The University of Arizona.

Seventh Annual Register, 1897-98

Announcements for 1898-99.

Tucson, Arizona, 1898.
The University of Arizona.

Seventh Annual Register, 1897-98

...with...

Announcements for 1898-99.

Tucson, Arizona,

1898.

For Table of Contents see end of register.
CALENDAR 1898-99.

1898.

September 19 and 20, Entrance Examinations at University Monday and Tuesday
September 21, Wednesday Registration Day
September 22, Thursday Recitations Begin
November 24 and 25, Thursday and Friday Thanksgiving Recess
December 22, Thursday First Term Ends

1899.

January 3, Tuesday Recitations Resumed
February 2, Thursday First Semester Ends
February 3, Friday Arbor Day
February 6 Second Semester Begins
March 17, Friday Second Term Ends
March 21, Tuesday Third Term Begins
May 30, Tuesday Decoration Day
May 31, Wednesday Recitations End
June 1, Thursday Commencement Day
BOARD OF REGENTS.

Ex-Officio.

Hon. Myron H. McCord, Governor of Arizona
Hon. Albert P. Shewman, Superintendent of Instruction

Appointed by the Governor.

Hon. Louis C. Hughes, A. M., Chancellor, Tucson
John H. Martin, Secretary, Tucson
Merrill P. Freeman, Treasurer, Tucson
William V. Whitmore, A. M., M. D., Tucson
MILLARD MAYHEW PARKER, A. M.,
President, and Professor of Civics.

WILLIAM PHIPPS BLAKE, Ph. B., A. M.,
Professor of Geology, Metallurgy, and Mining. Director School of Mines.

JAMES WILLIAM TOUMEY, B. S.,
Professor of Biology, Acting Director, Botanist and Entomologist, Agricultural Experiment Station.

LIEUT-COL. NATHAN HALE BARNES,
[Lieut. U. S. Navy, Retired.]
Professor of Civil and Hydraulic Engineering. Commandant of Cadets. Irrigation Engineer and Meteorologist Agricultural Experiment Station.

HOWARD JUDSON HALL, A. B.,
Professor of English. Librarian.

ROBERT HUMPHREY FORBES, M. S.,
Professor of Chemistry. Chemist Agricultural Experiment Station.

JOHN ALEXANDER ROCKFELLOW, A. M.,
Professor of Mathematics. Principal of Preparatory Department.

SHERMAN MELVILLE WOODWARD, A. M.,
Professor of Physics and Mechanics.

FRANK YALE ADAMS, A. M.,
Professor of Ancient and Modern Languages.

FRANK NELSON GUILD, B. S.,
Professor of Mineralogy.
UNIVERSITY OF ARIZONA.

ANDREW J. McCATCHLE, A.M.,
Professor of Agriculture and Horticulture.

MRS. MARY BERNARD AGUIRRE,
Instructor in History and Spanish.

CLARA MAY RUSSELL,
Instructor in English Branches, Elocution, and Physical Culture.

MRS. EMMA MONK GUILD,
Instructor in Preparatory Department.

MONTFORD MENDEHALL,
Instructor in Commercial Branches and Stenography.

HERBERT BROWN,
Curator of Territorial Museum.

MRS. IMOGEN LA CHANCE,
Matron of Dormitory.

Announcement of Additions to Faculty for 1898-99.

C. S. PARSONS,
Director of Agricultural Experiment Station. Irrigation Engineer.

FRANK E. WINSLOW,
Principal Preparatory Department. Governor of the Barracks.

MARGARET BAIRD RANDAL,
Vocal and Physical Culture, Elocution, English, Assistant Matron.
The University of Arizona is located near Tucson, the county seat of Pima county, and one of the largest towns in the territory.

Tucson is on the main line of the Southern Pacific railway, 312 miles west of El Paso, Texas, and 500 miles east of Los Angeles, Cal. It is easily reached from east and west without change and has railway connections with the central and northern portions of the territory via Maricopa, and with north-eastern states via Deming. The town lies in a broad, flat valley, at an elevation of 2,400 feet above sea level, and is surrounded by mountains. Its dry, healthful situation with its mild and equable climate have made Tucson a famous health resort, particularly for pulmonary patients.

The winter climate is especially good. Its temperature is cool and strengthening without being severe. The lowest temperature recorded during the average year is about 20 degrees above zero, Fahrenheit. But little rain falls during the winter; fogs are unknown; cloudy days are rare, the percentage of sunshine throughout the winter being greater than that recorded at any other place in the United States. In the summer the temperature ranges high, but the dry heat of this region differs greatly from the moist and oppressive heat of the eastern and gulf states. Owing to the extreme dryness of the air the highest temperatures known are less oppressive to the senses, and less dangerous to the health, than the summer heat of the upper Mississippi valley states.

The total amount of rainfall averages less than twelve inches. Of this amount fully one-half falls during July and August; yet the amount is so small as not to materially increase the atmospheric humidity, and the summers are found to be remarkably healthy. In general the climate may be described as well suited to nearly all people, but is particularly beneficial to the young, and to those who cannot endure with comfort or safety the extremes of temperature and the sudden changes of northern climates.

The University was established by an act of the Terri-
torial Legislative Assembly passed in 1885. A tract embrac-
ing forty acres of land lying just outside the city limits was
selected as a site and was donated by the citizens of Tucson.
A contract for erecting the main building was let in October,
1887, but owing to financial delays the building was not
opened to students until October 1, 1891. The site selected is
upon high ground about a mile from the business center of
the city. On every side it commands a view of mountain
scenery of remarkable extent and grandeur. The location
cannot be surpassed for healthfulness. The University pos-
sesses its own water system. The supply is drawn from a well
on the premises one hundred feet deep, and is of unusually
good quality.

BUILDINGS.

The main building is two hundred by one hundred five
feet, two stories in height, the lower story of gray stone, the
upper of red brick, and is completely surrounded by a wide
two-story veranda. This building contains the offices, recita-
tion rooms, laboratories, and apparatus rooms of the various
departments; an assembly room, the libraries of the University
and Experiment Station, and the Territorial Museum. Ad-
joining the main building is the mining annex, eighty by
sixty feet, filled with metallurgical machinery, while near by
is a new brick building erected especially for the work in as-
saying.

Three cottages have been built. They are of brick, two
stories in height, and were intended to accommodate each two
families. They were originally designed as homes for instruc-
tors, but owing to the pressure for accommodation for students
on the University grounds, two of the cottages have been con-
verted into homes for young ladies and furnish excellent
accommodations for twenty-five persons, while the third is
used as a residence for the president.

A dormitory built of a fine quality of gray stone, two
stories in height, has been provided as a home for male stu-
dents. It contains a students' dining room, kitchen connect-
ed therewith, and twenty rooms, each large enough to accommodate two students.

Other buildings are the boiler house, which also contains the well and pumps whereby the water supply for irrigation and general purposes is obtained; the new greenhouse, eighty by twenty-one feet, built wholly of glass; the old greenhouse, now used as a propagating house, also of glass; the cottage occupied by the assistant horticulturist; and a temporary wooden building used as a young men's dormitory. It is expected that in the near future the University will be able to add another wing to the stone dormitory, nearly doubling the present dormitory accommodations, and thus relieving the pressing demands in that direction.

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EQUIPMENT.

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LIBRARY.

The Library is a department of the University that is increasing in efficiency with the growth of the institution. The books have been selected with great care, with a view both to the requirements of the various departments of instruction and also to the building up of a well-balanced, symmetrical collection of books. All the works are new and standard. The scientific works represent the highest and latest authority while the literary and historical departments contain only the best known and most thoroughly tried authors. A main object in making the selection has been to furnish students with books of the highest class and to encourage them in habits of careful reading. Complete bound sets of the leading American periodicals are being collected every year, so that the library is already valuable as a means of research in present-day problems.

