjects which students are pursuing, such as chemical, biological, etc.; also Wenkebach's Deutsche Literatur Geschichte.

Readers: Maria Stuart, Minna von Barnhelm, Heine's Prose, Ekkehart. Sight Readers: German Daily Life and Geschichten von Deutschen Staedten, Leberecht Huenchen.

FRENCH.

Courses I and II devoted to the study of Chardenal's complete French course. Reader: Daudet (3 contes). Pour Apprendre a Parler. Les Forceurs de Blocus.

Courses III and IV consist of intermediate readings, such as Colomba, Zola's Debacle, Hugo's Hernani.

Moutonier's French Daily Life, followed by courses V and VI (elective), which will be devoted to the study of the French classics and scientific writings and Duval's Histoire de la Literature Francaise, Souvestre, Un Philosophe sous les toits. Sight reading: Les Miserables.

SPANISH.

A three-year 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. 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; recitation will be held in Spanish.

Readers—El capitan Venemo—El Si de las Ninas.

Extracts from Don Quixote.

Department of Chemistry.

THE CHEMICAL LABORATORIES.

The Department of Chemistry occupies most of the second floor of Science Hall, which contains eight 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 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.

Of the two laboratories, the larger is for the work in general chemistry and qualitative 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 with a water faucet over a sink, with taps for water on the desk, and tips for gas. The laboratory will accommodate forty students in all, with a maximum number of twenty-four in one section.

Each student is given a full set of apparatus. Each desk is locked by a single padlock.

The reagents are stored in large glass-stoppered, tabulated 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 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 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 a Bunsen burner. Water is brought to each desk in taps, and to the 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, bottle, etc.

In the balance and reading room are two 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.

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. It contains over 200 volumes in English and German, dealing with analytical, inorganic, physical, organic and industrial chemistry, and toxicology.

The following chemical journals are kept on file:

American Chemical Journal, Journal of the American Chemical Society, The Analyst, Journal of the Chemical Society, Chemisches Central-Blatt, Zeitzschrift fur Anorganische Chemie, Zeitschrift fur Analytische Chemie.

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, 4x14 feet, is provided with water and gas, and is very convenient for lecture experiments.

The private laboratory and office is a well-lighted room, 12x17 feet in size, located in the corner of the building. It opens into the lecture room and into the store room. It is provided with a laboratory desk, a hood, balance shelf, and is supplied with water and gas. An accurate analytical balance and a first class assay balance, sensitive to 1-200 milligram are used for the most accurate determinations.

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 tin pipe. 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.

ASSAY LABORATORY.

The Assay Laboratory is fitted with a large two muffle brick furnace, a Cary combination gasoline furnace, and a Brown's

UNIVERSITY HALL

portable furnace, a cupel machine, rock crushers and other necessary apparatus. The assay balance, made by Wm. Ainsworth of Denver, is sensitive to 1-200 milligram.

COURSES IN CHEMISTRY.

The courses in chemistry cover the field of pure chemistry, and are also designed for those who expect to engage in technical work.

As an introduction to all courses in this subject, a course in General Chemistry, extending over two semesters is given. This is presented by recitations, lectures and laboratory work, and is required of all students in the University. It should be taken in the Freshman year. In this year'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. The student will be expected to do a large amount of quantitative work in connection with the laboratory course.

One-half year in Qualitative Analysis follows this work. It is taught by lectures and 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 three semesters of work are required.

Advanced courses in Chemistry are taken up at the student's option. At present a course in Organic Chemistry involving lectures and laboratory work on the chemistry of the compounds of carbon is offered for those students fitted for the work.

The course in Physical Chemistry should be taken by all students specializing in either Physics or Chemistry. It is of great value to students of Philosophy.

CHEMISTRY AS A PROFESSION.

There is a large demand in Montana for Chemists who have a thorough mastery of their profession. The principal lines of work open to professional chemists are:

I. Teaching in colleges and secondary schools.

II. As chemists and assayers for smelters and mines.

III. Other technical work. There is a steadily increasing demand for chemists in many industries, including iron and steel works, sugar refineries, color works, print works, acid works, chemical manufactories, railroads and all large corporations. Manufacturing chemistry is a field of great profit, especially to those who introduce or develop new industries.

IV. Analytical chemistry and assaying. There is always a demand for chemists who can give their whole time to questions in legal and technical chemistry. The most profitable fields are: Toxicology, mining chemistry, sanitary chemistry, industrial applications and physical chemistry.

V. Government and state work. The geological surveys, the Philippine service, boards of health, agricultural experiment station and other government institutions, employ many chemists.

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.

COURSES IN CHEMISTRY.

I. GENERAL INORGANIC CHEMISTRY.—Non-Metals.—Required of all students. Open to all students who have no entrance conditions in mathematics. Two lectures or recitations per week. Two afternoons of laboratory work. Four hours. First Semester.

II. GENERAL INORGANIC CHEMISTRY.—Metals.—A continuation of Course I. Required of all students. Four hours. Second Semester.

III. QUALITATIVE ANALYSIS.—Required of all students specializing in chemistry, and must be preceded by Course I and II, or their equivalent in some laboratory of acknowledged standing. One lecture and ten hours of laboratory work. Five hours. First Semester.

IV. QUANTITATIVE ANALYSIS.—Introductory, must be preceded by Courses I, II and III. The principles of gravimetric and volumetric analysis are presented in this course. Required or all students specializing in Chemistry, Mineralogy and Assaying. Four afternoons of laboratory work, with explanatory lectures. Four hours. Either Semester.

V (a). DRY ASSAYING.—Must be preceded by Courses I and II and if possible by III and IV. 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 the bullion assay. Determinations involving volumetric methods, or the so-called wet methods, will be given as part of Courses IV, V, or VI, 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 should precede the course by Mineralogy. Two afternoons. Second Semester.

V (b). WET ASSAYING.—This course is designed for those who expect to become chemists in smelters and for those who are interested in mining work. Three afternoons. Either Semester.

VI. MINERAL ANALYSIS.—Systematic.—Quantitative analysis of representative minerals. Required of all students specializing in chemistry. Four afternoons. Either Semester.

VII. ORGANIC CHEMISTRY.—Lectures and recitations on the chemistry of the compounds of carbon, including the fatty and the aromatic series. The aim of the course will be to take up very thoroughly the simpler compounds, going with great detail into a study of the relationships and characteristic reactions of the different classes of organic compounds. Remsen's Organic Chamistry is used as a text and Richter's or Bernstein's Organic Chemistry will be used as a reference book. Must be followed by Course VIII.

Prequisite: General Chemistry and Quantitative Analysis. (Given in 1903-1904). Two hours. First Semester in alternate years.

VIII. ORGANIC CHEMISTRY.—A continuation of Course VII. (Given in 1903-1904). Two hours. Second Semester, in alternate years.

IX. ORGANIC PREPARATIONS.—Laboratory work. Open in connection with Course VII to students who have completed Course III. (Given in 1903-1904). Two afternoons. First Semester, in alternate years.

X. ORGANIC PREPARATIONS.—A continuation of Course IV. Open to students who are taking Course VIII. (Given in 1903-1904). Two afternoons. Second Semester, in alternate years.

XI. PHYSICAL CHEMISTRY.—Lectures, assigned readings and reports. Joyne's Physical Chemistry is used as a text. Course XI is necessary for all students who wish to acquire more than a very elementary knowledge of chemistry. Must be preceded by Courses I, II and III, and by Courses I and II in physics. This course will not be given during the year in which courses in organic chemistry are offered. Three hours. First Semester, alternate years.

XII. FUELS, AND THE METALLURGY OF IRON, STEEL, COPPER AND LEAD.—Lectures, assigned readings and reports. Each student will be expected to have a copy of Huntington and McMillan's Metals. Two lectures will be given per week, and each student will be expected to hand in a paper on some practical subject at least once a week. Three hours. First Semester, alternate years.

XIII. INDUSTRIAL CHEMISTRY.—A continuation of Course XII. Will be given only when a sufficient number of students desire to continue the work through this Semester. Acid and alkali manufacturing, sugar making and refining, petroleum, etc. Thorp's Industrial Chemistry is used as a reference book. Three hours. Second Semester, alternate years.

XIV. GAS ANALYSIS.—A short course in the technical analysis of gases with Hempel's apparatus. One or two afternoons. Either Semester.

XV. ORGANIC ANALYSIS.—Open to students who have completed Courses IV, VII, IX and X. Two afternoons. Either Semester.

XVI. INORGANIC PREPARATIONS.—A laboratory course in the preparation and purification of inorganic compounds. Lengfeld's Inorganic Chemical Preparations will be used as a text. Two to four afternoons. Either Semester.

XVII. ADVANCED INORGANIC PREPARATIONS.—A continuation of Course XVI. Two to four afternoons. Either Semester.

XVIII. PHYSIOLOGICAL CHEMISTRY.—Including Toxicology. Four hours. First Semester.

XIX. PHYSIOLOGICAL CHEMISTRY.—Four hours. Second Semester.

XX. SANITARY WATER ANALYSIS.—Two or four afternoons. Either Semester.

XXI. ANALYSIS OF MINERAL WATERS.—Four afternoons. Either Semester.

Department of Physics and Geology.

DESCRIPTION OF PHYSICAL APPARATUS.

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-chairs for taking 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 luminere has been mounted in a window of southern exposure to furnish illumination in the daytime. The Coult's projection apparatus is used for projection, either by sunlight, electricity or by the lime light.

The lecture room 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 Education Association, is now available for stu-

dents' 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, an excellent air pump, several X-ray tubes, a large Toepler-Holtz machine, electric motors, volt meters, ammeters, and a 50-volt 4-ampere shunt wound dynamo for manual operation, etc. During the past year many excellent pieces of apparatus have been added to this department. The work in Light has been materially strengthened by the addition of Michelson's Interferometer, several large lenses and a spectroscope.

GEOLOGY AND MINERALOGY.

The provisions made for laboratory work in these subjects have been much increased during the last year. The remodeling of Science Hall furnished two comodious and well lighted rooms, which have been thoroughly equipped for work in Mineralogy, Lithology, General Geology, Petrography and Paleontology.

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 metallurgical products in the Museum for work in Economic Geology. 4. The Invertebrate Fossils in drawers in the Museum, labeled and recorded. 5. A set of type specimens of rocks, igneous, sedimentary and metamorphic, in Science Hall for class work in Lithology and Geology. 6. A set of rock specimens representing the formations of such parts of the State as have been exploited or studied. 7. One set of specimens to illustrate Structural Geology and the various phenomena of geological action as far as possible, also a set of Frazer's Structural Geology including a large piece of columnar basalt and several beautiful stalactites and stalagmites. 8. One set of Crystal models of 108 figures; and one set of Preston's Modified Celluloid Crystals for study in Crystallography. 9. Crosby's set of 150 Common Rocks and Rock-forming Minerals for study in General Geology. With new and beautiful XI's and a complete set of Invertebrate Fossils, according to Geological Ages.

A large chart has been prepared 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, and an aneroid barometer reading to 16,000 feet, a 50-foot calibrated steel tape, drawing instruments, a complete camping outfit for the summer geological expeditions, a new and beautiful Petrographic microscope has recently been imported from Germany, and together with a large collection of rock and mineral slides the department is well equipped for work along this line.

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 also by lectures and laboratory work. 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 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 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 laboratory periods. Course begins in First semester. Lectures accompanied by experiments of illustrative rather than quantitative nature.

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. ELECTRICAL MEASUREMENTS.—Testing of Electrical Instruments, and the determniation of various Electrical Constants, etc. Lectures and Laboratory work. Three hours. First semester. Required of Engineers.

COURSE IV. ADVANCED EXPERIMENTAL PHYSICS.—Hours to be taken, optional with the student, but not less than two hours may be taken. May be taken during either or both semesters. Must be preceded by Courses I and II.

COURSE V. LIGHT.—Primarily a Laboratory Course. A few lectures will be given on the past theories of light and on manipulation of

apparatus. Two hours credit. First or second semester. Must be preceded by Courses I and II.

COURSE VI. HEAT.—A careful study of the subject of heat with both lectures and laboratory work. May be taken either semester. Two hours credit. Must be preceded by Courses I and II.

COURSE VII. SPECIAL PHYSICS.—Work for the more advanced students in Physics or for those desiring to specialize. This must be preceded by Courses I, II, V and VI. A Laboratory Course. May be taken either or both semesters.

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 Palaeontology and Stratigraphic Geology will be given and the subjects will receive treatment as 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 by megascopic and blow-pipe tests. For Geology the laboratory work is applied as field work and excursions to the different exposures of characteristic rocks, and to localities where important geological changes have taken place and left their trace.

COURSE I. 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, but Physical Geography is also fully treated. Open to all college students. First semester.

COURSE II. HISTORICAL GEOLOGY.—Continuation of Course I, In addition to the regular lectures and field work there will be an examination of the most familiar fossils and the determination of 150 common rocks and minerals. Second semester. Four hours.

COURSE III. MINERALOGY.—A study of the minerals from their

crystallographic and chemical properties. Subject of Crystallogrophy thoroughly reviewed before the study of minerals is taken up. Must be preceded by Chemistry I. 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 blowpipe analysis which will be studied during the latter portion of the term.

COURSE IV. LITHOLOGY.—A study of rocks from the physical and chemical properties without the use of the microscope. Patricular attention is paid to their mineralogical composition. Should 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 gangueson value of ores. Must be preceded by Courses I and II. First semester. Four hours, lecture and field work. Trips to mines and mills will be expected. Should be preceded by Courses I, II, III and IV.

COURSE VI. BLOW-PIPE ANALYSIS.—Second semester. A continuation of work in determinative mineralogy. Laboratory work only. Credit one or two hours. Must be preceded by Course III.

COURSE VIII. PETROGRAPHY.—The microscopic study of rocks and minerals, together with their classification and general derivation. Two or four hours credit. First and second semester.

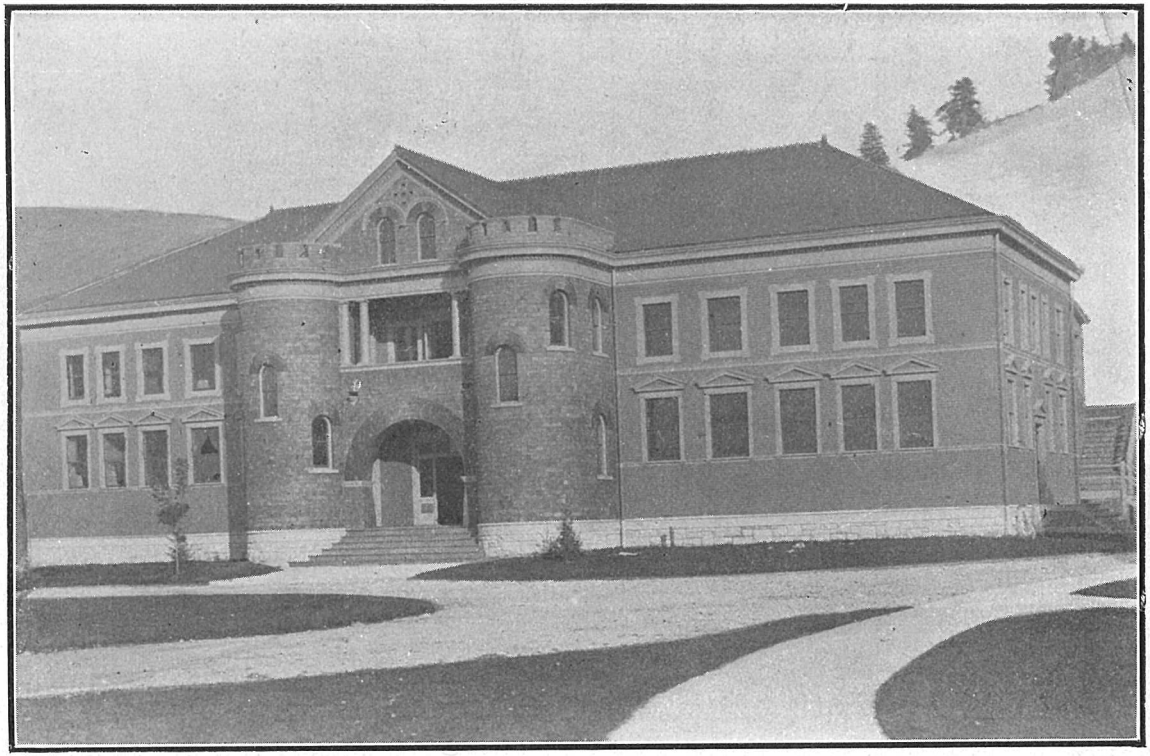
COURSE IX. ADVANCED GEOLOGY.—A more careful study of the principles of Geology. Field and laboratory work and a thorough review of recent geological literature. Must be preceded by Courses I and II. Two or four hours credit. First or second semester.

COURSE X. ORES.—A qualitative and quantitative study of the commercial ores of gold, silver, copper, lead, iron, etc., and a careful study of vein formations. May be taken with Course V. Must be preceded by Courses I, II and III. Four hours credit. First or second semester.

COURSE XI. SPECIAL WORK.—For students desiring to specialize in Geology and Mineralogy. Work to be outlined upon application.

COURSE XII. PHYSICAL GEOGRAPHY OR PHYSIOGRAPHY.—A study of the principal physiographic features of the earth, their origin, history, etc. Illustrated lectures, laboratory and field work. May be taken with Course I. Four hours credit. First semester. This course is especially adapted for those desiring to teach physical geography in the secondary schools.

GRADUATE WORK.—The department is especially equipped for advanced students in Geology and Paleontology. The state has many unworked geological fields, and by means of the summer geological expeditions much new and valuable material has been gathered. This material includes rocks, minerals, invertebrate and vertebrate fossils, from almost all the geological periods, together with a large collection of Cretaceous and Cenozoic leaves, and offer many problems for original investigation.



GYMNASIUM

Department of Biology.

GENERAL STATEMENT.

The Biological Laboratories are 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, and two rooms for laboratory. Across the hall is another room, 24x30, used as an unpacking room and room for general work, and used conjointly by the departments of Biology and Geology.

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 for chemicals, one large case for apparatus, a hood case for fumes, a small storage case, and a sink with water.

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

The tables are of a special patterns, 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. The tops are of oak, 1½ inches thick. Each student works individually at a table and the tables are just high enough to permit the use of a microscope vertically without discomfort. Each desk is fitted with gas, and when artificial light is needed the rooms are well lighted by incandescents. The paraffine baths are kept in the fume hood, and by them rheostats may be kept at constant temperature 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 at all times.

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.

At the foot of the stairway, in the basement, a room twenty by twenty-four is used as a work room and laboratory. 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, and assorting material. The basement rooms are light, dry and airy, and as pleasant as any rooms in the building.

Adjoining the preceding room is another room, filled with desks and cases, and used by advanced students in original work. This room accommodates six students, has three large cases for storage, and is light, dry and commodious.

Across the hall is a large basement room, fitted with shelves. This room is used for unpacking, for storage, for cleaning up specimens, etc. It is used conjointly by the departments of Biology and Geology. It is fitted with shelves and cases, and is filled with material which has been collected and for which there is no place in the Museum.

EQUIPMENT.

The microscopical equipment is as follows: There are two compound microscopes by Leitz. 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-twefth oil immersion. It has also a revolving stage, with substage condenser after Abbe, and with the iris diaphragm. It his 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, and will take the accessory apparatus mentioned under the preceding. By this same maker there is a dissecting microscope with lenses and camera lucida.

There are eighteen microscopes by the Bausch and Lomb Optical Company. Five of these are fitted with substage condensers for illumination. They are all provided with two-thirds and one-sixth objectives and double nose piece. There are two dissecting microscopes made by the same firm, with lenses.

In addition to the microscopes as perviously described there is a battery of extra objectives, two inch, one inch, one-half inch, one-fourth inch, one-eighth inch, and a one-tenth inch oil immersion. This gives a wide range of work, and is sufficient for most fields of work.

The additional microscopic and other accessary apparatus is as follows:

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; a Thoma haemacytometer for counting blood corpuscles; a centrifuge apparatus for analysis of blood, milk, wine, and for determination of quantity in lacustrine investigations; a mechanical stage for searching slides for minute objects; Wolfhengel's counting apparatus for bacteria. A filar micrometer eyepiece for measurement of minute objects, as bacteria and blood corpuscles; two cases for storing microscopic slides, containing nearly 1,500 slides; the usual hardware and glassware constanty used in all biological work.

An important part of the equipment of the department is a good collection of necessary chemicals, stains, and reagents for general histological and physiological study. This includes a series of chemicals representing most of the organic compounds of the human body, for elementary and advanced physiology. There is a large series of stains, dyes, oils, and fixatives, imported from Germany, made by Gruebler and Co. This collection is complete enough to permit extensive study and research in animal and vegetable histology.

The working material in photography is as fllows: Anthony's copying, reducing and enlarging camera, with accessories for making lantern transparencies; a Leitz vertical camera for photo-micrography; a set of lenses for general photography, Bausch and Lomb Optical Company's Set D, consisting of three anastigmat lenses, one of focus 9½ inches, one of focus 11½ inches, one of focus 14 inches; these may be used separately or in any combination of two, making thus the equivalent of six lenses; this set is provided with diaphragm shutter, ray filter, fitted in case; the outfit is one of the best on the market, and its field of usefulness is very great; a Folmer and Schwing camera box for preceding lenses, 6½x8½, with double holders, and kits for

18 plates, and capable of taking sizes 6½x8½, 5x7, 5x7, and 4x5; it has 26 inch bellows, and is fitted with carrying case, especially adapted to outdoor work.

For projection the department has a stereopticon, used conjointly with the departments of Geology and Art. The lantern has both electric and vapor attachments for illuminant, and accessories for use of microscopical slides and live animals in water. There is a series of several hundred lantern slides, made largely from original negatives. Many of these are colored. The stock of negatives now numbers several hundred, and includes much valuable material. Each year the stock of negatives and sides is materially increased, and at the present writing there is a very creditable accummulation.

WORKING MATERIAL.

For working material there is a collection of alcoholic vertebrates and invertebrates, land, fresh water and marine, made by purchase and collecting; more than fifteen hundred 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 about two thousand mounted slides; a large amount of working material from the state, colected by the department, by the Biological Station, and received through donations.

Owing to the fact that the department has been organized but a few years the amount of working material has of necessity been developed from a very small beginning. There is now on hand enough material for original investigations in several fields. The collection of Montana lepidoptera has been arranged, spread, and labelled, a total of about 3,500 specimens. The arrangement of the dragon-flies has also also been completed. There is yet much material to be worked out, within the ability of undergraduate students, and to which they will be directed as speedily as possible. 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 thousand mounted slides, additions being

constantly made. The University is situated under the shadow of University 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 ft. The opportunities botanically and zoologically are excellent.

The material which has accumulated from the Biological Station and the collecting trips taken during the past several summers is deposited in the University, and affords excellent material for original investigations. The material includes several thousands specimens of plants, a large series of land shells, a large collection of entomostraca, a collection of insects, and many fishes. Some of these have been worked upon by students, others await study. The collections are being constantly augmented, and the summer work at Flathead Lake makes possible the study of original problems in the field.

PLAN OF WORK.

The aim of the departments 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 neary free to residents of the State of Montana as possible. In carrying out this generous plan there are no laboratory fees. The students make 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 semester 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.

A nucleus of a department library has been made, and the library facilities are being increased yearly. The University is adding to the library facilities as rapidly as funds will permit. The literature in a few special lines is somewhat extensive.

The following publications are at the disposal of the student:

Nature.
Popular Science Monthly.
Psyche.
Entomological News.
American Monthly Microscopical Journal.
Zoologischer Anzeiger.
Annals and Magazine of Natural History.
American Naturalist.
Botanical Gazette.
Zeitschrift fur Microscopie.
Science.
Bird Lore.
The Zoologist.
Journal of the Royal Mic. Soc.
The Auk.
The Nautilus.
American Ornithology.

COURSES OF STUDY.

This department offers elementary work in general Biology looking toward a specialization either in Botany or Zoology with advanced work in some lines in either of these two subjects.

The following courses are offered for the year 1904-1905: for the year of required Biology the students may take Courses I and II, or V and VI.

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 recitations. Two lectures and five hours of laboratory per week. First Semester. Required of all students. Four hours credit.

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 about seventy-five slides and was taught to imbed in paraffine and use the microtome. To aid in the work reference was made to such works as Marshall and Hurst's 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 of students. 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 Uurchin, Sea-Cucumber, Starfish, 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 portion of the time is devoted to laboratory technique, and each student mounts a series of slides from some of the specimens as the work progresses.

Lectures or recitations occur twice a week. In the latter Thomson's Outlines are taken as a basis for study. First Semester. Four hours credit. Elective.

COURSE IV. A CONTINUATION OF COURSE III.—Vertebrate Zoology. The dissections include Balanoglossus, Amphioxus, Trout, Frog, Cat, etc. Second semester. Elective.

COURSE V.—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. Coulter's Plant structures was used during the past year, 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 re-agents, is taught to use the camera lucida and measure with a micrometer scale, and to prepare material for the microtome. First semester. 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 3,225 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.

The University hebarium contains over a thousand species of Montana plants. The spring of the year is the season for collecting at low altitudes. During the last six weeks of the school year the valley and mountain sides are a garden of flowers, so abundant that bits of color may be distinguished for several miles. The field is new, the material abundant and the opportunity for satisfactory work exceptionally good.

Laboratory and field work, with lectures or recitations. Second semester. Four hours credit.

COURST VII. ENTOMOLOGY.—A course in systematic entomology; a study of the anatomy and morphology of insects, followed by systematic study of the different orders and families, with use of keys for determination of species. Comstock's Insect Life is the basis for the specific determinations. Special attention is given to injurious insects, with means employed for their control. Four or six hours credit. Second semester. Elective.

COURSE VIII. PHOTOGRAPHY.—Recognizing the fact that photography is such an invaluable aid in all scientific study the work here given has been outlined. Those taking it will be instructed in the different styles of plates, the use of color screens or filters, and in the technique of developing, printing and toning. It is very desirable that students taking the course possess an instrument, as the laboratory material is in almost constant use. During this course students will furnish their own plates.

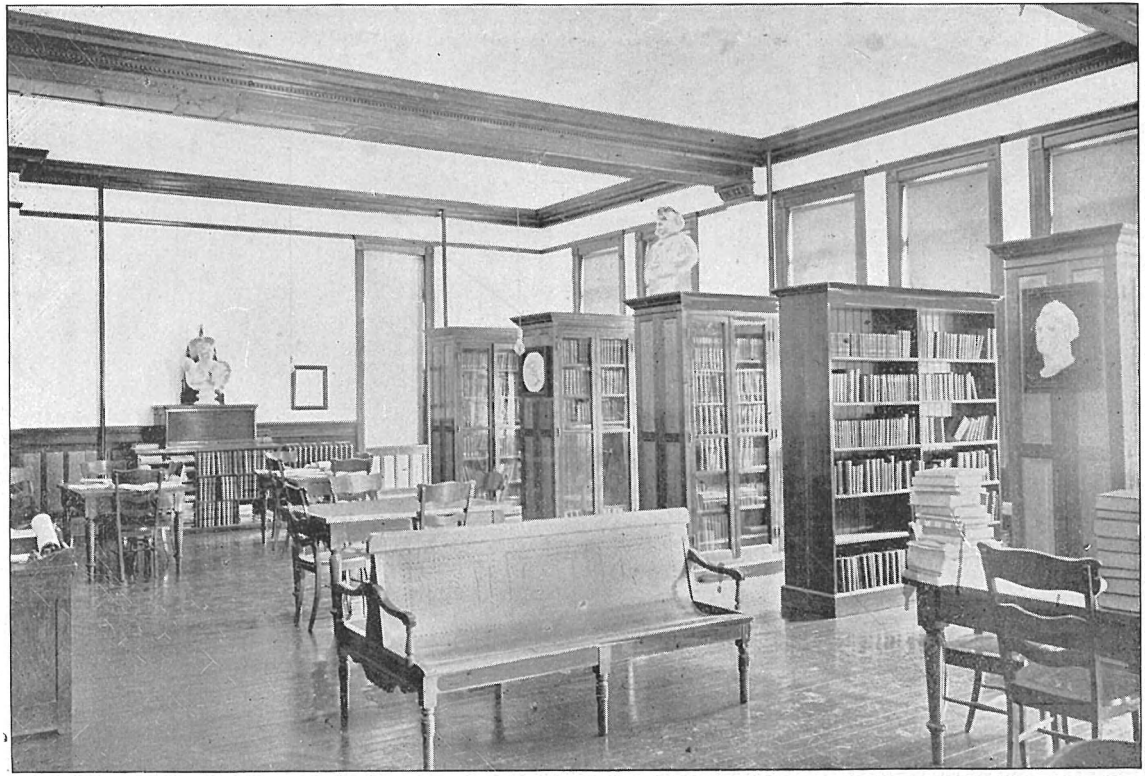
The course will consist of one lecture and one laboratory practice per week, with two hours credit. Elective, first semester.