The latest editions of the best cyclopaedias and dictionaries are constantly at the students' disposal. The leading American scientific and literary publications as well as the territorial newspapers are found in the reading room.

Aside from government publications and pamphlets the
library contains 3,100 bound volumes of which 800 have been added during the present year. Of the whole number about three-fifths are scientific works, the remainder belonging to general literature, biography, and history.

A complete card catalogue of authors and titles is maintained.

**CHEMISTRY.**

The chemical laboratories are two in number. The smaller one on the upper floor of the main building is for the use of students and is equipped for teaching the theory and practice of chemical science. The room for laboratory work is well lighted, provided with gas, water, working desks, ventilating hoods, an abundance of apparatus, and chemicals with which to carry on experimental work, and can be made to accommodate about twenty-four students. Adjoining the large room is a small store room stocked with apparatus for demonstrating the principles of chemistry and containing well selected collections of chemical substances.

The Experiment Station laboratory occupies three large working rooms and two small store rooms on the lower floor of the main building. This laboratory is devoted to analytical work and chemical investigations relating to the agricultural interests of the territory. It is excellently equipped for the special lines of investigation in which it is engaged, and although not primarily intended for the use of students, it has educational value to those who desire to witness the operations of a working laboratory. The equipment includes chemical balances, chemical apparatus and supplies, machinery for preparing samples, and special appliances for the analysis of milk, agricultural products, tanning materials, and soils.

**BIOLOGY.**

The biological laboratories occupy three rooms in the south-west half, second floor of the south wing of the main building. These rooms are piped for gas and water and liberally provided with apparatus for research and for giving instruction on biological subjects. Students pursuing histological work are provided without expense with simple and
compound microscopes, as the nature of their work demands. The laboratory is equipped with microtomes, culture baths, oven and other accessories used in modern methods of research.

An herbarium, containing nearly ten thousand sheets of plants, mostly indigenous to the south-west, a large percentage being from Arizona, is an important factor in the equipment. Some fifty cases of insects, including one large cabinet, is of value in giving instruction in entomology and to illustrate the economic insects of Arizona. The work in general and systematic zoology is greatly facilitated by the Herbert Brown collection of birds, and by other zoological material which has been brought together during the past five years.

To aid in the study of human and comparative anatomy and physiology there are provided articulate and disarticulate human skeletons, plaster and papier-mâché models of the important organs, and microscopical preparations illustrating the structure of the various tissues. The equipment also includes special apparatus for use of advanced students in this department.

**AGRICULTURE.**

Two rooms upon the first floor and near the central part of the main building are used for the work in the study of agriculture and for the Agricultural Experiment station headquarters. The equipment is quite complete. There have been imported from Europe several of the best Azoux models of portions of the domestic animals, showing normal and morbid conditions; also several cases of products of the vegetable kingdom. A very large collection of garden and farm seeds has been secured and arranged in jars and properly labeled. There is also a selection of garden tools, and instruments used in veterinary surgery. Recently there has been imported from Germany a collection of charts illustrating the anatomy and physiology of some of the fruits and grains. Specimens of the best fruits, grains, and other farm products are constantly received for examination; also specimens of an abnormal nature.

The old green-house, about fourteen by twenty feet in area, is used as a propagating house, and a new one has just
been built, twenty-one by eighty feet in size, constructed of glass throughout. Laboratory work is provided for in these green-houses, and in field work upon the University grounds. The general library contains many of the standard and most valuable of the recent publications upon agriculture in its various branches, and the science upon which it is based. All the bulletins and reports of the experiment stations of the United States and foreign countries are on file in the station library, and the principal agricultural and horticultural journals are upon the table of the reading room.

**CIVIL AND HYDRAULIC ENGINEERING.**

Recognizing the fact that the first actual engagement secured by the civil engineering student will be either in the field with a surveying party or in the drafting office, the equipment of this department has been chosen with a view to developing the highest skill in these fundamental lines of work. Already liberal, it is constantly being enlarged. It embraces surveyors’ and engineers’ chains; standard field and pocket tapes; plain and solar compasses and transits; engineers’ levels; stadia, level and transit rods; aneroid barometers; odometers; pedometers; automatic water registers; hook gages; three forms of current meters; stop-watch; meteorological instruments; drafting instruments; mechanical calculators; blue print apparatus; a four and one-fourth inch astronomical telescope with equatorial mountings and accessories; celestial sphere, etc.

In addition to the large number of technical books and periodicals contained in the general library, this department possesses a considerable number of valuable reference works concerning its special lines of investigation.

**MINING AND METALLURGY.**

The Department of Mining and Metallurgy is well equipped for giving both theoretical and practical instruction in the arts of mining, metallurgy, and assaying in all its branches.

Attached to the main building is an annex or mill, con-
taining machinery and appliances for crushing, sampling, concentrating, amalgamating, leaching, chloriding, cyaniding and the electrical treatment of various kinds of ore in large or small lots. Power is furnished from a seventy horse-power boiler, detached from the main building, the steam being carried under-ground to the engine-room, which contains a thirty-five horse-power engine, built by the Walburn-Swenson Manufacturing Co., of Fort Scott, Kan., and a sixteen horse-power Westinghouse automatic engine, the latter being used for running the dynamo.

The mill building has a storage capacity for ore of fifty to one hundred tons. From the bins the ore passes to the crushing floor above. A seven inch by ten inch Blake crusher is used for coarse crushing, and a Dodge crusher for finer work. Beneath the Blake crusher is a set of fourteen-inch by twenty-inch Cornish rolls, from which the ore passes by a conveyor to the main elevator, which carries it up thirty-one feet to the top of the mill. By means of slides and chutes the crushed ore may be sent at will to various machines to be tested by different methods. For concentration there are provided revolving sizing screens giving facilities for preparing six sizes, besides hydraulic separators for classifying slimes into three grades. The coarser sizes may be worked upon full sized jigging machines of the Hartz pattern, the finer sizes being jigged upon slide motion machines, and the slime being worked upon a double Rittinger percussion table, or otherwise as desired. A small apparatus, run by an electric motor, is also provided for dry concentration. Amalgamation tests may be made upon a working scale by different methods, including plates and riffles, pans and settlers, etc. A five stamp gold mill with silvered plates and aprons of the latest and most approved construction, by Fraser & Chalmers, of Chicago, has recently been added to the mill, thus permitting the working of free-milling gold ores by the usual methods and on a large scale. Several lots of ore have been successfully worked and returns made in gold bullion, thus familiarizing the mining students with all the details of feeding, stamping, cleaning up, retorting, smelting, and assaying.

In addition to the five stamp mill a smaller prospecting mill of three stamps has been added so as to work small lots
of ore from 100 to 200 pounds. A sampling mill permits of rapid crushing and mixing large samples preparatory to assaying.

Above the engine room is a seventy-five light Mather incandescent dynamo, from which six circuits are distributed to different parts of the University building. Of these, two circuits are for lighting purposes; one extends to the hoisting motor; another to the motor which runs the concentrating machinery; another circuit to the fan motors used for ventilating purposes; and the sixth goes to the storage batteries which provide current for electrolytic work in the assay laboratory.

The assay laboratory is equipped with assay furnaces for crucible work, for scorifying and cupelling, and for retorting mercury from amalgam. An adjoining room, supplied with water, gas and electric current, has a roomy hood for work involving fumes, with tables and desks for student work, besides all needed appliances for assaying by dry and wet methods including electrolysis.

The laboratory also has desks and fittings for the chemical work required in the metallurgical and mineralogical investigation and analysis of ores, mineral fertilizers and qualitative tests of minerals.

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MECHANICAL ENGINEERING AND PHYSICS.

Three large rooms in the basement of the main building are set apart for the teaching of physics.

The facilities for experimental demonstration of all important phenomena are very complete. The lecture room is fitted with shutters, so that it can be instantly darkened. A beam of sunlight, directed by a very fine clock heliostat outside, may be thrown steadily across the lecture table for experiments on light, or used in connection with the solar lantern for a variety of other work. The lecture table is supplied with gas, water, electric currents from primary and storage batteries, and from the large dynamo.

Adjacent to the lecture room is the apparatus room where are kept the many instruments owned by the University,
among which may be mentioned: An Atwood's machine; Kater’s pendulum; whirling table; many balances; barometers; an air pump and accessories; a hand dynamo; a 75-light Mather dynamo (not in apparatus room); motors; six storage cells; a large number of primary batteries; induction coils; Deprez-D'Arsonval tangent, and sine galvanometers; rheostats; Wheatstone’s bridges; a fine testing set; a Wimshurst electric machine; Leyden jars; Geisslers and Crooke’s tubes; diapasons; a sonometer; lenses, prisms, and mirrors of all kinds; a polariscope; steam gauges; indicators; calorimeters; and other apparatus, costing in all over $3,000.

Both these rooms open into the large physical laboratory, where the students verify for themselves the laws set forth in text-books and lectures.

REQUIREMENTS FOR ADMISSION, ETC.

Applicants for admission to any department of the University will be required to furnish satisfactory evidence of good moral character, and of honorable dismissal from the schools with which they were last connected.

For admission to the freshman class, applicants must be at least sixteen years of age and must pass satisfactorily examinations in subjects sufficient to give nine credits as described below. One study pursued satisfactorily for one year, one period a day, as ordinarily taught in high schools entitles a student to one credit. The subjects upon which examinations must be passed and the credits assigned, are:

Mathematics, including arithmetic, algebra, and plane geometry—3 credits.

English—2 credits.

History and Civics—1 credit.

Elementary Science—1 credit.

Latin, German, or French—1 credit.

Advanced Science—1 credit.

The scope of work required in the various subjects is indicated below.

Mathematics—Arithmetic, entire, including the metric
system; Algebra, through quadratic equations, including factoring, the greatest common divisor, and the least common multiple, as treated by Wentworth or Wells; Geometry, all of plane. (Wentworth or Wells.)

**English**—A competent knowledge of the elements of English grammar, composition, the elements of rhetoric, and the following English classics or acceptable equivalents: Longfellow's Evangeline; Irving's Sketch Book; Scott's Ivanhoe and Lady of the Lake; Whittier's Snow-Bound; Shakspere's Julius Caesar and Merchant of Venice; George Eliot's Silas Marner.

**History**—Ancient, Mediaeval and Modern. (The textbook in use in the preparatory department is Meyers' General History.) United States History and the Science of Government.

**Elementary Science**—Geography, political and physical, as included in "Frye's Complete Geography;" Physics, as much as is contained in "Gage's Introduction to Physical Science." Note books covering such laboratory work as has been performed by the student should be presented for examination.

**Latin**—As comprehended in "Collar & Daniels' Beginner's Latin Book" or an equivalent.

**Advanced Science**—One year's creditable work in biological science, or chemistry, or physics, at least one-half of which has been laboratory work, the quality and scope of which must be shown by the original laboratory note books.

Beginning with September, 1898, the entrance requirements will be increased to twelve credits, including:

- Latin or German or French or Advanced Science—2 credits.
- Drawing and Manual Training, or additional text-book subjects—3 credits.

If any language is offered it must be to the extent of two credits, as a single year's study of a language is not considered to have sufficient educational value to be entitled to credit.

Students from other institutions of equivalent rank may be admitted to the higher classes upon the presentation of properly authenticated certificates, showing clearly to the satisfaction of the faculty that they are qualified to proceed with such work.
Arrangements have been made with the Arizona Territorial Normal School, at Tempe, whereby students from that institution may have their record transferred to the books of the University with full credit, upon presentation of a certificate duly signed by the principal. Students of this University may also obtain the equivalent privilege at the normal school by presenting the proper certificate of standing signed by the president.

The faculty desires to establish such relations with high schools and other educational institutions as will enable it to accept their certificates without question. To this end presiding officers are respectfully requested to correspond with the president.

**REGISTRATION OF STUDENTS.**

All students are required to register on registration day at the beginning of the year in the president's office. A matriculation fee of $5.00 is required of all students. Each will receive a card indicating the classes which he or she is to attend, and a receipt for the matriculation fee, when paid. No class card will be issued until all dues are paid. No change in registration can be made without the consent of the faculty.

Permission of the faculty is necessary to register at any time after registration day.

No student shall be permitted to register in the spring term of the senior year as a candidate for a degree who has not previously made up all failures and "conditions" in subjects required for the degree.

**TERM RECORDS.**

The class standing of each student is determined by the instructor in charge. The method of ascertaining the student's term record is left to the instructor, and his report in all cases is final.

**MONTHLY REPORTS OF STUDENTS.**

Reports of standing in classes are regularly sent each month to parents and guardians from the president's office. Those to whom these reports are addressed are urgently requested to examine each with care and to spur up delinquent students, or commend those who are diligent, as the case may
be. Without such hearty co-operation, good results cannot be anticipated.

FACULTY MEETINGS.

Regular meetings of the faculty are held weekly.

Students' individual petitions must be in the hands of the president before the hour of faculty meeting in order to receive attention the same week. Petitions from classes, or from any two or more students will not be acted upon by the faculty unless presented in writing to the president at least two days before the meeting at which action is desired.

DISCIPLINE.

It is understood that students enter the institution with serious purposes and that they will cheerfully conform to such regulations as may be made by the faculty. It is the aim of the faculty to maintain a high standing of integrity and a strict regard for truth. Any attempt on the part of a student to present as his own the work of another, or to pass any test or examination by unfair means is considered a most serious offense. Any conduct harmful to the moral standing of the school will, after due admonition, render a student liable to dismissal.

THE HUGO ZECKENDORF PRIZES.

A gold medal and a silver medal have been offered as prizes by Mr. Hugo Zeckendorf, of Tucson, on the following conditions:

1.—The Senior student who presents the best essay upon some subject relating to the duties of citizenship, will be awarded the gold medal.

2.—The student who maintains the best class record throughout the Junior year will be awarded the silver medal.

Both awards are subject to the regulations of the University Faculty.

The awards of these prizes on Commencement Day, 1897, were:

The Gold Medal, for the best Senior essay, to Mark Walker Jr., of Tucson.

The silver Medal, for best Junior record, to Granville Malcom Gillett, of Phoenix.
VACATIONS, ACCOMMODATIONS, ETC.

VACATIONS AND HOLIDAYS.

Short vacations (as per Calendar on page 3) are taken at Christmas and Easter. The long summer vacation begins about June 1st and continues until near the close of September.

All legal holidays are observed by the cessation of ordinary University work, and the Thanksgiving recess extends from the close of regular exercises on the preceding Wednesday until the Monday morning following.

Appropriate exercises may be arranged by the Faculty for any of the legal holidays, in which the students will be expected to join, if required.

Arbor day has been formally adopted by the University Faculty as the regular anniversary, on which shall be celebrated the founding of the institution, in connection with the ceremonies of tree planting.

LIVING ACCOMMODATIONS AND EXPENSES.

Provision is made as far as possible for furnishing board and rooms for students, of both sexes, upon the University grounds.

Young men have excellent quarters in the new dormitory building.

A separate home for young ladies is in charge of Mrs' Imogen LaChance, an experienced and capable matron, who, as last year, will have constant supervision of those rooming in "ladies' hall."

There is no charge for tuition in the University. All students are required to pay once only, (upon entrance) a matriculation fee of five dollars.

Charges will be made for material actually consumed by students in the laboratories.