COURSE IX. A CONTINUATION OF COURSE VIII.—Devoted to the practical use of tne camera in scientific work. Instruction is given in making lantern slides, transparencies and bromide enlargements. Negatives are made of scientific objects and groups of objects. Copies of important photographs will be made. Photomicrography will be a prominent feature. Laboratory, five hours per week, two hours credit. Second semester. Elective.

COURSE X. HUMAN ANATOMY.—An advanced subject, for mature students, and demanding a good foundation in Zoology, Chemistry, and Microscopical Technique. The laboratory work will include a study of the various organic compounds of the body, experiments with the same, various electrical experiments on nerves and muscle, an examination and study of the various complex organs of the body, with microscopical preparations.

Recitation, lecture and laboratory, either semester. Four to six hours credit.

COURSES XI AND XII. RESEARCH 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 investigation 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



LIBRARY

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.

Credit from four to twelve hours may be had.

COURSE XIII. BACTERIOLOGY.—This course is similar to that outlined in Kanthack and Drysdale's book. There is given methods of inoculation ,of staining, counting, measuring and photographing bacteria. Instruction is given in preparation of material, in sterilization, etc. Some time will be devoted to examination of different substances and products for bacteria. First semester. Laboratory subject four to six hours credit.

COURSE XIV. EMBRYOLOGY.—Devoted largely to the study of the chick, working out the various stages of development. Other studies will be introduced so far as possible. The course will consist of laboratory and library work, with occasional recitations or lectures.

Second semester, elective, four to six hours credit.

GRADUATE COURSES.

Graduate students applying for work will be given every facility for study. Individual work will be outlined, considering the facilities of the department and the previous work of the applicant. Problems in variation, ecology and histology are readily found, and candidates will be encouraged to pursue studies for which they are fitted and for which they have preference.

BIOLOGICAL STATION.

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 satisfactory completed during the summer.

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, V, and IX. Students in Classical Course or the Course in Letters 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.

II. HIGHER ALGEBRA.—Ratio; Proportion; Variation; Binominal Theorem; Arithmetic, Geometric, and Harmonic Progressions; Permutations and Combinations; Undetermined Co-efficients; Summation of Series; Higher Equations. Second Semester. 4.

III. ANALYTICAL GEOMETRY.—First Semester. 4. Must be preceded by Courses I and II.

IV. DIFFERENTIAL AND INTEGRAL CALCULUS.—Second semester. 4. 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. 4. 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. THEORY OF EQUATIONS.—Second semester. 4.

IX. DIFFERENTIAL EQUATIONS.—Second semester. 2. Elementary Course. Must be preceded by Course V.

X. ADVANCED ANALYTIC GEOMETRY.—Second semester. 4. Must be preceded by Courses III, IV and V.

XI. HISTORY OF MATHEMATICS.—Either semester. 2. May be taken by any student as an elective.

For work in Surveying see School of Mechanical Engineering.

Department of Free-Hand Drawing.

This department occupies the south end of the third floor of University Hall. The large and well lighted studio is very attractive with its green tinted walls, casts, variously colored still-life, and pictures of famous paintings.

The department is well equipped. A set of geometric solids and papier mache reliefs of decorative designs, flowers, and heads form material for introductory drawing. An adequate number of casts, which are so chosen as to afford gradual progress, serve for work in charcoal. 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.

Still-life forms of differing shapes and colors are used in the beginning work in color. Fruit, flowers, and the draped model are furnished for more advanced study. Five hundred foreign photographs of famous works of art have been recently purchased for illustrative material in the History of Art. The department shares with the departments of Biology and Geology a sciopticon that has both vapor and electrical attachments. The department has also a constantly increasing number of slides. The

library is well supplied with standard books on art, thus affording reference material for thorough thesis work.

It is the purpose of this department to give thorough and systematic instruction in Drawing and Painting, and to instill the refinement and aesthetic taste 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.

Two years of Free-hand Drawing is required of all preparatory students. Two and a half hours, once a week, are devoted to the work.

The first year's work serves as an introduction into the subject. A variety of exercises is 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 precision of line from pen-and-ink wor.k

In the second year 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 a number of college courses are given as free electives. In these courses the student may devote from two and a half to five hours per week, and will be given credit according to the time spent. It is the desire to afford as much freedom in the exercise of individual taste as is consistent with thorough work. But it is expected that all of who undertake these courses will wish to study progressively and systematically.

A choice of four lines of work is offered, black-and-white work, water color painting, oil painting, and design.

In these college courses a deposit of $2.50 per semester is required in order to cover the expense of certain material furnished by the department.

In courses I, II, III, and IV, the black-and-white work is given. Charcoal, crayon sauce, pen-and-ink, and wash blacks are the mediums used. The student works from the antique, still-life, landscape, and the draped model, and the work leads to illustration.

In courses V, VI, VII, and VIII water color painting is taken up. The student begins making still-life studies, and gradually acquires ability to work from fruit, flowers, landscape, and the draped model.

Courses IX, X, XI, and XII are devoted to oil painting. The student paints first from still-life, and then progresses to flowers, landscape, and the draped model.

Before any regular work from the model can be taken, some charcoal drawing from the full length cast is required.

In Courses XIII, and XIV, design is studied. The student is taught lettering; composition; the making of calico and rug patterns, and book covers; pyrography, and basket weaving.

Three coures are offered in the History of Art. Course XV. is devoted to the History of Architecture, Course XVI. takes up the History of Sculpture, while Course XVII. deals with the History of Painting. The work consists of recitations from the textbook and of lectures, frequently illustrated with the sciopticon. Lantern slides, photographs, and reference books furnish adequate illustrative and research material. The study of the History of Art is conducive to culture and refinement. It gives an understanding of the emotional and spiritual life of man.

A course in Artistic Anatomy is offered and will be found profitable, and even necessary to the student who intends to pursue the study of Art.

COURSES IN DRAWING, PAINTING AND HISTORY OF ART.

SECOND PREP. COURSE—FREE HAND DRAWING. 2.

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. Drawings in outline from single pieces of furniture, and from interior of rooms.
5. Simple studies in design with brush.

THIRD PREP. COURSE.—FREE HAND DRAWING. 2.

1. Drawings in charcoal from the cast; hands, feet, head, etc.
2. Drawings in sepia from the interiors of rooms.
3. Drawing in pen and ink.
4. Drawing red crayon.

COURSE I. BLACK AND WHITE WORK. Elective. 2.

1. Drawing in charcoal from full length cast.
2. Drawing in pen and ink and wash from still life.
3. Composition.

COURSE II. BLACK AND WHITE WORK. Elective. 2.

1. Drawing in charcoal from full length cast.
2. Quick sketching from the draped model.
3. Out-door sketching.
4. Memory sketching.

COURSE III. BLACK AND WHITE WORK. Elective. 2.

1. Drawing in charcoal from draped model.
2. Quick sketching from model and interiors.
3. Newspaper illustration.

COURSE VI. BLACK AND WHITE WORK. Elective. 2.

1. Work from draped model and interior in any medium.
2. Drawing from landscape and street scenes.
3. Costume Studies.
4. Magazine illustration.

COURSE V. WATER COLOR PAINTING. Elective. 2.

1. Painting from still life.
2. Painting from flowers.
3. Painting from fruit.

COURSE VI. WATER COLOR PAINTING.Elective. 2.

1. Painting from flowers and still life.
2. Out door sketching.
3. Composition.

COURSE VII. WATER COLOR PAINTING. Elective. 2.

1. Drawing in charcoal from full length cast.
2. Painting from draped model.
3. Painting from landscape.
4. Posters.

COURSE VIII. WATER COLOR PAINTING. Elective. 2.

1. Drawing in charcoal from human head.
2. Painting from human head.
3. Painting from landscape.
4. Painting from draped model and interiors.
5. Costume Study.

COURSE IX. OIL PAINTING. Elective 2.

1. Painting from still life.
2. Painting from fruit and still life.

COURSE X. OIL PAINTING. Elective. 2.

1. Painting of flowers and still life.
2. Sketching and painting from landscape.
3. Composition.

COURSE XI. OIL PAINTING. Elective. 2.

1. Drawing in charcoal from full length cast.
2. Painting from draped model.
3. Painting from landscape.

COURSE XII. OIL PAINTING. Elective. 2.

1. Drawing in charcoal from the human head.
2. Painting from the human head.

3. Painting from landscape.
4. Painting from model and interiors.
5. Costume Study.

COURSE XIII. DESIGN. Elective. 2.

1. Conventional designing.
2. Calico and rug patterns.
3. Lettering.
4. Book covers.

COURSE XIV. DESIGN. Elective. 2.

1. Basket weaving.
2. Pyrography Original designs.
3. Designing in clay.

COURSE XV. HISTORY OF ARCHITECTURE. Elective. 2.

COURSE XVI. HISTORY OF SCULPTURE. Elective. 2.

COURSE XVII. HISTORY OF PAINTING. Elective. 2.

COURSE XVIII. ARTISTIC ANATOMY. Elective. 2.

School of Mechanical Engineering.

The School of Mechanical Engineering has been especially designed to meet the growing demand in the State of Montana for bright energetic young engineers to cope with the vast problems which must be solved before the unlimited resources of the state can be fully developed. To this end the Engineering Laboratories have been designed to offer facilities for tests and experimental inquiry, such as (1) submitting to actual test, and verifying directly, principles developed in the lecture-room; (2) building and testing machinery designed by the students; (3) investigating such subjects and engineering problems as are calculated to impart training in methods of investigation, and to yield results, which may prove of value in engineering science; (4) ascertaining the character and proper treatment of materials, and acquiring familiarity with the appliances and processes necessary for the construction of designs. Opportunity is afforded the student to acquire skill in the working of metals by hand and machine tools; in wood-turning, planing, and carpentry; in moulding and pattern-making; in forging and tempering tools. These processes are well illustrated in the construction of machines for experimental work. After the student has become sufficiently acquainted with these processes, and is able to recognize the differences in appliances and methods, visits of inspection are made to manufacturing establishments and power stations

in the vicinity, in order to give him familiarity with engineering operations on a large scale.

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 two-story extension of the building; and the engine room, located in the basement under this extension.

The draughting tables are located in a well-lighted room 23x34 feet in size. The office of the Professor of Mechanical Engineering is adjacent to it. Fourteen drawing tables furnish accommodations for twenty-eight students. A library of over two 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 two-story extension above referred to, the wood, machine, forge shops, and foundry, occupy rooms, in the order mentioned. The wood shop is 30x40 in size, and is well lighted on both the north and south sides. Work benches with vices and tool cupboards, furnish accommodation 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 30x27⅓ feet in size, and is lighted from both north and south sides.

The equipment comprises one 16-inch by 8-foot engine lathe, with taper-turning attachment, chuck, large and small face plates, a 32-inch swing drill press, a sensitive drill, a 16-inch stroke, shaper, a power hack saw, a wet emery grinder, a double emery grinder, and benches with four machinist's vises.

The forge shop opens off the machine shop. It is 30x30 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. It is a well lighted room, 30x30 feet. The equipment consists of a No. 0 Whiting Cupola, a Sturtevant steel pressure blower, core oven, core making bench, and the small tools and supplies needed.

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 convenietnly stored. A checking system enables the instructor to give out these tools for student's 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.

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.

To follow up the application of principles taught in the lecture room, the department is supplied with an excellent surveying outfit consisting of a transit, Y level, compass, panimeters, leveling rods, chains, tapes, etc.

SHOP WORK.

Instruction in shop work is given in the afternoon throughout the Freshman and Sophomore years, and a half year in the Junior and Senior work. There are three shop periods per week of two and one-half hours each.

I. FRESHMAN SHOP WORK.—During the first semester attention is given to acquiring a knowledge of the use and care of tools in this shop. A systematic course of exercise 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 in sawing, planing, joining,

splicing, mortising, dovetailing, framing and paneling. On the lathe exercises are given in the turning of cylinders, cones, beads, ogee curves, etc., and chucking and face turning. The last four weeks of this semester will be devoted to pattern making.

In the second semester pattern making is continued. 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. A portion of the time in this semester is given to molding and casting. This work is designed to give a general knowledge of foundry practice, and includes making of molds in green sand, core making, and charging and operating the cupola furnace.

During part of each period lectures are given in the use and care of tools, and in the elements of wood construction. Lectures are also given on the elements of pattern making, followed by a description of a variety of representative pieces of pattern construction.

Five hours throughout the year; 2 units per half year. Prescribed Freshman year.

II. SOPHOMORE SHOP WORK.—Molding and casting is continued for the first six weeks, and is followed by twelve weeks of iron and steel forging. Exercises in drawing out, upsetting, welding, punching, and forming, are followed by a course in steel working and the forging and tempering of tools.

The second semester's work is in the machine shop. The work consists, first, of exercises in vice work, involving practice in the use of hammer 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.

Part of each period is taken up in lectures on the use of tools such as hammers, cold chisels and files. The engine lathe and other machine tools are described, and various shop processes and operations are given, the purpose being to give the student such knowledge of shop practice as would be most likely to be useful in his future work.

Five hours throughout the year; 2 units per half year. Prescribed Sophomore year. Pre-requisite Course I.

III. JUNIOR AND SENIOR SHOP WORK.—During the Junior year and first semester of the Senior years, machine shop practice is continued. Additional practice is given in the use of lathe, shaper, and other machine tools. Various machines designed by the students will be built.

Five hours throughout the year; 2 units per half year. Prescribed Junior and Senior years.

DRAWING.

I. INSTRUMENTAL DRAWING.—Instrumental drawing, solving of geometrical problems, cross-hatching, line shading, drawing from copy, and orthographic projection. In the second semester drawings to scale are made of simple machines and machine parts.

Five hours throughout year; 2 units. Prescribed, Freshman year.

IA. ELEMENTARY FREE HAND DRAWING.—Drawing in outline

and light shades from geometric solids, for which see Department of Free Hand Drawing.

Five hours throughout the year; 2 units. Prescribed Freshman year.