The expense for board and room rent will amount to about $15.00 per month. By resolution of the Board of Regents of the University, board is to be paid in advance at the beginning of each term. Checks, P. O. or Express Money Orders should be made payable to the President. No reduction will be made for absence for a period of less than one week.
Students will be provided with simple furniture, including single bedstead, mirror, wash-bowl, pitcher, and slop jar. They will supply their own mattress, pillow, bed clothing, towels, etc. They will care for their own rooms, and the halls, staircases, and study rooms of their respective dormitories under the direction of the person in charge.

Text-books required are obtained direct from the publishers through a book association managed on the co-operative plan under the direction of the Faculty, and may vary in cost between five and ten dollars in different years of the course.

Economical students should readily go through the year with $150.00 to $160.00, excluding clothing.

Members of the battalion will be required to provide themselves with the prescribed uniform. During the past year the cost of uniform with cap, and including transportation charges, has been $14.90. This uniform has shown better wearing qualities than a civilian suit of equal cost, and parents are urged to consider the matter of uniform when supplying their sons with clothing for the approaching school year. It may be worn on all occasions, and thus will remove the necessity for the usual expenditures for outer clothing other than overcoats.

 Provision has been made for the self-support of students to a limited extent.

LITERARY SOCIETY.

The Philomathean Society, an organization of students open to all, holds its meetings in the assembly room of the University. Its work embraces general literary exercises and parliamentary usage, and is a valuable adjunct to the regular college course.

ATHLETICS.

Encouragement is given to athletics and athletic organizations are under the immediate care of a committee of the faculty. Membership in these organizations is subject to forfeiture for failure in any regular line of school work.

MILITARY TRAINING.

Appreciating the importance of military drill as a physi-
cal exercise and as an aid to discipline, provision has been made for a course in military science and tactics.

Military drill is required of all male students throughout the preparatory course and as far as the end of the sophomore year, unless excused by the faculty for sufficient cause, and is optional through the remaining years. Students claiming exemption from drill by reason of physical disability will be required to secure from a physician designated by the faculty, a certificate of incapacity, except when the disability is apparent. In general the officers and non-commissioned officers will be chosen from the higher classes, scholarship as well as proficiency in drill being considered in making promotions.

Each member of the military organization will be required to provide himself with the prescribed uniform within six weeks after his entrance. The uniform consists of cap, coat and trousers of cadet gray cloth trimmed with black braid and closely resembles the undress uniform of the U. S. Military Academy at West Point. Black shoes and white cotton gloves are also required. A uniform vest is prescribed. The purchase of this garment is optional as it is not required to be worn unless the coat is worn unbuttoned. A committee of the faculty will protect the interests of students by inspecting all uniforms as received from the makers in order to secure good materials and workmanship at a minimum cost.

An equivalent of the time occupied in military drill will be devoted by female students to physical culture, vocal culture, and instruction in the rudiments of hospital practice and prompt relief of the injured.

COURSES OF INSTRUCTION.

The facilities and privileges of the University are open to all qualified persons of either sex without charge.

Three regular four-year courses of study leading to a degree are offered, viz:

- Literary and Scientific.
- Engineering and Mining.
- Agriculture.
In each course the work is partly required and partly elective as shown in schedules later. Four hours of recitation a day are required in each course as full work. In laboratory work two to two and one-half hours are considered the equivalent of one recitation hour.

Persons of mature age and with sufficient preparation who are not candidates for a degree will in some cases be admitted to regular classes as special students, without having taken the required work of the lower years of the course; provided, however, that in all such cases they show to the satisfaction of the instructor giving the course that they can take the work with profit to themselves and without detriment to the work of the regular class.

Work is offered in the following lines: English language and literature, Latin, Spanish, French, German, history and civics, mathematics, physics, chemistry, biology, mineralogy and geology, drawing and shop work, engineering, mining.

The exact scope and nature of the various courses are shown in detail later.

Students, who have completed satisfactorily the required work and the specified amount of elective work in either of the four year courses, during will be given the degree of Bachelor of Science. (B. S.)

Each candidate for graduation is required to present an acceptable thesis embodying the results of a special and thorough study of some subject within the range of the course pursued. The subject of the thesis must be submitted for the approval of the faculty not later than the opening of the second term of the senior year, and the completed thesis must be presented not later than three weeks before commencement day.

The advanced degrees of Master of Science and Master of Arts are conferred upon Bachelors, graduates from this University or from institutions of equivalent grade, who have successfully pursued a course of study marked out by the faculty and requiring not less than one year.

The degrees of Civil Engineer, Mining Engineer, Irrigation Engineer and Electrical Engineer are open to graduates properly prepared, who have pursued special lines of post graduate work in accordance with faculty regulations.
# COURSES OF STUDY 1898-99.

## Literary and Scientific.

**FRESHMAN YEAR.**

| Required | | Required | |
|----------|----------|
| English | 19th Century Prose | English | 19th Century Prose |
| Elective | Solid Geometry, Trigonometry, Higher Algebra | Solid Geometry, Trigonometry, Higher Algebra |
| Latin | | Drawing and Shopwork |
| French | | Qual. Anal. or Botany |
| German | | Instrumental Drawing |
| History | | |
| Drawing | | |

**SOPHOMORE YEAR.**

| Required | | Required | |
|----------|----------|
| English | | Higher Alg., Analytic Geom. Surveying |
| Elective | Higher Alg., Analytic Geom. | Elective |
| Latin | Chemistry | Chemistry |
| French | French | French |
| General Chemistry Qual. Anal. or Botany | German | German |
| | Spanish | Spanish |

**JUNIOR YEAR.**

| Elective | | Required | |
|----------|----------|
| English | Calculus |
| Calculus | * Physics |
| History | Analytic Mechanics |
| * Political Economy and Civics | Mineralogy, Assaying |
| * Physics | Quantitative Analysis |
| Botany | History |
| Anatomy and Physiology | * Political Economy and Civics |
| Zoology | Advanced Mechanical Drawing |
| Mineralogy | | |

**SENIOR YEAR.**

| Elective | | Required | |
|----------|----------|
| * Psychology, History of Education, Pedagogy | Analytic Mechanics |
| Geology, Astronomy | Geology |
| History | | | |
| Logic, Ethics | Metallurgy and Assaying |
| And other electives not previously taken | And other electives not previously taken |
It is the present policy of the faculty to give some of the advanced courses only once in two years. By this means a greater variety of courses can be offered by the limited number of members of the faculty and still give every student an opportunity to take all those which he desires. The courses marked with a star in the table have been given in the year 1897-98, and will probably not be given in 1898-99. Classes beginning French and German will be formed in alternate years.

AGRICULTURAL COURSE.


SENIOR YEAR—Stock Breeding and Feeding, Dairying, Veterinary Medicine, Geology, Fruits and Fruit Culture, Vegetables and Vegetable Culture.

EXPLANATORY OF COURSES OF STUDY.

ENGLISH.—Prof. Hall.

The object of the work in English is, first, to promote a taste for literature as a means of pleasure and of culture, and secondly, by means of the study of eminent authors to cultivate a correct standard of literary judgment and taste. With these objects in view the method of work is intensive rather than extensive. A few authors are chosen for careful study, and sufficient time is spent upon these to acquire accurate ideas of their individual merits and style.
FRESHMAN YEAR—Prose writers of the 19th century, especially DeQuincey, Macaulay, Carlyle; English classics.

SOPHOMORE YEAR—Advanced rhetoric and rhetorical analysis, argumentative and expository composition; Burke, Webster; in the spring term Elizabethan literature; Lowell.

JUNIOR YEAR—Shakespeare; early 19th century poets; Tennyson, Milton.

RHETORICALS—The appearance once during each term in public rhetorical exercises, suited to their position in the course, is required of all students taking courses leading to a degree and of students taking English or Elocution, unless excused by vote of the faculty. Deficiency in rhetoricals is ranked as a deficiency in any other subject; failure to appear on date assigned is regarded as total failure.

LATIN—Prof. Adams.

The aim of the work in Latin will be to produce in the student the ability to read the original with an appreciation of its meaning and beauty without conscious translation into the vernacular. Incidentally and of no less value, it is expected that his power of observation, mental ability, and knowledge of the use of English will be greatly strengthened. The instruction throughout the course will be shaped with the above ends in view. The laboratory method will be used in part, giving to each pupil the opportunity of doing as much work as his strength and knowledge of the subject will allow.

FIRST YEAR—Special attention will be given to vocabularies; an accurate knowledge of all inflectional forms will be insisted upon, and the student will be led to investigate and discover the underlying laws and principles on which these are based. Attention will be paid to the Latin sentence structure, and the comparison of this with English sentence structure, and in translation from Latin to English, idiomatic English will be insisted upon, while in translation from English into Latin, attention will be called to the English grammatical structure and its comparison with the Latin. In the latter part of the year easy Latin, like Viri Romae, will be read. Text-book: Collar’s First Latin Book.

SECOND YEAR—An introduction to the study of Roman
literature. Selections from Caesar, the Lives of Nepos, and similar Latin will be read with much sight reading. The text will be studied critically with translation into idiomatic English. Prose composition will be continued throughout the year with incidental study of history and geography. Textbooks: Allen and Greenough's Grammar and texts; Daniell's or Bennett's Prose Composition.

THIRD YEAR—Cicero's Orations and Vergil's Aeneid will be read. While the same principles will govern the work as in the second year, more attention will be paid to sight reading and to the reading of the original with an appreciation of its meaning in the same way that English is read. In connection with the reading of Cicero a thorough study will be made of the Roman system of government and the customs and occupations of the people. In connection with the Aeneid a similar study will be made of Latin poetry and the scansion of the hexameter, also of the religious rites and beliefs of the ancients together with the principal mythological characters. Throughout the course attention will be paid to word study and English derivatives of Latin words.

FRENCH AND GERMAN.—Prof. Adams.

The work in the modern languages will in general have the same end in view as that in Latin, and will be made an exact equivalent for the work in Latin as far as possible.

FIRST YEAR—Careful attention will be given to fixing correct habits of pronunciation together with thorough drill in forms and syntax. Constant attention will be paid to translation at sight and at hearing, and to some extent to conversation. Text-books: French; Sym's First Year in French, Super's French Reader, Heath's Texts. German; Collar's Shorter Eysenbach, Joynes Meissner's German Grammar, Harris' German Composition, Heath's texts.

SECOND YEAR—French: Standard prose will be read, selections being taken from Dumas, Hugo, and Moliere, together with sight translations and composition. As far as possible French will be made the language of the class room. German: The same general plan will be followed. Standard prose and a play of Schiller will be read, German being the language of the class room.
SPANISH.—Mrs. Aguirre.

A thorough course of instruction in Spanish grammar and in reading, writing, and speaking the language.

HISTORY, CIVICS AND PHILOSOPHY.

PSYCHOLOGY—First Semester—Lectures, recitations, and collateral reading, with special consideration of the subject as applied to teaching. Text-book: James Briefer Course.

—Prof. Woodward.

HISTORY OF EDUCATION—PEDAGOGY—Second Semester—Lectures giving a brief but comprehensive outline of the school system of ancient, mediaeval, and modern countries, with special study of leading educators, such as Socrates, Commenius, Pestalozzi, Froebel, Mann, etc. The course will also cover the present trend of pedagogical thought and practice.

—Prof. Adams.

MATHEMATICS.—Prof. Woodward.

It is the aim of the work in mathematics to train the student to the habit of logical and vigorous courses of reasoning, to show the wonderful breadth of application of higher mathematics, to display the beauties and pleasures of the demonstrations, methods, and results of higher geometry and calculus, and to give such practice in the use of these agents as will enable students who pursue the higher branches of engineering to use them naturally and easily in those multitudinous applications where they are indispensable. The courses in mathematics depend upon each other to such an extent that they can be taken only in the order in which they are printed.


CALCULUS—Junior Year. Lectures and recitations covering differential and integral calculus, with special reference to their use in higher branches of engineering. Some notice is also taken of the modern branches of higher mathematics which are led up to and investigated by means of the calculus. Text-book: Bowser’s Calculus.

CHEMISTRY.—Prof. Forbes.

The instruction in chemistry has two main objects in view—first, to promote general culture; and second, to introduce students to technical work, especially in mining. The first year’s work in general chemistry and qualitative analysis places the student in an advantageous position to take up the study of mining and metallurgy.

GENERAL CHEMISTRY—First Semester—Sophomore Year. The subject is introduced by a course of lectures and experiments by the instructor, and this is supplemented by recitations and laboratory practice. Emphasis is laid on the laboratory work, and special effort is made to secure its full value both as a source of information and as a means of training students in habits of careful observation and skillful manipulation. Text-book: Remsen’s Briefer Course.

QUALITATIVE ANALYSIS—Second Semester—Sophomore Year—This subject is pursued with careful attention both to the principles of the science and to its technical execution. At the end of the course a fairly bright student is expected to be able to determine the composition of any unknown substance submitted to him for examination. Text-book: Eliot and Storer’s Qualitative Analysis, and various reference books.

QUANTITATIVE ANALYSIS—Junior Year—This course has technical value in connection with the mining and metallurgical courses besides training the student in habits of thorough and accurate work.

PHYSICS.—Prof. Woodward.

PHYSICS—Junior Year—Lectures, recitations, and laboratory work. A knowledge of trigonometry is necessary for this course. Text-books: Hall and Bergen’s Physics, Ames’ Theory of Physics.
BIOLOGY.—Prof. Toumey.

In addition to the elementary work provided in the preparatory course, as elsewhere stated, this department offers two lines of work, viz: botany and zoology.

Botany.—The work in botany covers one and one-half years. The preparation for this work consists of the course in elementary biology given in the preparatory department, or its equivalent. The work is of elementary character, covering in a general way the histology, physiology, morphology, and systematic relationships of the more important types of plant life. The instruction is in the form of laboratory work with occasional lectures covering the subjects under investigation. Bessey’s Botany, advanced course, is used as a text-book, supplemented by the following as necessary reference books: Gray’s Structural Botany, Sach’s Physiology of Plants; Goebel’s Outlines of Classification and Special Morphology. The botanical library contains the more important literature bearing upon the systematic botany of this region.

Zoology.—The work in zoology covers one year. In this work attention is given to the principles of classification, the structure and development and the comparative anatomy of types of animal life. Considerable time is occupied in laboratory work, making dissections and in microscopical study of animal histology. Orton’s Comparative Zoology is the text-book in use.

One full course is given in human anatomy and physiology. That this subject may be represented in a creditable manner the laboratory is provided with articulate and disarticulate human skeletons, casts representing the vital organs and numerous charts. Martin’s Human Body, advanced course, is used as a text-book, the daily recitations being supplemented by lectures and laboratory investigations.

In addition to the course as given above, this department offers facilities for more advanced work or original research in botany to those qualified to pursue the same.

MINERALOGY AND GEOLOGY.

Mineralogy and Assaying. Junior Year.

A year’s course of lectures, recitations, and laboratory
work covering (a) crystallography, (b) blow-pipe analysis and determinative mineralogy, and (c) fire assaying. At the end of the course the student is expected to know at sight all the common ores and minerals, and to be able to determine and classify, by the use of the blow-pipe and a few simple reagents, any less common mineral he may meet. A study is also made of the occurrence, uses, and distinctive characters of the most important minerals.

—Prof. Guild.

Metallurgy and Assaying—Senior Year. This work is intended to fit the student to accurately make determinations of gold, silver, and lead in bullion, ores, and furnace products, by the furnace method, and to become familiar with the standard methods used in this country for the determination of all the metals of economic metallurgical importance. The course also includes instruction in the complete analysis of alloys, ores, slags, mattes, etc. The text-books required are Fresenius' Quantitative Analysis or some similar standard work, and Furman's Manual of Practical Assaying.