2A. DESCRIPTIVE GEOMETRY.—The correct representation of the point, line, plane and solid space; sections and intersections of various geometrical figures.

Five hours first half year; 2 units. Prescribed Sophomore year.

2B. DESCRIPTIVE GEOMETRY.—Shades and shadows, isometric projection.

Five hours second half year. Prescribed Sophomore year. Pre-requisite Course 2A.

3. MECHANICAL DRAWING.—Drawing of simple machine parts complete sets of working drawings are made of existing machines. The necessary sketches and measurements are first made of existing machines, thus gaining additions training in free-hand drawing, and from these sketches the finished drawing is made.

Five hours second half year. Prescribed Sophomore year. Pre-requisite Course I.

4. MACHINE DESIGN.—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 empiracel formuias are used, and standard authorities are consulted.

Five hours first half year. Prescribed Junior year, Pre-requisite Courses I and III.

5. STEAM ENGINE DESIGN.—Continuation oi Course 4. In the latter part of the year the work in steam engine design is commenced. A series of ideal indicator diagrams are drawn so as to give diagrams of actual force transmitted to crosshead and crank pin.

Five hourse second half year; 2 units. Pre-requisite Course IV.

6. GRAPHIC STATICS.—General theory of graphic statics with applications. Graphical analysis of stresses in Engineering structures. and includes the designing of engineering structures, such as roof-trusses, bridges, etc.

Five hours first half year; 2 units. Pre-requisite Course II.

7. ELECTRICAL DESIGN.—This work consists in the design of simple parts in electrical machinery.

One hour lecture, 3 hours drawing; 2 units.

MECHANICAL ENGINEERING.

1. ANALYTICAL MECHANICS.—The mathematical treatment of the important principles of dynamics and statics, fully illustrated by problems and applications. Bowser's Analytical Mechanics is used.

Four hours throughout the year; 4 units per half year. Pre-requisite. Courses III and IV in Mathematics and Course I in Physics.

2. HYDRODYNAMICS.—Investigation of the action of forces producing equilibrium or motion in liquids; pressure, stability, flow, etc., as affected by gravity, inertia, outer and inner friction. General theory and construction of hydraulic motors ana pumping machinery.

Three hours first half year. Prescribed Senior year. Prerequisite Course I.

3. HYDAULICS AND HYDRAULIC MACHINERY.—Discussion of such machines and apparatus as operate through the agency of fluids, either in modifying motion or transmitting power.

Three hours second half year Prescribed Senior year. Prerequisite Course I.

4A. THERMODYYNAMICS AND THE THEORY OF THE STEAM ENGINE.—Mechanical theory of heat, thermodynamics of gases and vapors, and the theory of the steam engine; discussion of the effects of compounding, jacketing, and superheating; efficiences of the steam engine.

Three hours first half year. Prescribed Senior year. Prerequisite Course I.

4B. CONSTRUCTION AND OPERATION OF HEAT ENGINES.—Power plant equipment; construction and operation of steam, gas, oil and air engines, boilers, refrigerating machines, air compressors, steam turbines, etc.

Three hours second half year. Prescribed Senior year. Prerequisite Course I.

5A. KINEMATICS.—Theoretical: Treatment of motion without reference to the cause which produces it, comprehending the study of pure mechanism, or the mutual dependence of the movements in the parts of a machine. Applied: Application of the preceding to the various kinematic problems connected with machine design and construction, such as link motion, transmission by rolling and sliding contact, teeth of wheels, cams, form and proportions of the steam engine and other motors.

Two hours throughout the year. Prescribed Senior year. Prerequisite Course I.

5B. KINEMATICS.—Draughting and designing.

Two and one-half hours second half year; 1 unit. Prescribed Senior year. Prerequisite Course I.

6A. SURVEYING.—Theory of surveying; modern surveying instruments; methods employed in topographic, land, city, mining, and hydrographic surveys, and in making maps and calculations from field-notes. Full illustration by practical problems. Lectures and recitations.

Three hours first half year, 1 hour last half. Prescribed Sophomore year.

6B. FIELD PRACTICE AND MAPPING.—The adjustment of surveying instruments in the field; taking of notes for plane and topographical surveys and making of maps from them; to illustrate the theoretical work of the class-room. Completed maps of all surveys will be required.

Three hours throughout the year; 1 unit per half year. Prerequisite Sophomore year.

7. STRENGTH OF MATERIALS.—Discussion of the elastic and the ultimate resistance of the materials used in construction; of the best methods in designing parts of structures, such as suspension rods, pillars,

girders and shafts; and of parts of uniform strength. Lectures and problems.

Four hours second half year. Prescribed Junior year. Prerequisite. Thoroughly satisfactory standing in the first half year of Course I.

8. MECHANICAL LABORATORY, EXPERIMENTAL ENGINEERING.—Experiments in steam engineering, hydraulics, testing of machinery, materials, etc.

Five hours first half year; 2 units. Prescribed Senior year.

9A. ELECTRICAL MACHINERY AND CONSTRUCTION.—Discussion of the construction and operation of electrical machinery and its application to electric lighting and power distribution. The location and construction of electric lighting and power systems for cities, street railways and mines.

Two hours second half year. Pre-requisite Mathematics IV and V. Prescribed Junior year.

9B. ELECTRICAL MACHINERY AND CONSTRUCTION—Continuation of Course 9A.—

Two hours first half year. Prescribed Senior year.

10. ALTERNATING CURRENT AND ALTERNATING CURRENT MACHINERY.—The theory of the generation of single-phase and poly-phase alternating currents, the use of the complex quantity, and the calculation of the regulation and behavior of alternating-current apparatus and transmission lines. In the latter part of the year is taken up, the theory of the single-phase and poly-phase induction motor, synchronous motor and rotary converter, and their effects and operation in transmission lines.

Four hours throughout the year; 4 units per half year. Prescribed Senior year. Prerequisite Course I and III in Physics.

11. MECHANICAL ENGINEERING SEMINARY.—Critical discussion of special mechanical and electrical installations. Special tests and laboratory work.

Hours and credit value to be arranged. Primarily for graduates.

12. THESIS.—A candidate for a degree in the mechanical engineering course is required to write a thesis upon some subject in Mechanical or Electrical engineering.

Department of Music.

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, Reinecke, 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 are 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 chord arpeggios. Carmer's Etudes, Czerny's Virtuosen Schule, and Clementi's Gradus ad Parnassum. 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.

As it becomes financially possible concerts will be given by artists of distinction and these will be open to the general public, students receiving tickets at reduced rates.

Scholarships and Medals.

Two scholarships are held at present in the Piano School.

In June, 1904, three medals will be awarded. The first, donated by Mr. Alfred Reeves of Helena, to that pupil of the school, who shall have made the greatest progress during the school year. The second, is the Bessie Wild's Medal, to be given to the student showing the greatest proficiency. The third, will be awarded by the Director to the student who has been most regular and conscientious in work.

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 rendered.

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

Department of Physical Culture.

EXERCISES FOR MEN.

The work for the men consists of exercises with Indian Clubs, Dumb Bells and Parallel Bars, also Military Drill, Swedish Gymnastics, Tumbling, and Corrective Gymnastics. Classes have been formed for 9:30, 10:30, 11:30 A. M. and 1:30 P. M. The object being to build up the weaker parts of the body; enlarge the thorax and to form correct carriage. The younger students are given light work and plain exercises, while the older students are given heavier work and more complicated exercises. All students, in the Preparatory Department and also in the first and second collegiate years are required to take two hours of Gymnasium per week.

The light Gymnastics consist of exercises with Indian Clubs, Dumb Bells and Military Drill while the heavy Gymnastics consist of Swedish Gymnasium Parallel Bar and Corrective Gymnastics. Each division is given some Tumbling.

EXERCISES FOR WOMEN.

The work in this department is made as practical as possible. The aim is to make the Gymnasium practices progressive and systematic. General development of the body, a correct carriage, ease and grace of movement, and a correct method of breathing are the objects in view.

Two hours per week in the gymnasium are required of all young women in the Preparatory Department, and in the first and second years in the Collegiate Department.

THE BIOLOGICAL STATION, BIG FORK, MONTANA

University of Montana, Biological Station.

STATION STAFF.

OSCAR J. CRAIG, M. A., Ph. D.,
President of the University, Lecturer.

MORTON J. ELROD, M. A., M. S.,
Director, General Zoology, Plankton Methods.

J. M. HAMILTON,
Professor of Psychology, Systematic Botany and Nature Study.

MAURICE RICKER, M. S.,
Principal, High School, Burlington, Ia.
Nature Study and Photography.

MRS. EDITH RICKER,
Station Artist.
Postoffice, Bigfork, Flathead Co., Montana.

The laboratory work of the Station for 1904, will open Monday, July 18, and continue five weeks, or until Saturday, August 20.

For a week or ten days before the Station opens and for two or three weeks after the work closes some one of the Station staff will be at or near the Station, and will aid any who may choose to work during such time. The laboratory is at the disposal of students, if it is wanted, from June 15 to September 1.

EQUIPMENT.

The Station is located on the bank of Swan River at its outlet into Flathead Lake. It was established in the spring of 1899.

The laboratory is a one-story frame structure, 18x24, 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.

The Station is in possession of three boats for use in the work; a gasoline launch "Missoula," a row boat "Culex," and a canvas boat "Daphnia." These boats enable the Station force and those attending to get around very nicely. In addition to the above the Station is in possession of numerous smaller peices of material; a pump after plans of Ricker, plankton net after plans of Kofoid, insect nets, dredges, camp material, and other necessary appliances are supplied for the work. Microscopes, chemicals, glassware, and books are taken annually from the University for use at the Station.

ORGANIZATION.

The Biological Station of the University of Montana was established in 1899, for the purpose of offering to the students of the University and to the teachers and students of the State an opportunity for study, collection, investigation and recreation during the summer. By providing the best facilities the state can afford, and making the instruction free to all, the summer work at the Station presents exceptional opportunities for study, and every encouragement is given to those attending to have both a pleasant and a profitable time. The situation of the Station on the largest fresh water lake in the Northwest makes possible a study of inland and cold water life not presented at any other locality.

LOCATION.

The field laboratory is located on the bank of Swan River at its outlet into Flathead Lake. This location affords a fine harbor for boats and a good camping site for the tents of those attending. The adjacent region contains forests, ponds, lakes, swamps, cultivated fields, mountains, rivers and ravines. It is rich in animal and vegetable life. The lake offers rare opportunities for collecting, and presents some beautiful scenery. East of the lake the Mission range comes abruptly to the water's edge. The range slopes from the Swan river on the north to the high peaks, ten thousand feet, at the southern end, and its scenery is wild, rugged and grand, truly Alpine in character, and rivaling the Alps in beauty and magnificence. West of the lake are the Cabinets. Near the Station Swan lake, Rost lake, Echo lake, and other waters, are easily accessible. Daphnia pond, a few minutes walk from the Station, is rich in pond life, while Estey's pond, about as far again, is fully as productive.

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 2,900 feet. Flathead and Swan rivers flow into the lake from the north, the Pend d'Oreille 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 lakes, rugged and jagged peaks and beautiful falls.

East of the Station a few miles the Swan range presents some of the most sublime scenery in the world with remarkable opportunities for study of problems in ecology and distribution of plants.

COURSE OF STUDY FOR 1904.

ZOOLOGY—(a) Laboratory and field work, including dissection or microscopic study of type forms, with field work and instruction in collecting and preserving for laboratory use and permanent collections.

(b) Field and laboratory course in entomology. Instruction in collecting, preserving and labelling insects. Dissection and study of type specimens. A study of injurious insects.

(c) Ichthyology. Special course devoted particularly to the lake and river fishes and their food supply. The course will include plankton study.

(d) Ornithology. A study of birds, with methods of collecting, making and preserving skins; habits and lives of birds of the rich avian region adjacent.

BOTANY—(a) Laboratory and field course; study of type forms. The course will consist of collecting trips in the field where common species of the different orders are found, classification of the more common species, study of structure, with methods of preservation, both dry and in liquid, for immediate and permanent use.

(b) Ecology. General course including local ecological problems and local plant geography. For this the region offers a rich field.

PHOTOGRAPHY.—No regular course will be given in this subject, but every aid which the station can give will be given those who wish to become proficient in this art. Students in photography must supply their own plates or films and paper. There is a dark room at the laboratory, and the scenery in the vicinity gives ample scope for a series of negatives either in landscape or of scientific subjects.

NATURE STUDY.—A course of study and practical work will be outlined which will afford both a fund of information on which to draw during school work and at the same time secure a collection of material to be used in illustration. The scope of the work will include zoology, botany, geology and physiography of the region.

METHODS OF INSTRUCTION.

The work will consist very largely of field collecting and observation, study of relation to environment supplemented by laboratory dissections and microscopic examination. The general courses will enable teachers to familiarize themselves with methods of field work, and give a store of information from which to draw in nature study subjects. The general courses also give opportunity to students and others to pursue lines of study with better facilities for outdoor work, with fresher material, than is generally to be had in regular university work.

LECTURES.

During the session the lectures following will be given at the laboratory. They will be given daily, at least one each day. The list will probably be increased, and may be silghtly modified. They are free to all students attending, and to any others who may choose to hear them.

Flathead Lake as a Collecting Field.
The Enemies of the Forests.
Alpine Vegetation as Observed on MacDougal Peak.
The Entomostraca of Flathead Lake.
Air Currents in Mountains.
Fresh Water Biological Stations in America.
Structure of Orchids.
Adaptation in Insects.
Protective Coloration and Mimicry as Seen About the Station.
Photography as an Aid to Science.
Intelligence of Animals.
The Value of Nature Study to Pupils.

FEES AND EXPENSES.

There are no tuition fees. Students attending will be charged for matrial consumed, for breakage, for a share of the expense for excursions, and like necessary expense. Necessary books, chemicals, micrscopes, and glassware will be supplied free. The intention is to give the best facilities possible, so as to make it worth while for students to attend.

BOARD AND ROOM.

Day board may be had at Sliter's Hotel for $5.00 per week, room extra. The hotel is situated on a bluff overlooking the lake, with a beautiful and commanding view. It is customary for most of those attending to sleep in tents, on the Station grounds, taking meals only. For those who wish to tent and cook in regular camp style there will be every opportunity given

for comfort, the region affording a bountiful food supply of everything necessary, but those attending will be expected to supply their own tents and bedding.