—Prof. Guild.

Geology—Senior Year. Lectures, recitations, and examination of specimens from the large collections in the museum, covering the subjects of dynamic, historical, and economic geology. Text and reference books: Dana, Le Conte, Geikie.

—Prof. Blake.

Drawing and Shop-Work.

Free-hand Drawing—Throughout Freshman Year. Drawing from copies, from geometrical models, perspective, shading and machine sketching.

Instrumental Drawing—Sophomore Year. Linear drawing, lettering, shading, machine drawing, tracing and blueprinting.

Advanced Instrumental Drawing. Junior Year.

(a) Descriptive Geometry. Lectures, recitations, and drawing. Must be preceded by free-hand and instrumental drawing.

(b) Graphical Statics. Lectures, recitations, and drawing. Simple roof and bridge trusses considered with dead, moving, wind, and snow load.
(c) Kinematics. Lectures, recitations, and drawing. Curves, cams, gear teeth, and various machine motions will be treated.

Shopwork. Practice in joinery, wood turning, and iron work.

SPECIAL COURSES.

In addition to the foregoing regular courses the special courses enumerated below have been established by the Board of Regents in response to the demand for them.

COMMERCIAL COURSE—Mr. Mendenhall.

A one year's course in business arithmetic, book-keeping, stenography, typewriting, penmanship, and commercial law designed to prepare students for actual commercial life.

SHORT COURSE OF INSTRUCTION IN ASSAYING AND MINING.

In order to meet the needs of many young men who are desirous of learning the art of assaying the common ores and metals, and who are not able to give the time required in the full course of study for graduation and the degree of mining engineer, the Board of Regent has approved of a short course of instruction in practical assaying, metallurgy, etc., to be given in the laboratories and mill.

This course commences with the first college term in each year and requires at least one year of time, but students are advised to give two years or more to the work, of which in one year they cannot expect to gain more than the rudiments and outlines.

The lectures in the regular courses of study upon chemistry, mineralogy, geology and metallurgy, are open to deserving students in the special short course.

REQUIREMENTS FOR ADMISSION.

Young men desiring to take this course are required to be at least eighteen years of age, to have good health, and to have a sufficient knowledge of English and arithmetic. They must agree to observe the rules and regulations of the University.

Instruction is gratuitous, but each student is required to pay the regular entrance or matriculation fee of five dollars, and to pay the cost of materials, glassware, and apparatus.
used by him. For this purpose a deposit of ten dollars will be required each term in advance, and any balance will be refunded.

If for good reasons students are unable to enter at the commencement of the year, they may be received at a later date, at the discretion of the director, upon passing a satisfactory examination upon the studies already passed over by the other students in the course.

**COURSE OF STUDY.**

**SEPTEMBER TO JANUARY.**

**Elementary Chemistry**—The elements; their symbols, combining numbers, their nature and properties. Nature and properties of reagents used.

**Fire Assaying**—Furnace, apparatus, materials, and manipulation. Work in laboratory.

**Blowpipe Practice**—Manipulation. Tests of simple substances, metals and fluxes.

**Mineralogy**—Lectures and work in the laboratory.

**Geology**—Lectures on structural and historical geology.

**JANUARY TO MARCH.**

**Sampling Ores and Mines**—(Mill.)

**Wet Assaying.**

**Determinative Mineralogy.**

**Geology**—Prospecting and testing. Mineral deposits.

**MARCH TO JUNE.**

**Mining**—Sinking, driving, stoping, hoisting.

**Mill Work**—Crushing, stamping, amalgamating, etc.

**Metallurgy**—Melting and refining bullion; processes for the extraction of gold and silver.

**Electrolysis**—Assaying by electricity. Deposition of metals.

**Geology**—Mineral veins and ore deposits.

**TEXT-BOOKS.**

The following text-books and others are used:

Assaying—Ricketts, Brown, Furman, Aaron.

Mineralogy—Dana, Brush’s Determinative Mineralogy; Dana’s How to Study Minerals.

Geology—Dana, Le Conte, Geikie.
PREPARATORY COURSE.

The preparatory course, occupying three years, has been especially designed for those who have not had sufficient training to enter the classes of the freshman year.

It is not the desire of the faculty to engage in any work which can as well be done in the public schools of the territory, but we have found it impracticable to dispense with classes designed to prepare students for the work of the higher classes. This course affords thorough training, as far as it goes, and provides a good foundation for future studies. One of its main objects is to give training in the best methods of study, to teach pupils to think. In many cases, students lacking neither in zeal, nor ability, are at a disadvantage in not knowing how best to direct their energies to the matter in hand. It will be the constant aim of the instructors in the preparatory school to overcome this difficulty, which has heretofore been the most serious hinderance to educational progress.

To each student who completes the studies of the preparatory course, a certificate stating that fact will be given, which certificate will entitle the holder to admittance to the higher courses of the University without examination.

Preparatory Course of Study.

Numerals indicate number of recitations per week.

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<td>English</td>
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<td>English</td>
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<td>Elementary</td>
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<td>German,</td>
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</table>
AGRICULTURAL EXPERIMENT STATION.

STATION STAFF.

Millard M. Parker ........................................... President
James W. Toumey, Acting Director ................................ Botanist
Robert H. Forbes .............................................. Chemist
Nathan H. Barnes ........................................... Irrigation Engineer and Meteorologist
A. J. McClatchie ........................................... Agriculturist and Horticulturist

Mark Whiker, Jr. ........................................ Assistant Chemist
Lee LaChance .................................................. Stenographer
Ben Eager ........................................................ Foreman Phoenix Station

ESTABLISHMENT AND OBJECT.

The Agricultural Experiment Station is established according to an Act of Congress, and by the Territorial Legislature has been made a part of the University.

The function of the station is to aid in developing the agricultural and horticultural resources of the Territory, by solving as completely and rapidly as possible some of the complex problems with which the farmers, fruit growers and stock raisers are confronted. In aid of this the national government has appropriated the sum of $15,000 to be paid annually to the Board of Regents for this specific purpose.

The lines along which the work of the station runs, embrace the investigations of the conditions of climate, soil, and water supply in the various parts of Arizona, and the adaptability of the conditions found to the growth of different agricultural and horticultural crops; the range of climate suited to the production of these crops; the maximum, minimum, and mean amount of water; the successful cultivation of dif-
ferent farm and garden crops; water storage and the development of water from other sources; the best means of applying water; methods of culture; the best season for planting; breeds of farm animals and their improvement to meet local conditions; the introduction of new fruits, vegetables and farm crops, and the distribution of plants and seeds; the development of forest tree culture; the investigation of diseases affecting the plants and animals of the territory, and the remedies best suited to prevent or eradicate them; the publication of bulletins upon investigations undertaken, and the results obtained. These bulletins are issued periodically and sent free to all who apply for them. The range of the work of the station is only limited by the needs of the territory, and the funds available for use in making the investigations. Those questions which are thought to be of greatest importance to the territory come first in the line of work pursued.

To further the ends of the station in extending its usefulness, the co-operation of all interested in its work is earnestly solicited. Suggestions will be gratefully received and inquiries answered cheerfully, wherever possible, by the members of the staff, each for his own department. No charge is made for answering these questions, and when qualitative chemical analyses or other investigations, of general public interest and benefit are requested, they will be undertaken if possible, and without cost. For quantitative analysis, involving more labor and expense, a small charge is made.

The location of the experiment station at the University is of great benefit, directly and indirectly, to the students in the University. The specialists in the station work are available as professors in their respective branches in the University, thus affording a larger corps of teachers specially equipped in the several departments. The station investigations also provide opportunities to students in agriculture and other special branches, for the study of special conditions and methods of peculiar interest to the territory, which would not otherwise be available.