OPPORTUNITIES FOR INVESTIGATION.

Any one wishng to engage in investigation of biological problems pertaining to the life of the locality, before or after the regular work, will be given the freedom of the building, boats and apparatus, and will be afforded every facility possible. In such cases no fees will be charged, except for special material or reagents which may be needed.

RECREATION.

Many will wish to combine an outing with study. Fishing near the laboratory is excellent. There are many boats besides those of the Station, and rowing may be indulged in. The field is excellent for photography. Bathing in the lake is always a treat and the beach is fine. The region has an abundance of fruit of all kinds. The hills and forests afford quiet retreats for study or for strolls. Few places have more natural attractions. At the proper season hunting is good. Deer have been seen a few rods from the laboratory. Grouse and pheasants abound in the hills. In season duck shooting is fine. Most of the country affords good wheeling for bicycles.

EXCURSIONS.

The following excursions will be taken during the session of 1904, unless the weather is unfavorable:

1. A trip to Swan Lake, through the forests, with stop over night at the lake. This is a beautiful lake in the mountains, of great interest biologically and geologically.

2. A trip to Rost Lake, at the base of the Kootenay Mountains. This is a lake almost filled up, a fine collecting field. It is an admirable location for camps.

3. An ascent of MacDougal Peak via an Indian trail, to an altitude of 7,725 feet. This will afford opportunity for alpine collecting, and will present some of the most sublime scenery in the world.

4. A trip around Flathead Lake, making study of its banks, bays, and swamps.

These trips will be under the personal supervision of the Director of the Station. Those taking the trips must bear a proportionate share of the expense necessary. Such trips will prove

of great value and interest biologically aside from the pleasures they bring. These trips are not for mere pleasure, but are held to report on observations and to make suggestions.

TO OUR EASTERN FRIENDS.

The laboratory has had students from a dozen states. No student has come to the mountains and gone away disappointed. Cheap railway rates make it possible to visit the west at a minimum cost. The Station affords a place where our scientific brethren may make headquarters, from which they may collect in almost virgin fields, scale unnamed heights and revel in mountains with grand scenery, seek the unknown in the pathless forest, under guidance of those who have spent years in this field. The Station fills a unique place in the work of the fresh water stations of the world. No other place in the world offers a more attractive or more varied field for study.

Collegiate Courses of Study.

The University offer the following general courses of instruction:

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

B.—A course in letters leading to the degree of A. B.

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

D.—A pre-medical course, leading to the degree of B. S.

E.—A course in mechanical engineering, leading to the degree of B. S. in Mechanical Engineering.

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 made 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 in 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, construction 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 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).

(a) Shakespeare's Macbeth, Macaulay's Essay on Milton, Macaulay's Essay on Addison, Burke's Conciliation with America, Milton's L'Allegro, Il Penseroso, Comus, and Lycidas.

(b) Shakespeare's Julius Caesar, Shakespeare's Merchant of Venice, Carlyle's Essay on Burns, Addison's De Coverley Papers, Goldsmith's Vicar of Wakefield, George Eliot's Silas Marner, Coleridge's Ancient Mariner, Lowell's Vision of Sir Launfal, Scott's Ivanhoe, Tennyson's The Princess.

IV. HISTORY—ANCIENT HISTORY.—The equivalent of one year's work, with special reference to Greece and Rome.

V. HISTORY—MEDAEVAL AND MODERN HISTORY.—The equivalent of one year's work.

VI. 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.

VII. 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. This amount is usually covered by three years work.

VIII. GERMAN.—Grammar, Joyne's Meissner, Whitney's or their equivalents. Ability to read easy prose fluently, and to translate at sight such work as "Hauff's Maerchen" (Goold).

IX. FRENCH.—Grammar, Chardennal'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).

X. BIOLOGY.—One year's work in Biological Science, with half the time given to Laboratory work, the equivalent of Davenport's Elementary Zoology for class, and Kingsley or Colton in Laboratory, with accompanying special reading or study.

XI. 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.

XII. PHYSICAL GEOGRAPHY.—One-half year, the equivalent of Tarr's Elementary Physical Geography.

XIII. PHYSIOLOGY.—A half year. Martin's Human Body, Briefer Course, or its equivalent, with laboratory work representing a minimum of 75 hours of work.

XIV. MECHANICAL DRAWING AND SHOP WORK.—One year.

REQUIRED FOR ADMISSION.

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

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

Scientific Course, I, II, III, IV, or V, VI, X or XI. Two years study of either ancient or modern languages, and one of IV, V, X, XII and XIII.

Literary Course, I, II, III, IV, V, VI, VII. For VII, wholly or in part, the student may substitute two years of Modern Languages and one year of Science.

Mechanical Engineering Course, I, II, III, IV, V, VI, VII, with any one of the following: For VII, wholly or in part, may be substituted an equivalent amount of VIII, IX, X, XI, XII, XIII, XIV.

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, including 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 partial elective courses allowed.

GENERAL WORK REQUIRED FOR DEGREES, EXCEPTING B. S. IN MECHANICAL ENGINEERING.

Drawing, twice per week for one year, I, II	1 course
Rhetoric I or II	1 course
Political Economy, I	1 course
Psychology, I	1 course
Literature, I, II	2 courses
Biology, I, II	2 courses
Chemistry, I, II	2 courses
Elocution, I	1 course
General required work	11 courses

WORK REQUIRED FOR DEGREE B. A.

(Classical Group.)

General required work (given above)	11 courses
Special required work, Latin	5 courses
Special required work, Greek Life	1 course
Special required work, Roman Life	1 course
Partial Electives, in Greek, Latin, Modern Languages	6 courses
Partial Elective, Trigonometry or Higher Algebra	1 course
Free Electives	7 courses
Total	32 courses

(Literary Group.)

General required work (given above)	11 courses
Partial Electives, Ancient and Modern Languages	6 courses
Partial Electives, History, Literature and Philosophy	8 courses
Partial Elective, Trigonometry or Higher Algebra	1 course
Free Electives	6 courses
Total	32 courses

WORK REQUIRED FOR DEGREE B. S.

(General Science Group.)

General required work (given above)	11 courses
Special required work, Trigonometry	1 course
Special required work, Higher Algebra	1 course
Special required work, Physics	2 courses
Partial Electives, Modern Languages	4 courses
Partial Electives, Science and Mathematics	6 courses
Free Electives	7 courses
Total	32 courses

(Pre-Medical Group.)

General required work (given above)	11 courses
Partial Electives, Modern Language	4 courses
Special work Required:—	
Biology, Course IV, Vertebrate Zoology. Course VI, Microscopy. Course XI, Human Anatomy. Course XIV, Bacteriology. Course XV, Embryology	5 courses
Chemistry, Cours III, Qualitative Analysis. Course IV, Quantitative Analysis. Course VII, VIII, Organic Chemistry. Courses IX, X, Organic Preparations	4 courses
Courses XVII, XIX, Physical Chemistry	4 courses
Physics, Courses I and II	2 courses
Psychology, Experimental	1 course
Free Electives	1 course
Total	32 courses

FOR THE DEGREE OF B. S. IN MECHANICAL ENGINEERING.

In Mathematics, I, II, III, IV, V	5 courses
Model and Object Drawing, I, II	1 course
Physics, I, II	2 courses
Political Economy, I	1 course
German, I, II	2 courses
Chemistry, I, II, XII	2¾ courses
Literature, II	1 course

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

BACCALAUREATE DEGREES.

The University grants the following baccalaureate degrees for undergraduate work.

1. The degree of Bachelor of Arts to those who complete either the Classical group or the Literary group in the College of Liberal Arts.

II. The degree of Bachelor of Science to those who complete the Scientific course.

III. The degree of Bachelor of Science in Mechanical Engineering to those who complete the course in Mechanical Engineering.

ADVANCED DEGREES.

Master of Arts, Master of Science. The Degree of Master of Arts or Master of Science, will be conferred upon resident graduates on the following conditions:

I. The candidate must be a graduate of this University, or a University or College of good standing, as approved by the faculty.

II. He must have pursued, during one or more years, a course of graduate study at this University, the minimum requirement of work being represented by forty hours of credit.

III. The candidate may pursue one major study and two minors, one major and one minor, or may devote his entire time to the major, the division of time and arrangement of work to receive the recommendation of the department in which the major work is taken and the approval of the faculty. In any case one-half of the candidate's work must be on the major subject.

IV. The minor, or minors, must be closely allied to the major subject, provided, however, that any candidate, in residence for two or more years, may select any approved subject as a second minor for a degree.

V. All courses of study leading to advanced degrees are subject to approval first, by the head of the department of the University in which the major subject for each student belongs; second, by the faculty. The signatures of the heads of the departments in which chosen minor subjects belong must also be obtained. The list of studies with the approval signatures must be deposited with the secretary of the faculty. No changes may subsequently be made except under the same line of approvals, but extension of time may be arranged with the professors concerned.

VI. He must submit a thesis of at least 5,000 words, showing marked attainment in some branch of learning. The subject of the thesis must be announced to the faculty for approval, not later than the second Friday in December, and the thesis itself must be presented to the examining committee at a date to be set by the professor in charge of the thesis work, not later, in any case, than May 20th of the year in which the degree is expected.

VII. He must, at the close of his course, pass a satisfactory examina-

tion, either oral or written, or both, conducted by a committe which shall consist of three professors, selected by the faculty for this purpose.

VIII. The degree of Master of Arts will be conferred only upon the completion of a course mainly literary in character and the degree of Master of Science upon one mainly scientific. The degree of Mechanical Engineer will be conferred on those holding the degree B. M. E. on the same conditions as in the other courses.

IX. Graduate students pursuing courses for the Master's degree may by special permission of the faculty, carry on a portion of the work in absentia; but at least one-half the work must be done in residence.

Scheme of Courses Offered by the University.

* These courses are the general requirements for college courses.

** Technical courses in Mechanical Engineering.

Roman numerals indicate the number of the course; Arabic indicate the number of recitations per week.

RHETORIC.

FIRST SEMESTER.	SECOND SEMESTER.
*Rhetoric, I. 4.	*Rhetoric, II. 4.
Rhetoric, III. 2.	Rhetoric, IV. 2.

LITERATURE.

FIRST SEMESTER.	SECOND SEMESTER.
*Literature, I. 2- Rec. 5. 7 pm. 9:30	*Literature, II. 4.
Literature, III. 4.	Literature, VI. 4.
Literature, V. 4.	Literature, VIII. 4.
Literature, VII. 4.	Literature, IX. 4.
Literature, IX. 4.	

ELOCUTION AND PHYSICAL CULTURE.

Elocution, I. 4.	Elocution, III. 4.
Elocution, II. 4.	Elocution, IV. 4.
Physical Culture.	Oratory and Debate. 4.
	Physical Culture.

LATIN.

Latin, I. Virgil. 4.	Roman Life, VI. 4.
Latin, III. Horace and Cicero's Essays, 4.	Latin, IV. Livy and Tacitus. 4.
Latin, V. Comedy. 4.	Latin, II. Virgil. 4.

GREEK.

Greek, I. Grammar and Lessons. 4.
Greek, III. Anabasis. 4.
Greek, V. Odyssey, Herodotus, Thucydides. 4.
Greek, VII. Dramatists. 4.
Private Life of the Greeks, IX. 4.

Greek, II. Anabasis. 4.
Greek, IV. Iliad. 4.
Greek, VI. Plato, Demosthenes. 4.
Greek Archaeology, VIII. 3.

GERMAN.

German, I. Joynes-Meissner—Grammar, 4.
Grammar, III. Bernhardt—Composition, Conversation. 4.
German, V. Schiller Wallenstein—Conversation and Composition. 4.

German, II. Same. Joynes' Reader. 4.
German, IV. Peter Schlemihl, Wilhelm Tell. Composition and Conversation. 4.
German, VI. Faust. 4.
Deutsche Lit. Geschichte. Conversation and Composition. Aus dem Reich Friedrichs des Grossen. 4.

FRENCH.

French, I. Chardenal's Complete Grammar. 4.
French, III. Napoleon. L'Abbe Constantin. 4.
French, V. Histoire de la Lit. Francaise. Composition and Conversation. 4.

French, II. Chardenal's Complete Grammar.
Contes, Daudet. 4.
French, IV. Colomba. 4.
Racine—
Esther.
Athalie.
French, VI. Modern Writers and Classics. Composition and Conversation. 4.

SPANISH.

FIRST SEMESTER.

Spanish, I. Schilling's Spanish Grammar.
Spanish, III. Same.
La Vida es Sueno.
El si de las Ninas.
Spanish, V. Ruy Blas.

SECOND SEMESTER.

Spanish, II. Same.
Spanish, IV. Modern Writers.
Spanish, VI. Cervantes.

CHEMISTRY.

FIRST SEMESTER.

*General Inorganic, I. 4.
Qualitative Analysis, III. 5.
Introductory Quantitative Analysis, IV. 4
Mineral Analysis, VI. 4.
Organic Chemistry, VII. 2.
Organic Preparations, IX. 2.
Physical Chemistry, XI. 3.
Metallurgy, XI. 3.
Gas Analysis, XIV. 2.
Organic Analysis, XV. 2.
Inorganic Preparations, XVI. 4.
Physiological Chemistry, XVIII. 4.
Sanitary Water Analysis, XX. 4.
Mineral Water Analysis, XXI. 4.

SECOND SEMESTER.

*General Inorganic, II. 4.
Introductory Quantitative Analysis, IV. 4.
Assaying, V. 3.
Mineral Analysis, VI. 4.
Organic Chemistry, VIII. 2.
Organic Preparations, X. 2.
Industrial Chemistry, XIII. 3.
Gas Analysis, XIV. 2.
Organic Analysis, XV. 2.
Inorganic Preparations, XVII. 4.
Physiological Chemistry, XIX. 4.
Sanitary Water Analysis. 4.
Mineral Water Analysis. 4.

PHYSICS.

FIRST SEMESTER.

Physics, I. 4 hours.
Physics, III. Electrical.
Measurements. 3 hours.
Physics, V. Light. 2 hours.
Physics, VI. Heat. 2 hours.
Physics, VII. Special. 2 or 4 hours.

SECOND SEMESTER.

Physics, II. 4 hours.
Physics, IV. Advanced.
Experimental Physics. 2 or 4 hours.
Physics, V. Light. 2 hours.
Physics, VI. Heat. 2 hours.
Physics, VII: Special. 2 or 4 hours.

GEOLOGY AND MINERALOGY.

FIRST SEMESTER.

General Geology, I. 4 hours.
Mineralogy, III. 2 or 4 hours.
Lithology, IV. 2 or 4 hours.
Paleontology, VII. 2 or 4 hours.
Special Geology, XI. 2 or 4 hours.
Petrography, VIII. 2 or 4 hours.
Advanced Geology, IX. 4 hours.
Ores, X. 4 hours.
Physical Geography, XII. 4 hours.

SECOND SEMESTER.

General Geology, II. 4 hours.
Mineralogy, III. 2 or 4 hours.
Lithology, IV. 2 or 4 hours.
Paleontology, VII. 2 or 4 hours.
Economic Geology, V. 2 or 4 hours.
Blow-pipe Analysis, VI. 2 hours.
Special Geology, XI. 2 or 4 hours.
Petrography, VIII. 2 or 4 hours.
Advanced Geology, IX. 4 hours.
Ores, X. 4 hours.

BIOLOGY.

General Biology, I. 4.
Zoology, Invertebrates, III. 4.
Botany, Historical, V. 4.
Microscopy, VII. 2 to 6.
Photography, X. 2.
Human Anatomy, XI. 4 or 6.
Research, XII. 4 to 12.
Bacteriology, XIV. 4 to 6.
Graduate Courses.

General Biology, II. 4.
Zoology, Vertebrates, IV. 4.
Botany, Systematic, IV. 4.
Microscopy, VII. 2 to 6.
Entomology, VIII. 4 to 6.
Photography, X. 2.
Human Anatomy, XI. 4 to 6.
Research, XIII. 4 to 12.
Embryology, XV. 4 to 6.
Graduate Courses.

MATHEMATICS.

FIRST SEMESTER.

Trignometry, I. 4.
Analytical Geometry, III. 4.
Calculus, V. 4.
Elective Geometry, VI. 1.
Elective Geometry, VII. 1.
Descriptive Geometry.
History of Mathematics, XI. 2.
Surveying. 4.

SECOND SEMESTER.

Higher Algebra, II. 4.
Calculus, IV. 4.
Elective Geometry, VI. 1.
Elective Geometry, VII. 1.
Theory of Equation, VIII. 4.
Differential Equations, IX. 2.
Advanced Analytical Geometry, X. 4.
Surveying. 2.

DRAWING AND PAINTING.

Black and White Work, I. 2.
Black and White Work, II. 2.
Black and White Work, III. 2.
Black and White Work, IV. 2.
Water Color Painting, V. 2.
Water Color Painting, VI. 2
Water Color Painting, VII. 2.
Water Color Painting, VIII. 2.
Oil Painting, IX. 2.
Oil Painting, X. 2.
Oil Painting, XI. 2.
Oil Painting, XII. 2.
Design, XIII. 2.
Design, XIV. 2.
History of Architecture, XV. 2.
History of Painting, XVII. 2.
History of Sculpture, XVI. 2.
Artistic Anatomy, XVIII. 2.

PHILOSOPHY AND EDUCATION.

Descriptive Psychology, I, 4.
Experimental Psychology, II. 4.
History of Education, I. 4.
Theory and Practice of Education, II. 4.
Logic, IV. 2.
Ethics, I. 2.
History of Philosophy, II. 4.
Modern Philosophy, III. 4.

HISTORY AND ECONOMICS.

English History, I. 4.
American Constitution, II. 4.
Ancient History, III. 4.
Mediaeval History, IV. 4.
Modern European History, V. 4.
International Law, IV. 4.
Modern Economics, II. 4.
Elements of Political Economy, I. 4.

Mechanical Engineering Course.

Roman numerals Indicate courses: Arabic hours credit.

The courses in mechanical engineering are designed for students who wish to become professional engineers, or to engage in any of the lines of manufacture and construction allied to the mechanical industries.

The requirements for admission are given on page ——

The requirements for graduation from this department with the degree of B. S. in (M. E.) are set forth in the following scheme. The studies are explained in detail in the description of the Courses of Instruction.

FRESHMAN YEAR.

FIRST SEMESTER.	SECOND SEMESTER.
Trigonometry, I. 4.	Higher Algebra, II. 4.
Chemistry, I. 4.	Chemistry, II. 4.
Rhetoric, I. 4.	Rhetoric, II. 4.
Model and Object Drawing, 1. 2.	Model and Object Drawing, II. 2.
Mechanical Drawing, I. 2.	Mechanical Drawing, II. 2.
Shop Work, I. 2.	Shop Work, II. 2.

SOPHOMORE YEAR.

Analytical Geometry, III. 4.	Calculus, IV. 4.
Physics, I. 4.	Physics, II. 4.
Surveying, (6A). 4.	Surveying, (6B). 2.
Drawing, (2A) and (2B). 2.	Descriptive Geometry. 2.
Shop Work, II. 2.	Shop Work, II. 2.
	Mechanical Drawing (3). 2.

JUNIOR YEAR.

Integral Calculus, V. 4.	Differential Equations, VI. 2.
Analytic Mechanics (7). 4.	Analytic Mechanics (7). 4.
Metallurgy. 4.	Strength of Materials. 4.
Machine Design (5). 2.	Steam Engine Design. 2.
Graphic statics (6). 2.	Elec. Machinery and Construction (9A). 2.
Shop work, III. 2.	Electrical Measurements. 3.

SENIOR YEAR.

Hydrodynamics (2). 3. Thermodynamics and Theory of Steam Engine (4A). 3. Alternating Current and Alternating Current Machinery (10). 4.	Hydraulics (3). 3. Construction and Operation of Heat Engines (4B). 3. Kinematics (5A). 2. Kinematics (5B). 1. Alternating Current and Alternating Current Machinery (10). 4. Thesis (12). 4.

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 students 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.

Students entering the second semester will be furnished work by the organization of classes needed for this purpose.

Prepararatory Departments of Instruction.

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—First semester. 4.

V. GEOMETERY, PLANE, Second 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.

VII. Advanced Arithmetic. First semester. 4.

ENGLISH.

The purpose of this work as pursued in the Preparatory Department is 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 the 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 wll receive special attention. "Brooke's English Literature" will be used as an outline for this work.

The College Entrance English Requirements for 1904 and 1905 are given below.

(a) The following list of books has been selected for critical study. Shakespeare's Macbeth, Macaulay's Essay on Milton, Macaulay's Essay on Addison, Burke's Conciliation with America, Milton's L'Allegro, Il Penseroso, Comus, and Lycidas.

(b) List for reading: Shakespeare's Julius Caesar, Shakespeare's Merchant of Venice, Carlyle's Essay on Burns, Addison's De Coverley Papers, Goldsmith's Vicar of Wakefield, George Eliot's Silas Marner, Coleridge's Ancient Mariner, Lowell's Vision of Sir Launfal, Scott's Ivanhoe, Tennyson's The Princess.

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. Special attention is 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. Much collateral reading is given from time to time. Davenport's Zoology was used the past year in class recitations.

LATIN.

The following general remarks are here made to avoid unnecessary repetitions under 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 desirabe 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 coarse 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—

A First Year Latin Book Completed, comprising a complete presentation of regular forms, and the principal rules of syntax, with reading and composition for the application of these forms and rules.

SECOND YEAR—

Easy reading in Gradatim, followed by selections from Caesar.

The equivalent of four books of Caesar will usually be read.

Throughout the year lessons in Grammar and Composition will accompany the reading.

THIRD YEAR—

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

Five 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 they may begin with Course III 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 sutdy of Mediaeval and Modern History, with special 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 preparatory students intending to enter the Mechanical Engineering Course may take work in Mechanical Drawing and Shop Work, four hours per week, equally divided between drawing room and shop.

MECHANICAL DRAWING.—In the first year, instruction is given in the use and care of instruments, lettering and drawing from copy.

During the second year, drawing from copy is continued, and drawings from sketches of simple machine parts, with sections and complete dimensions.

SHOP WORK.—During the first year, a course of exercise in carpentry and wood turning is pursued, for the purpose of teaching, the use of ordinary wood working tools, and the simpler processes of construction.

In the second year, work in the wood shop is continued, the student adding to his experience by making book shelves, cupboards, and similar pieces of work. A portion of the time may be given to pattern making and foundry practice.

Courses of Study.

Classical Course.	Scientific and Literary Courses.	Mechanical Engineering Course.
	FIRST YEAR.	
Algebra. Composition and Literature Ancient History. Latin.	Algebra. Composition and Literature Ancient History. Biology (Scientific.) Latin or Biology, (Literary)	Algebra. Composition and Literature Ancient History. Arithmetic.
Algebra. Composition and Literature Ancient History. Latin.	Algebra. Composition and Literature Ancient History. Biology, (Scientific.) Latin or Biology, (Literary)	Algebra. Composition and Literature Ancient History. Civics.
	SECOND YEAR.	
Algebra. Rhetoric and Literature. Mediaeval History. Latin. Free Hand Drawing.	Algebra. Rhetoric and Literature. Mediaeval History. German. Free Hand Drawing.	Algebra. Rhetoric and Literature. Mediaeval History. Mechanical Drawing and Shop work. Free Hand Drawing.
Plane Geometry. Rhetoric and Literature. Modern History. Latin. Free Hand Drawing.	Plane Geometry. Rhetoric and Literature. Modern History. German. Free Hand Drawing.	Plane Geometry. Rhetoric and Literature. Modern History. Mechanical Drawing and Shop work. Free Hand Drawing.
	THIRD YEAR.	
Plane Geometry. Literature. Physics. Latin. Free Hand Drawing.	Plane Geometry. Literature. Physics. German. Free Hand Drawing.	Plane Geometry. Literature. Physics. Mechanical Drawing and Shop work. Free Hand Drawing.
Solid Geometry. Literature. Physics. Latin. Free Hand Drawing.	Solid Geometry. Literature. Physics. German. Free Hand Drawing.	Solid Geometry. Literature. Physics. Mechanical Drawing and Shop work. Free Hand Drawing.

Accredited High Schools.

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

"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.

. . . . . .

"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 Examination 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."

This legislation is still in force.

At the December meeting of the Board it appointed a committee "to formulate a uniform plan for accredited high schools." The committee met in Helena December 28th, 1897, and formulated a plan, and a brief outline of work for accredited high schools which was adopted at the next meeting of the State Board of Education.

"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."

This recommendation, which was adopted by the Board, became of effect in 1899, when the State Common School Course of Study was published and placed in the hands of school boards, teachers and superintendents, and it still remains in force.

In June, 1899, the State Board of Education instructed the Diploma Committee to revise the Course of Study for accredited high schools. At the December meeting the committee asked for further time, which was granted. At the regular meeting of the Board in June, 1900, the Diploma Committee reported the following outline of work which was unanimously adopted.

Program of Studies

FOR ACCREDITED SCHOOLS.

Classical Curriculum Prepares for entrance to Classical Course, State University.	*Science Curriculum* Prepares for all General Science Courses.	*English Curriculum* Prepares for all Technical Courses, and for the Normal School Professional Course.
FIRST YEAR.		
Latin. English. Algebra. General History.	English. Algebra. General History. Physiology.	English. Algebra. Physiology. General History. Word Analysis.
Latin. English. Algebra. General History.	English. Algebra. Physical Geography. General History.	English. Algebra. Physical Geography. General History. Orthoepy and Phonics.
SECOND YEAR.		
Latin. English. Algebra. General History.	German or Latin. English. Algebra. Botany or Zoology.	English. Algebra. Botany or Zoology. General History.
Latin. English. Plane Geometry. General History.	German or Latin. English. Plane Geometry. Botany or Zoology.	English. Plane Geometry. Botany or Zoology. General History.
THIRD YEAR.		
Latin. English. Plane Geometry. Physics.	German or Latin. English. Plane Geometry. Physics.	English. Plane Geometry. Physics. U. S. History .
Latin. English. Solid Geometry. Physics.	German or Latin. English. Solid Geometry. Physics.	English. Solid Geometry. Physics. Artihmetic. Civics.

LIST OF ACCREDITED HIGH SCHOOLS.

City High Schools.

City.	Superintendent.
Anaconda	J. W. Dale
Billings	C. S. Brother
Butte	R. G. Young
Forsyth	Henry V. Beeman
Glendive	F. D. Smith
Great Falls	S. D. Largent
Hamilton	Adelaide R. White
Helena	S. D. Condon
Marysville	M. Jounod
Miles City	H. P. Leavenworth
Missoula	J. G. McKay

County High Schools.

County.		Principal.
Beaverhead	Dillon	J. A. Koontz
Broadwater	Townsend	H. C. Riggs
Carbon	Red Lodge	J. M. Kay
Fergus	Lewistown	P. M. Silloway
Flathead	Kalispell	J. A. Ketcham
Gallatin	Bozeman	George B. Swan
Jefferson	Boulder	Frances Miller
Park	Livingston	Lewis Terwilliger
Powell	Deer Lodge	W. E. Eaton
Sweet Grass	Big Timber	W. C. Ryan
Teton	Chouteau	A. B. Guthrie

Graduating Class, Commencement 1904.

ACADEMIC DEGREES.

Candidates for the degree of Bachelor of Arts (Literary Group.)

Walter Hammer ..... Miles City, Mont.
Alice Herr ..... Bannack, Mont.
Georgia Evelyn Polleys ..... Missoula, Mont.

Classical Group.

Roxy Howell ..... Missoula, Mont.
George Greenwood ..... Anaconda, Mont.
Page Bunker ..... Missoula, Mont.
Moncure Cockrell ..... Deer Lodge, Mont.

GRADUATE STUDENTS.

Martin Samuel Jones, B. S. ..... Mineralogy and Chemistry ..... Missoula.
Agnes McDonald, B. A. ..... Geology and Art ..... Anaconda
George Butler Westby, B. M. E. ..... Chemistry ..... Missoula
Benjamin Duane Stewart, B. S. ..... Biology ..... Missoula
William Oscar Craig, B. S. ..... Biology ..... Missoula
Guy Sheridan, B. S. ..... Chemistry ..... Butte
Claude Moss, B. A. ..... Pedagogy, Spanish ..... Garnet

COLLEGIATE STUDENTS.