All communications respecting station matters should be addressed to:

DIRECTOR EXPERIMENT STATION,
Tucson, Arizona.
THE ARIZONA SCHOOL OF MINES.

In addition to the facilities for general instruction in the arts of mining, metallurgy and assaying, this department of the University is provided with a mill for working ores in large or small quantities from a few pounds weight to a ton or more. Mill tests can be made by either the small three stamp mill, or by the large five stamp battery. There are rolls for roller crushing, and jigs and Rittinger tables for concentrating ores.

QUALITATIVE EXAMINATIONS.

In order to promote knowledge of the mineral wealth of Arizona and to disseminate accurate information regarding the minerals and rock formations, and their distribution, qualitative tests or determinations of the nature of mineral substances not requiring an assay, are made gratuitously upon samples sent by mail, or delivered to the institution without charge. Samples sent for this purpose should be in their original condition, as broken out, and not crushed to a powder or pulp. Tests requiring determination of the presence of gold or silver must be paid for at assay rates. The locality from which the specimen is taken should be stated so that it may be entered upon the records of the museum of the school.

QUANTITATIVE DETERMINATIONS.

When quantitative determinations or analyses are required, or when assays showing the quantity and value of a metal or metals are necessary, a charge is made under the provisions of the territorial law of March, 1897, regulating the prices or fees to be charged for an assay at the University. These rates are shown in the following schedule:

_Assaying Ores From Arizona._

<table>
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<tr>
<th>Description</th>
<th>Rate</th>
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<tr>
<td>Silver and gold, or either</td>
<td>$ 50</td>
</tr>
<tr>
<td>Silver, gold and copper</td>
<td>1 00</td>
</tr>
<tr>
<td>Copper</td>
<td>50</td>
</tr>
<tr>
<td>Ores containing more than three common metals</td>
<td>1 50</td>
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</tbody>
</table>

The following rates have been established by the Board
of Regents for assaying ores taken from deposits or mines without the Territory of Arizona.

**Assaying Ores from Without the Limits of Arizona.**

- Silver and gold, or either alone: $1 00
- Copper: 1 00
- Lead: 1 00
- Zinc: 2 50
- Iron: 2 00
- Silica: 1 50
- Alumina: 5 00

And for other determinations such rate as the director of the school of mines may in each instance fix.

**Payment in Advance Required.**

The director is required, in all cases, to hold the assay until the fee or charge therefor is paid.

**Rates for Sampling.**

- Lots of 100 pounds or less, including assays of three metals: $5 00
- Each additional 100 pounds, to 500 pounds: 1 00
- Over 500 pounds to 1 ton: 10 00
- Each additional ton: 4 00

**Reducing to Metal by any Process, as below.**

- Ordinary Stamp Mill test and plate amalgamation, for first ton or fraction of a ton: $20 00
- From 1 to 2 tons: 30 00
- Pan Amalgamation, including crushing and assays, per ton: 20 00

Large lots, proportionately less, per ton; small lots more in proportion.

**Cyanide Process.**

The School of Mines is prepared to make experimental tests of ores and of tailings by the cyanide process in large or small quantities, at rates to be agreed upon with the Director. Working tests and experiments by other processes may be undertaken at rates to be agreed upon in each instance, depending upon the amount of materials, time and labor required.
Concentrating (Including all Assays.)

Wet or dry test of small lot (under 500 lbs.)... $15 00
500 pounds to 1 ton.......................... 20 00
Each additional ton.......................... 7 00

In addition to the regular assay work for the precious and ordinary metals, quantitative determinations are made of the value and amounts of the rare metals, such as tungsten, molybdenum, vanadium, uranium, etc.

Directions for Forwarding Samples.

Samples for assay may be most conveniently, expeditiously and cheaply sent by mail if under four pounds in weight. Each sample should be labeled by a slip of paper, inside, giving the name and locality of the claim and the address of the sender.

As the express company does not deliver goods at the University there is a delay of a day or more in the reception of samples sent by express. Much vexatious delay may be avoided by using the mail. Sample bags of stout paper addressed to the School may be obtained upon application to the director at the rate of 25 cents per dozen to cover cost and postage.

As by order of the Board the results of assays cannot be delivered until the fees are paid, delays will be avoided by a remittance with the samples. Remittances may be by check, postal order, express order or by enclosing the money with the sample, first securely wrapping it in paper.

Delay is also avoided by addressing communications and samples direct to the School of Mines. Checks and money orders should be made payable to the School of Mines.

Unless otherwise directed the certificate of the results of an assay will be forwarded by mail to the consignor of the sample.

Special rates of freight on consignments to the "Director of the School of Mines," are granted by the Southern Pacific R. R. from points in Arizona. Ask the agent at shipping point for particulars.

All business communications should be addressed to the

ARIZONA SCHOOL OF MINES,

Wm. P. Blake, Director.

Tucson, Pima County, Arizona.
The Arizona Legislature, Session 1893, passed an Act establishing a general Museum at the University. The object of this is to collect materials of all kinds illustrating the resources and development of the region, and particularly to preserve historical relics, including those pertaining to the aboriginal inhabitants.

Donations of specimens and collections will be received and acknowledged with thanks; but no provision has yet been made by the legislature for the support of this department, aside from the appropriation of $100 per annum for the salary of a curator for two years.

A collection has been bequeathed by the late Edward Rose, of Pleasant Valley, Gila county, and the nucleus of additional collections will come from duplicates of the material obtained by members of the faculty in their annual tours of scientific investigation in the territory. The collection of minerals made by Mr. Sorrin, at the World's Fair, in 1893, is also placed with the foregoing. Historical records of much value are being gradually accumulated as a part of this museum, and an appeal is made to old settlers and others to bear this fact in mind when making disposition of articles bearing even remote relation to the early pioneers and their history. All records and data of any nature which can be gleaned are worthy of preservation, and we earnestly desire to have them placed at the University where they will always be accessible for reference.

A large and valuable collection of skins of the birds of Arizona has been deposited by Mr. Herbert Brown in the museum.

It is desired to make the collection of ores and minerals fully represent the great mineral resources of Arizona, and specimens from all of the mines will be thankfully received and acknowledged.

All business communications should be addressed to

Herbert Brown, Curator.
SPECIAL NOTICE.

Reduced Railroad Rates to and From the University.

The Southern Pacific, the Maricopa, Phoenix & Salt River Valley Railway Company, the Santa Fe, Prescott and Phoenix railway, and the G. V. G. & N. railway from Bowie to Solomonville, have all generously allowed students in attendance upon the University, half rates when journeying to and from their homes. In the case of students coming to the University these half rates may be secured by notifying the president of the University a sufficient length of time in advance to enable him to secure from the proper authorities the permits. Students at the University may secure transportation to their homes and return at any time by making application at the office of the president of the University.

The railroad authorities have very kindly supplied a quantity of blanks to be filled out and presented to the proper ticket agents. It is hoped and expected that like concessions may be secured over all the roads in the territory, as students may desire to travel over various lines in coming to the University.
LIST OF STUDENTS 1897-98.

**Seniors.**

- Ferrin, Hattie, (General Course.) ........................................... Tucson
- Gillett, Granville Malcom, (Electrical Engineering) ......................... Phoenix
- Watts, Minnie Ruth, (General Course) ......................................... Congress
- Young, John Desha, ................................................................. Phoenix

**Juniors.**

- Garnett, Robert F, (Mining and Metallurgy) ................................ Phoenix
- Miller, Eric Rex, .......................................................... Prescott
- Morton, Robert L, .............................................................. East Randolph, N Y

**Sophomores.**

- Flood, Ida Clarissa ............................................................ Tucson
- Haynes, Felix Grundy ............................................................ Sacaton
- Logan, Harry Gaylord ............................................................ Phoenix
- Sparks, Ralph Waldo ..............................................................
- Richmond, Charles Pierce ........................................................
- Seargeant, John W .................................................................
- Welles, Florence Russell ........................................................ Tucson
- Welles, Justice Philip, Jr. ......................................................
- Guild, Nott E .................................................................