Ethel Barnes ..... 18 ..... B. S. ..... Helena
Lura Barnes ..... —..... B. A. ..... Helena
Sarah Amelia Beckwith ..... 42 ..... B. A. ..... Missoula
Anne Marie Bielenberg ..... 38 ..... B. A. ..... Deer Lodge
Jessie May Bishop ..... 80 ..... B. A. ..... Great Falls
James Henry Bonner ..... B. M. E. Sophomore ..... Missoula
Joseph Buckhouse ..... B. M. E. Sophomore ..... Fort Missoula
Maud Burns ..... 54 ..... B. A. ..... Twin Bridges
Frederick Busch ..... B. M. E. Sophoomre ..... Miles City
Page Bunker ..... 109 ..... B. A. ..... Missoula
Anna Carter ..... Freshman ..... B. M. E. ..... Chicago, Ill.
Moncure Cockrell ..... 122 ..... B. S. ..... Deer Lodge
Edwin Reed Corbin ..... Sophomore ..... B. M. E. ..... Missoula
John Henry Curtis ..... B. A. ..... Butte
William Oren Dickinson ..... 78 ..... B. S. ..... Missoula
Charles Dimmick ..... Freshman ..... B. M. E. ..... Missoula
Frederick Dion ..... Freshman ..... B. M. E. ..... Glendive
Florence Ervey ..... 84 ..... B. A. ..... Butte
Fay Gwen Evans ..... 16 ..... B. A. ..... Livingston
Mary Porter Evans ..... 32 ..... B. A. ..... Livingston
Thomas Joe Farrell ..... 26 ..... B. S. ..... Virginia City
Linda Ellen Featherman ..... 16 ..... B. A. ..... Drummond
Mary Monica Fergus ..... 8 ..... B. A. ..... Whitehall
Grace Flynn ..... 48 ..... B. A. ..... Missoula
Rufus King Garlington ..... 24 ..... B. S. ..... Missoula
Susie Garlington ..... 16 ..... B. A. ..... Missoula
Frank German ..... B. A. ..... Butte
Alice Gertrude Glancy ..... 100 ..... B. A. ..... Lewistown
Laurence Edward Goodbourn ..... 20 ..... B. A. ..... Missoula
Thomas Leo Greenough ..... Sophomore ..... B. M. E. ..... Missoula

George Greenwood .....112.....B. A. .....Anaconda
Delbert Grush .....Sophomore.....B. M. E.....Hamilton
Laura May Hamilton .....24.....B. A. .....Missoula
Walter Hammer .....112.....B. A. .....Miles City
Floyd James Hardenburg .....52.....B. S. .....Missoula
Ralph LeVerne Harman .....16.....B. A. .....Kalispell
Walter Hay .....Junior.....B. M. E.....Missoula
John Rawlinson Haywood .....Junior.....B. M. E.....Utica, Mont.
Alice Herr .....108.....B. A. .....Bannack
Gilbert Joseph Heyfron .....54.....B. A. .....Missoula
Roxy Howell .....114.....B. A. .....Missoula
Agnes Hughes .....B. S. .....Missoula
Herbert Henry Hughes .....46.....B. S. .....Missoula
Anna Josephine Hutter .....24.....B. A. .....Missoula
Elmer Reed Johnson .....26.....B. S. .....Missoula
Florence Matilda Johnson .....53.....B. A. .....Missoula
Maud Esther Johnson .....46.....B. A. .....Missoula
John Davis Jones .....48.....B. A. .....Ovando
Daisy Kellogg .....14.....B. A. .....Missoula
Nellie Mae Kellogg.....119.....B. S. .....Fort Robinson, Neb.
Avery Falkner May.....76.....B. A. .....Missoula
John McDonald .....Sophomore.....B. M. E.....Anaconda
Jennie Andrews McGregor .....16.....B. A. .....Missoula
Roy Daniel McPhail .....28.....B. A. .....New Chicago
James Mills, Jr.....Freshman.....B. M. E.....Deer Lodge
Fay Murray .....44.....B. A. .....Missoula
Alma Myers .....54.....B. A. .....Lewistown
George Wilbur Noffsinger .....16.....B. A. ..... Kalispell
Georgia Evelyn Polleys .....110.....B. A. .....Missoula
Hovey Polleys .....Sophomore.....B. M. E.....Missoula
Lulu Railsback .....18.....B. A. .....Billings
Josie May Robb .....54.....B. A. .....Hamilton
Thomas Joe Ross ..... 8.....B. A. .....Red Lodge
Anabel Ross .....32.....B. A. .....Missoula
Charles Edward Schoonover .....84.....B. A. .....Philipsburg
Blanche May Simpson .....80.....B. A. .....Stevensville
Charles Edward Simons .....71.....B. A. .....Missoula
Montgomery Smith .....Freshman.....B. M. E.....Hamilton
Georgia Bright Smurr .....21.....B. A. .....Deer Lodge
Ona Mansfield Sloane .....50.....B. A. .....Missoula
Thomas Claude Spaulding .....38.....B. S. .....Missoula
Arthur Steward .....Freshman.....B. M. E.....Butte
Joseph William Streit .....16.....B. A. .....Highwood
Margaret Summers .....34.....B. S. .....Hamilton
David Martin Trepp .....48.....B. A. .....Lewistown
Edward Martin Tucker .....12.....B. S. .....Victor
Masajiro Urase .....Sophomore.....B. M. E.....Nagasaki, Japan
Debora Wagy ..... 8.....B. A. .....Corvallis
Ray Walters .....52.....B. A. .....Missoula
Ruth Ward .....83.....B. A. .....Hamilton
Lillian Warren .....16.....B. A. .....Missoula
Alice Brown Welch ..... 8.....B. A. .....Deer Lodge
Edward Williams .....70.....B. A. .....Missoula
Florence Wood .....B. A. .....Missoula

SPECIAL STUDENTS.

Ottilie Abendrath .....Trigonometry..... Missoula
Alena Carolyn Berglund ....Lit. and Art..... Minneapolis, Minn.
Grace Conibear .....Art..... Chicago, Ill.
Ada Cramer .....Literature History .....Missoula
Marie McCormick .....Gymnasium .....Missoula
Thomas Westby .....Chemistry ..... Missoula
Charles Mitchell, U. S. A., International Law, Spanish .....Fort Missoula

Preparatory Students.

THIRD YEAR.

Ethel Ambrose .... Missoula
Ida Cunningham .... Missoula
Vincent Stuart Wiley Craig .... Missoula
Charles Dyson .... Missoula
Phoebe Aditha Finley .... Missoula
Margery Winifred Feighner .... Missoula
John Flynn .... Missoula
Harris Paul Greenough .... Missoula
Warren Earl Greenough .... Missoula
Fern Healy .....Rock Creek, Wis.
Carrie Elizabeth Hardenburg .... Missoula
Blanche Pearl Ingalls .... Missoula
Sarah Kennett .... Missoula
John Lucy .... Missoula
Henrietta Viola Longley .... Missoula
Guy Warren Mills ..... Bonner
Isabel Nina Mason .... Missoula
Herman Cole McGregor .... Missoula
Fred Andrew Mentrum .... Missoula
Dorothy Polleys .... Missoula
Eloise Spencer .... Missoula
Clarissa Spencer .....White Sulphur Springs
William Alonzo Sparks .... Missoula
Edith Antoinette Tietjen .... Missoula
Kathryn Maud Trevaille .... Missoula
Bennett Vickery .... Missoula
Victoria Violet Whitaker .... Missoula
Winifred Blanche Whitaker .... Missoula
Arthur Williams ..... Radersburg..

SECOND YEAR.

Almeda Andrews .... Missoula
Arthur Joe Butzerin .... Missoula
Walter Beck .... Missoula
Montana Buswell .... Missoula
Jay Nelson Cheatham .... Missoula
Norman Elmer Carter .... Missoula
Silas Meade Cheatham .... Missoula
Lilliam Draper .... Missoula
Ella Elizabeth Farley .... Missoula
Charles Frederick Farmer .... Missoula
Lauretta Fay ..... Mabton, Wash.
Kathryn Foster .... Radersburg

Mordy Freeborn ..... Basin
Frank Jenkins ..... Missoula
William Ernest Kranich ..... Missoula
Cladie Likes ..... Missoula
Frederick Hewitt Linley ..... Missoula
Abbon Mark Lucy ..... Missoula
Frank Lewis ..... Missoula
Norman Mix ..... Missoula
Eleanor McCall ..... Missoula
Agnes McBride ..... Superior, Mont.
Donald Bunyan McGregor ..... Missoula
Charles Simms Marshall ..... Missoula
Ralph Landers Messenger ..... Missoula
Thomas Porter Morgan ..... Missoula
Frederick Messenger ..... Missoula
Sterret Napton ..... Anaconda
Leila Noffsinger ..... Kalispell
Ethel Orvis ..... Missoula
Edgar Harwood Polleys ..... Missoula
Jessie Quist ..... Superior, Mont.
Leverett Castle Rennick ..... Missoula
Mary Francis Rankin ..... Missoula
Eva Lucile Stevens ..... Missoula
Laurence Lee Simpson ..... Stevensville
Zona Shull ..... Philipsburg
Elizabeth Pauline Schilling ..... Missoula
Allan Toole ..... Anaconda
Hazel Wallace ..... Missoula
Blanche Watts ..... Missoula
Hart Willis ..... Plains
Helen Whitaker ..... Missoula
Alice Wright ..... Missoula
Frank John Wallace ..... Missoula
Mabel Wagy ..... Corvallis
Arthur Newton Westby ..... Missoula
Lenore Elizabeth Williams ..... Missoula
Dale Ward ..... Hamilton
Elijah Watts ..... Hamilton

FIRST YEAR.

Keith Ambrose ..... Missoula
Emily Albert ..... Grass Valley, Mont.
Lulu Rosetta Barnes ..... Lewistown
Maud Elzora Bryan ..... Missoula
Howard Burton Berry ..... Billings
Raymond Cyr ..... Grass Valley
Kenneth Caine ..... Missoula
James Dingwall ..... New Chicago Mont.
Charles Finley ..... Missoula
Edna Fox ..... Twin Bridges
Lulu Fitzgerald ..... Thompson
Evelyn Heimbach ..... Missoula
Ray Hamilton ..... Missoula
Grace Holmes ..... Victor
Luther Haven ..... Missoula

John Wesley Keith ..... Missoula
Claire Kenton ..... Missoula
Louis La Chambre ..... Missoula
Helen Lombard ..... Missoula
Christie McPhail ..... New Chicago, Mont.
Corinnne McDonald ..... Missoula
David Lamar McClay ..... Lolo
Edna Louise Mentrum ..... Missoula
Louise Mix ..... Missoula
Jay Morrison ..... Missoula
Uriel Murphy ..... Garnet
Lulu Perkins ..... Quartz
Christina Quist ..... Superior, Mont.
Eva Ray ..... Bozeman
Florence Ryder ..... Missoula
Helen Ross ..... Missoula
Paul Barry Rennick ..... Missoula
Arthur Sticht ..... Missoula
Hayward Logan Shields ..... Fort Missoula
Frank Willian Svenson ..... Missoula
Kate Stillinger ..... Iron Mountain
Arthur Thompson ..... Missoula
John Howard Toole ..... Anaconda
Cecil Eugene Taylor ..... Saco, Mont.
Beatrice Wiles ..... Missoula
Cora Webster ..... Missoula
Myron Whitman ..... Missoula
Charles Martin Webster ..... Missoula
Frank Williams ..... Deer Lodge

IRREGULAR.

Ole Bakke ..... Missoula
Mattie Daigle ..... Bonita
Edgar Roe ..... Elliston
Ladelle Roe ..... Elliston
Frazer, Frederick ..... Butte
Bessie Groller ..... Bozeman
Bessie Hollenbeck ..... Missoula
Edna Kirkeby ..... Missoula
Margaret Keenan ..... Gold Creek
John Pabst ..... Missoula
Flora Pestana ..... Missoula
Gertrude Rowland ..... Missoula
Lillian Elizabeth Trump ..... Missoula
Adah Ulm ..... Toston

SUMMER SCHOOL.

Ottilie Abendrath ..... Missoula
Anna Abendrath ..... Missoula
Inez Adams ..... Butte
Ethel Barnes ..... Helena
Margerite Berry ..... Butte
Edna Cannon ..... Butte
Elmer Carter ..... Missoula
Helen Cramer ..... Missoula
Carolyne Cronkrite ..... Missoula

Jennie Devan ..... Missoula
Lillian Doggett ..... Townsend
Marie Doughty ..... Radersburg
Anna Faherty ..... Missoula
Charles Fred. Farmer ..... Missoula
Kent Fay ..... Butte
Fred Frazer ..... Florence
Mary Feeny ..... Butte
Clara Ada Folkins ..... Missoula
NelllieMay Fox ..... Deer Lodge
Catherine Gehrett ..... Missoula
Kate Goodman ..... Missoula
Alice Herr ..... Missoula
Mary Holland ..... Red Lodge
Isabel Kelly ..... Butte
Abbon Mark Lucy ..... Missoula
Agnes McDonald ..... Anaconda
Harriet McKay ..... Missoula
Fred Mentrum ..... Missoula
Edna Mentrum ..... Missoula
Beulah Morgan ..... Missoula
Cyrus Paxton ..... Manhattan, Mont.
Manor Livingston Pennell ..... Radersburg
M. F. Roark ..... Stevensville
Florence Ryder ..... Missoula
Frances Charlotte Sackett ..... Bozeman
Zona Shull ..... Missoula
Mella Spohn ..... Missoula
William Earl Stilwell ..... Missoula
Ethel Irene Stillwell ..... Missoula
John Howard Toole ..... Anaconda
Allan Toole ..... Anaconda
Della Beatrice Van Stone ..... Missoula
Mary Anna Weber ..... Pana, Ill.
Thomas Westby ..... Missoula

IN ATTENDANCE AT THE BIOLOGICAL STATION AT BIGFORK.

Edith Ricker ..... Burlington, Iowa
Charlotte Cahoon ..... Butte
Herbert Silloway ..... Lewistown
Thomas Claude Spaulding ..... Missoula
Avy Short ..... Butte
Walter Lehman ..... Lewistown
Gertrude Norton ..... East Helena
Nelle Manning ..... Butte
James A. Fossum ..... Bigfork
O. H. Barnhill ..... Holt
Claude McAllister ..... Kalispell
Mary Elrod ..... Missoula
Vincent Craig ..... Missoula
Winnie Miles ..... Corydon, Iowa.
Nathaniel Alcock ..... Yankton, S. Dakota
F. M. Fultz ..... Burlington, Iowa
Mrs. F. M. Fultz ..... Burlington, Iowa

George Ricker ..... Des Moines, Iowa
Pearl Ricker ..... Des Moines, Iowa
James Hamilton ..... Missoula
Emma Hamilton ..... Missoula

SCHOOL OF MUSIC.