**Freshmen.**

- Angus, William ............................................................... Tucson
- Castaneda, Rudolph .............................................................. Benson
- Drachman, Albert ................................................................. Tucson
- Ferrin, Clara .................................................................
- Frazier, Claire ................................................................. Phoenix
- Grijalva, Arturo Ochoa ........................................................ Benson
- Luce, Robert F ................................................................. Yuma
- McBride, William A .......................................................... Phoenix
- Morton, John H ................................................................. East Randolph, N Y
- Parker, George M ............................................................... Tucson
- Smalley, Fred H ................................................................. Montawac, Wis
- Steele, Edward ................................................................. Willcox

**Third Preparatory.**

- Brown, Ruth ............................................................... Tucson
- Colbath, James Sollitt ......................................................... Holbrook
- Culver, Emma ................................................................. Tucson
- Early, Clinton Claude ........................................................ Phoenix
Second Preparatory.

Alexander, Andrew Charles........................................... Ft. Thomas
Armstrong, Carrie...................................................... Tucson
Armstrong, Violet Agnes................................................ Tucson
Carty, Harry A............................................................ Holbrook
Castaneda, Henry........................................................ Benson
Cheyney, Bernice.......................................................... Tucson
Dial, Joseph H............................................................. Safford
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Guild, Roy................................................................. Tucson
Hasselgren, Harry William............................................. Tombstone
Herrick, Henry Clay....................................................... Fairbanks
Herndon, Thomas........................................................ Tucson
Hill, Geo. V................................................................. Tombstone
Hoff, Mamie................................................................. Tucson
Horn, Guy W................................................................. Mesa City
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Barkley, Hassie May ............................. Mesa City
Bernard, Allen Chartan .......................... Tucson
Brown, Owen ........................................ "
Calderon, Gerardo ................................. Hermosillo, Sonora
De la Ossa, Albert ................................ "
Doyle, Ella ........................................ Tucson
Finley, Charles .................................... "
Fish, Florence ..................................... "
Flainig, Matt. ............................... Bisbee
Francis, Corrinne ............................... Tucson
Gittins, Kate ...................................... Washington Camp
Igo, John ........................................ Ft. Huachuca
Katzenstein, Alma Fanny ........................ Tucson
Linder, Jacob A ................................ Nogales
Maher, Katie B .................................... Tucson
Martin, George ................................... "
Martin, Madge .................................... "
Martin, Willie B .................................. "
Pearce, William ................................... "
Parks, Charles W .................................. Solomonville
Potts, Lallah Zaff ................................ Kingman
Paul, Edith ........................................ Tucson
Reicker, Edna Florence .......................... "
Riggs, John D ..................................... "
Robinson, James Newton ........................ Geronimo
Rolett, Albert Ralph ............................ Tucson
Schafer, William A ................................ Dos Cabezas
Soldini, Constance Rosalie ...................... Tucson
Strauss, Ruth ...................................... "
Stevens, Elisia .................................... "
Villasenor, Julio .................................... Hermosillo, Sonora
Wadhams, Jennie Lea ................................................. Tucson
Wood, Gwendylin ...................................................... "
Woodford, Lincoln D. .................................................. "

**Special Students.**

Arriago, Alfredo (English) ........................................ Vera Cruz, Mex.
Benson, William Almon (Assaying) ................................ Florence
Brown, Stephen D. (Assaying) .................................. Tucson
Butler, Chauncey Eldridge (Assaying) ........................... Salina, Kan.
Cowan, Mrs. Rosalie Rice (Spanish) ............................ Tucson
Davidson, Edith (English, Elocution) ......................... Los Angeles, Cal.
Delano, Cora (Stenography, Book-keeping) ...................... Tucson
Doan, Frank Wilson (Chemistry) ................................. Florence
Drachman, Myra (Elocution) ....................................... Tucson
Drachman, Lillie (Stenography, Book-keeping) ............... "
Felix, Arthur (Book-keeping) ...................................... "
Fish, Frank (Assaying) .............................................. "
Goodfellow, Emma Dottie (Stenography, Book-keeping) .... "
Healey, Terrance (Chemistry) ...................................... "
Hill, Annie (English) .................................................. Bisbee
McLeod, Alexander Forrest (Assaying) ......................... New York, N. Y.
Mendenhall, Montford (Assaying) ............................... Tucson
Morgan, Eddie Leon (Assaying) .................................... Breckenridge, Tex.
Nespital, William C. (Spanish) ..................................... Tucson
Powers, Ridgley C. (Assaying) .................................... Prescott
Riggs, Lizzie (Book-keeping) ....................................... Tucson
Rochester, E. R. (Assaying) ......................................... Tucson
Scholey, Charles K. (Chemistry) ................................. Maher
Scribner, James V. (Assaying) ..................................... Tucson
Towner, Nora (General Course) ................................... "
True, Arthur Leander (Assaying) ................................. Spokane, Wash.
Wilbur, Mary L. (Stenography, Book-keeping) ............... Tucson
Zeigler, Albert (Stenography, Book-keeping) ............... "

**Summary.**

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MILITARY ORGANIZATION, 1897-98.


Adjutant ............................................. Felix Grundy Haynes
Sergeant Major ...................................... Clinton Claude Early
Quartermaster Sergeant ............................. James Sollitt Colbath
Principal Musician .................................. Stephen S. McKenna
Musician Corporal ................................... Harry Augustus Carty

COMPANY A.

Captain .............................................. Charles Pierce Richmond
1st Lieutenant ....................................... Phillip Justice Welles, Jr
2nd ......................................................... Edward Steele
1st Sergeant ......................................... Thomas Austin Herndon
Sergeant ............................................. Joseph Peter Schafer
Corporal .............................................. Andrew Charles Alexander, Jr

COMPANY B.

Captain ............................................... Harry Gaylord Logan
1st Lieutenant ....................................... John William Seargeant
2nd ......................................................... Rudolph Castaneda
1st Sergeant ......................................... Joseph H. Dial
Sergeant ............................................. William P. Reid
Corporal ............................................... Allen Chartan Bernard

ALUMNI ASSOCIATION.

Organized June 2nd, 1897.

CONSTITUTION.

In order to promote the interests of the University, to secure unity among its graduates, and to foster an attachment to our Alma Mater, we do hereby constitute ourselves as asso-
ciation to be known as the **ALUMNI ASSOCIATION OF THE UNIVERSITY OF ARIZONA**.

I.

All persons who have received a degree from the University of Arizona are members of this association.

II.

All members of the faculty are honorary members of this Association.

III.

The officers of this Association shall be a president; one vice-president from each successive group of five classes, provided that when the last group shall number three classes it shall thereafter be entitled to a vice-president, a secretary and a treasurer.

IV.

There shall be an executive committee to consist of the following persons: The secretary and treasurer of the association, and three others chosen by the association, one of whom shall be designated as chairman of the committee.

V.

It shall be the duty of the executive committee to arrange the programmes for Alumni Day and other public occasions; to regulate the finances of the Association; to perform such other duties as may be imposed upon them, and to attend to all business of the Association not otherwise provided for.

VI.

The president shall be ex-officio a member of all committees. At each annual business meeting he shall appoint a committee of two persons to audit the treasurer’s accounts.

VII.

The officers and the executive committee shall be elected by ballot at the annual business meeting to be held on Alumni Day, a majority of all votes cast being necessary for election.

VIII.

Any proposition to alter or amend these articles of Association must be made at a regular meeting, and have the assent of two-thirds of the members present.
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