Evaro Avery ..... Missoula
Sadie Beckwith ..... Missoula
Bernice Berry ..... Missoula
Clara Bishop ..... Great Falls
Ora Broulette ..... Missoula
March Broulette ..... Missoula
Eva Coffee ..... Missoula
Florence Chandow ..... Missoula
Grace Corbin ..... Missoula
Hilda Dunstan ..... Missoula
La Delle Edgar ..... Elliston
Florence Ervey ..... Butte
Mary Elrod ..... Missoula
Linda Featherman ..... Drummond
Florence Foster ..... Missoula
Edna Fox ..... Twin Bridges
George Greenwood ..... Anaconda
Alice Hathaway ..... Missoula
Agnes Hughes ..... Missoula
Blanche Ingalls ..... Missoula
Ruth James ..... Missoula
Daisy Kellogg ..... Missoula
Bernice Kemp ..... Missoula
Gertrude Lynch ..... Missoula
Tracy Holmes ..... Chicago, Ill.
Mabelle Michand ..... Missoula
Alma Myers ..... Missoula
Agnes McBride ..... Superior, Mont.
Ethel Orvis ..... Missoula
Helen Orvis ..... Missoula
Mrs. Patton ..... Missoula
Mary Rankin ..... Missoula
Marjorie Ross ..... Missoula
Lulu Rathbon ..... Missoula
Gladys Roberts ..... Missoula
Florence Ryder ..... Missoula
Elizabeth Schilling ..... Missoula
Clarissa Spencer ..... White Sulphur Springs
Bessie Stoddard ..... Missoula
Zona Shull ..... Missoula
Kate Stillinger ..... Iron Mountain, Mont.
Mrs. Sliter ..... Missoula
Maysie Taylor ..... Missoula
Helen Van Leuren ..... Missoula
Ethel Wilkinson ..... Missoula

SUMMARY OF ENROLLMENT.

Post Graduate	7
Collegiate	84
Special	7
Third Preparatory	29
Second Preparatory	50
First Preparatory	46
Irregular Preparatory	14
Summer School	45
Biological Station	22
School of Music	46
	350
Counted Twice	37
Net Total	313

Register of the Alumni, University of Montana.

1898.

Mrs. Ella Robb Glenny, B. A.,
Missoula, Montana.

Miss Eloise Knowles, B. Ph.,
Instructor in Drawing, University of Montana, Missoula, Montana.

1899.

Earl Douglass, M. S.,
Director Carnegie Museum, Pittsburg, Pennsylvania.

Zoe Bellew, B. A.,
Teacher in Missoula, Montana, Public Schools.

Anna Louise Hathaway, B. A.,
Instructor in Rhetoric, University of Montana, Missoula, Montana.

Helena McCrackin, B. A.,
Teacher in Hamilton, Montana High School.

George Hempstead Kennett, B. S.,
Physician, Presbyterian Hospital, Chicago, Illinois.

Charles Pixley, B. S.,
Physician, Missoula, Montana.

1900.

Eben Hugh Murray, B. A.,
Superintendent Moscow, Idaho Public Schools.

Gertrude Buckhouse, B. S.,
Librarian University of Montana, Missoula, Montana.

Caroline Harrington Conkrite, B. S.,
Teacher, Missoula, Montana, Public Schools.

Lu Knowles, B. S.,
Medical Student Johns Hopkins' University, Baltimore, Maryland.

Sidney Elery Walker, B. S.,
Law Student Ann Arbor, Michigan.

Charles Earle Avery, B. Ph.,
Lawyer, United States Land Office, Missoula, Montana.

Percy Shelley Rennick,
Medical Student, University of Kentucky.

1901.

Sue Lewis, B. A.—(Mrs. Thompson),
St. Louis, Missouri.

Mary Lewis, B. A.,
Teacher, Missoula, Montana, Public Schools.

Estelle Bovee, B. Ph.,

Bertha Simpson, B. Ph.,
Teacher, Missoula, Montana, Public Schools.

Sidney Mire Ward, B. Ph.,
Hamilton, Montana.

Kathryn Wilson, B. Ph.,
Seattle, Washington.

Hugh Graham, B. S.,
Eureka, California.

Lydia Jimmie Mills, B. S.,
Missoula, Montana.

George Cutler Westby, B. S., M. E.,
Chief Chemist, Washoe Smelters, Anaconda, Montana.

1902.

Helene Kennett, B. A. (Literary),
Missoula, Montana.

Fannie Maley, B. A. (Literary),
Teacher Hamilton, Montana, Public Schools.

George Barnes, B. A. (Classical).
Minister, Helena, Montana.

Helena La Caff, B. A., (Classical)
Teacher, Hamilton, Montana, Public Schools.

Agnes McDonald, B. A., Classical)
Anaconda, Montana.

Helen McPhail, B .A., (Classical)
Teacher, New Chicago, Montana.

Katherine Ronan, B. A., (Classical)
Teacher, Butte, Montana, Public Schools.

Margaret Ronan, B. A., (Classical)
Teacher, Missoula, Montana, Public Schools.

Pearl Scott, B. A., (Classical)
Teacher, Phillipsburg, Montana High School.

Edith Watson, B. A., (Classical)
Teacher, Red Lodge ,Montana, Public Schools.

William O. Craig, B. S.,
Deputy Clerk, Supreme Court, Helena, Montana.

Homer McDonald, B. S.,
Assayer, Great Falls, Montana.

Jeannette Rankin, B. S.,
Missoula, Montana.

Guy Sheridan, B. S.,
Assayer, Butte, Montana Reduction Works.

Benjamin Stewart, B. S.,
United States Topographical Survey.

Frederick Anderson, B. S., M. E.,
Werdburg Engine Works, Milwaukee, Wisconsin.

Harold Blake, B. S.,
Machinist Draftsman, Washoe Smelter, Anaconda, Montana.

Grant McGregor, B. S.,
Power House Draftsman, Anaconda, Montana.

1903.

Mabel Jones, B. A., (Literary.)
Missoula, Montana.

Lillian F. Jordan, B. A. (Literary).
Glendive, Montana.

Rella Likes, B. A., (Literary).
Teacher, Frenchtown, Montana.

Lucy Likes, B. A. (Literary).
Teacher, Whitehall, Montana, Public Schools.

Claude O. Marcyes, B. A., (Literary)
Forsyth, Montana, Merchant.

Ida G. Rigby (Deceased) February 19, 1904, B. A., Literary,
Carlton, Montana.

Mrs. Charles E. Avery, B. A., (Classical)
Missoula, Montana.

Miriam Hatheway, B. A., (Classical)
Tacoma, Washington.

Harriet L. Rankin, B. A., (Classical)
Missoula, Montana.

Martin Jones, B. S., P. G.,
Instructor in Preparatory, University of Montana, Missoula, Montana.

Wellington Rankin, B. S.,
Student at Harvard.

Eloise Rigby, B. S.,
Teacher, Hamilton, Montana.

Leslie Sheridan, B. S., in (M. E.)
Butte, Montana.

HONORARY DEGREES CONFERRED.

1901.

Ex-United States Senator Thomas H. Carter, L. L. D., Helena, Mont.

1902.

His Excellency, Jos. K. Toole, L. L. D.,
Governor of Montana, Helena, Montana.

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.

Branches of the Y. M. C. A. and of the Y. W. C. A. are organized, are prosperous and give promise of effective work along educational and social lines.

The Philharmonic Society has charge of students' musical organizations. Two Glee Clubs are under its direction. The Orphea is composed of young women and is directed by Mrs. Blanche Whitaker. The Young Men's Glee Club is directed by Mr. George Greenwood. Both organizations are in a flourishing condition and have provided good music for University events during the year. These clubs furnish a splendid opportunity for all students who have musical talent to cultivate it as well as to participate in the social pleasures pertaining to such organizations.

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; in 1900 to Eben Hugh Murray; in 1901 to Kathryne Wilson; in 1902 to George E. Barnes; in 1903 to Corliss P. Hargraves; in 1904 to Gilbert J. Heyfron.

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 Tibault. In 1899 the first prize was won by Gilbert Heyfron, and the second by William Dickinson. In 1900 the first prize was won by Laurens Lind Hechler, and the second by Washington J. McCormick. In 1901 the first prize was won by Elmer Woodman and the second by Mildred Corbin. In 1902 the first prize was won by Lillian Warren and the second by Lucia M. Mirrieles. In 1903 the first prize was won by Blanche Ingalls and the second by Anna Hutter.

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

THE STATE ORATORICAL ASSOCIATION.

This assocation was organized in 1900. The institutions represented are the Montana Wesleyan University, the Montana College of Agriculture and the Mechanics Arts and the University of Montana. The purpose of the association is to promote the interest of work along oratorical lines.

The contest in 1900 gave first place to Laurens Lind Hechler the representative from the University, and that of 1901 gave first place to Mr. Farris, the representative from the College of Agriculture and Mechanic Arts. In 1902 the honors were won by George E. Barnes of the University, in 1903 by Corliss P. Hargraves of the University, and in 1904 by Gilbert J Heyfron of the University.

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, 1900, 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.

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 some 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 ..... George Greenwood
Literary Editor ..... Fay Murray
Literary Editor ..... John Jones
Local Editor ..... Evelyn Polleys
Exchange Editor ..... Roxy Howell
Business Managers..... Lawrence Goodbourne, Delbert Grush

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 has been 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 3,312 feet above sea level. This has now been corrected by the survey brought in from the Pacific Ocean whereby the corrected height of 3,323 feet is estab-

lished. The triangulation party has established a bench mark on the campus, with stone piers making the meridian line, giving the latitude and longitude accurately determined, and these marks will no doubt be starting points for future work.

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. The details of the management are in the hands of the Board of Directors of the Athletic Association. Regular gymnasium classes have been organized during the past year, one of young men and one of young ladies. The class of young men have exercises with the dumb bells, Indian clubs, punching bag, etc., together with seventeen "setting up" exercises and military drill. The class of young ladies are drilled with the dumb bells, Indian clubs, free arm exercises, wands and general calisthenics. This has been made possible by one of Missoula's citizens, Mr. C. H. McLeod, who has very kindly equipped the gymnasium with parallel and horizontal bars, trapeze and swinging rings, chest weight machines, and Whitely exerciser, vaulting horse, punching bag, boxing gloves, fencing foils, Indian clubs, dumb bells, wrist and finger machines, and a 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 athletic field, located in the northwest corner of the Campus is now in excellent condition. A quarter of a mile running track is nicely finished, and the entire field has been well scraped and leveled. Within this track there is located the base ball diamond and the foot ball field. To the south are the tennis courts.

The general sports indulged in are foot ball, basket ball and base ball, together with the indoors and out doors field sports.

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 12 hours per week of recitations or lectures 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 schoos or colleges unless the latter conform to the same requirement for study.

Third. At least four days before the departure of University teams to play with school and college teams elsewhere, and also four days before games with such teams on the home grounds a list of the students from which names are to be selected for University teams, must be presented by managers to the Faculty for consideration and approval.

The University is a member of the Northwest Intercollegiate Athletic Association. The other members of this association are: University of Washington, University of Oregon, University of Idaho, Montana Agricultural College, Washington Agricultural College, Oregon Agricultural College and Whitman College. The purpose of this association is to regulate athletic contests among the colleges constituting its membership.

The following rules as to eligibility of contestants have been adopted:

Division II—Rules of Eligibility—Article I—Bona fide students—Sec. 1—No one shall participate in any collegiate contest unless he be a bona fide student carrying work of 12 credits or recitation hours in a regular or special course as defined in curriculum.

Sec. 2. No student shall be allowed to participate in any intercollegiate contest who has failed to pass on any regular college work which has been assigned to him, until such work has been made up.

Sec. 3. No person having been a member of a college athletic team during any year, and having been in attendance in his institution less than one-half of the preceding college year, shall be permitted to play in any intercollegiate contest thereafter until he shall have been in attendance one-half a college year.

Sec. 4. No student who has represented one institution in any intercollegiate contest shall be allowed to represent another institution during the following year.

Sec. 5. No student registering after the 15th of October shall be eligible to play in any intercollegiate football contest.

Sec. 6. No student registering after the 15th of February shall take part in any intercollegiate contest held during the remainder of that year.

RULES ON AMATEURS.

Articles II—Amateurs—Sec. 1. No person shall be allowed to compete in athletic contests of this association who is not an amateur.

Sec. 2. An amateur is a person who has never competed for money, or under false name, or with a professional for a prize, or with a professional where gate money is charged, nor has at any time taught, pursued or assisted at athletic exercises for money or for any valuable consideration.

Sec. 3. Nothing in this definition shall be construed to prohibit the competition between amateurs for medals, cups or prizes other than money. It is hereby expressly declared that this definition is to be retroactive.

Sec. 4. Nothing in this article shall be construed to prohibit the ac-

ceptance by any amateur of his necessary traveling expenses incurred as referee, judge, umpire, scorer or starter, in going to and from the place of any amateur contest.

EVIDENCE OF PROFESSIONALISM.

Sec. 5. The disposing of any medal, cup or prize for a consideration shall be considered evidence of professionalism.

Sec. 6. The governing board shall have the power to restore to amateur standing any person who has violated the letter of these rules, but who, in their judgment, is not a professional by the spirit of these rules.

ARTICLE III.—Four year rule—Section 1. No student shall take part in athletic exercises between institutions represented in this association for more than four years. It is understood that this rule shall not go into effect until September 1, 1904.

FEES AND DEPOSITS.

Preparatory, or any College Course, per year (Matriculation fee), payable at entrance	$10.00
Athletic fee, per semester	1.00
Physical apparatus (deposit) per semester	3.00
Chemistry I and II—Chemical apparatus (deposit per semester	7.50
Chemistry III—Qualitative apparatus (deposit) per semester	6.00
Chemistry IV—Quantitative apparatus (deposit) per semester	6.00
Chemistry V and VI—$10.00; each additional hour	2.00
Chemistry IX and X—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
Photography	5.00

EXPENSES.

The Woman's Hall on the campus is a new building, well furnished, lighted and heated. Room and board is furnished for $18 per month, board for $15 per month or $3.75 per week. Rooms are for ladies only, but all students may board at the Hall.

Students not accommodated at the Hall 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 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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