

REGISTER

OF THE

UNIVERSITY OF ARIZONA

ELEVENTH YEAR

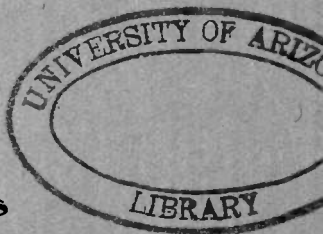
1901-1902

ANNOUNCEMENTS

1902-1903

TUCSON, ARIZONA

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TUCSON, ARIZONA
THE CITIZEN PRINTING AND PUBLISHING COMPANY
1902

CALENDAR

1902

Sept. 15, Monday	}	--	--	--	Entrance Examinations.
Sept. 16, Tuesday					
Sept. 17, Wednesday		--	--	--	Registration day.
Sept. 18, Thursday		--	--	--	First Semester begins.
Nov. 26, Wednesday		--	--	--	Thanksgiving Recess begins.
Dec. 1, Monday		--	--	--	Instruction resumed.
Dec. 19, Friday		--	--	--	Holiday Recess begins.

1903

Jan. 6, Tuesday	--	--	--	--	Instruction resumed.
Feb. 5, Thursday	--	--	--	--	First Semester ends.
Feb. 6, Friday	--	--	--	--	Arbor Day; celebrated also as the Anniversary of the Uni- versity.
Feb. 9, Monday	--	--	--	--	Second Semester begins.
May 31, Sunday	--	--	--	--	Baccalaureate Discourse.
June 2, Tuesday	--	--	--	--	Annual Commencement Ad- dress.
June 4, Thursday	--	--	--	--	Commencement.

BOARD OF REGENTS

EX-OFFICIO

HON. NATHAN OAKES MURPHY	Phoenix
<i>Governor of the Territory.</i>		
HON. ROBERT L. LONG	Phoenix
<i>Superintendent of Public Instruction.</i>		

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HON. WILLIAM HERRING	Tucson
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HON. JAMES A. ZABRISKIE	Tucson
<i>Secretary.</i>		
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FACULTY

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Director and Chemist Agricultural Experiment Station;

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*Professor of Mathematics and Mechanics; Meteorologist Agricultural
Experiment Station.*

FRANK NELSON GUILD, B. S.,

Professor of Mineralogy and Analytical Chemistry;

Associate Professor General Chemistry.

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Professor of Ancient and Modern Languages.

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(Captain U. S. Army.)

Professor of Military Science and Tactics; Instructor in Mathematics.

*MRS. MARY BERNARD AGUIRRE,

Instructor in Spanish.

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Instructor in Physical Culture and the Art of Expression.

MABEL GRAY HOOVER,

Instructor in Domestic Science.

NORA TOWNER,

President's Secretary; Instructor in Stenography and Typewriting.

*On leave of absence.

HATTIE FERRIN, B. S.,
Instructor in English, Latin and History.

ELBERT JOHN HOLLINGSHEAD,
Instructor in Bookkeeping and Civics.

OTHER OFFICERS

HERBERT BROWN,
Curator Territorial Museum.

JAMES STEPHEN MANN, B. S.,
Commercial Assayer.

MILDRED MEDORA CHASE, A. B.,
Preceptress in Charge of North Hall.

JESSIE EAGLESON OGLEVEE, Ph. B.,
Library Assistant.

SEDGWICK P. GREENLEAF,
Superintendent of Grounds.

CHARLES E. CHASE,
Engineer.

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WILLIAM D. WHIPPLE.

UNIVERSITY OF ARIZONA

ORIGIN

The University was established by an act of the Thirteenth Legislative Assembly of the Territory in 1885. The bill was introduced into the Council by Hon. C. C. Stephens of Tucson, carried through the House by the able efforts of Hon. Selim M. Franklin, and approved by the Governor March 12, 1885. A tract of forty acres of land was given by the citizens of Tucson as a site. The University was opened to students October, 1891.

DESIGN

The purpose of the University of Arizona is, in the language of the organic law, "to provide the inhabitants of this Territory with the means of acquiring a thorough knowledge of the various branches of literature, science and the arts;" and so far as possible a technical education adapted to the development of the peculiar resources of Arizona. In furtherance of this latter purpose, instruction is especially provided in agriculture, the mechanic arts, and in mining and metallurgy. The Agricultural Experiment Station, a department of the University, is wholly engaged in developing the agricultural resources of the Territory. The institution aims to fill in the Territory the place occupied in the states by the state universities. That the institution may be of service to all, a sub-collegiate department is maintained.

ORGANIZATION AND ADMINISTRATION

The government of the University is vested in a corporation styled The Board of Regents of the University of Arizona, consisting of the Governor of the Territory and the Superintendent of Public Instruction, *ex-officio*, and four other members appointed by the Governor.

LOCATION AND CLIMATE

The University of Arizona is located at Tucson, 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. 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 has made Tucson a famous winter resort.

The winter climate is especially good; the temperature is cool and strengthening but not severe, the lowest temperature recorded during the average year being about twenty 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. 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.

SITE

The University is situated upon high ground about a mile from the business center of the city with which it is connected by a street-car line. On every side it commands a view of mountain scenery of remarkable extent and grandeur. The location cannot be surpassed for healthfulness. The water supply of the University is drawn from a well on the premises 100 feet deep and is of unusually good quality.

BUILDINGS

The main building, University Hall, is 200x105 feet, two stories in height, the first story of gray stone, the second of red brick, and is completely surrounded by a wide two-story veranda. The building contains the offices, recitation rooms, laboratories and apparatus rooms of the various departments, an assembly room, the libraries of the University and Experiment Station, and the Territorial Museum. Adjoining the main building is the mining annex, 80x60 feet, equipped with metallurgical machinery.

Three brick houses two stories in height are occupied as homes by the president and instructors.

North Hall, a dormitory two stories in height built of gray stone of fine quality, originally provided as a home for male students, has

been refitted for the use of young women. It contains a students' dining-room, kitchen connected therewith, sixteen rooms, each large enough to accommodate two students, and a reception room.

South Hall, a fine brick dormitory containing forty rooms, with bath and toilet rooms, has been recently built for the use of male students and instructors.

A new dining hall, with kitchen, 40x104 feet in size is in process of construction and will be ready for occupancy by June first.

A substantial brick building contains a suite of rooms for the use of the commercial assaying department, the rooms being furnished with a large melting furnace, with necessary muffle furnaces and other accessories.

Joined in continuous structure with the assaying building are the shops of the mechanic arts department, occupying an area 80x95 feet, containing a room for mechanical and free-hand drawing, and the machinery and appliances for the working of wood and iron.

Other buildings are the boiler-house, which also contains the well and pumps whereby the water supply for irrigation and general purposes is obtained; a green-house, 80x21 feet; a propagating-house; the cottage occupied by the classes in domestic science; and a temporary wooden building used for various purposes.

The Twenty-first Legislative Assembly of Arizona has authorized the issuing of territorial bonds to the amount of \$25,000 for the purpose of constructing new buildings. It is expected that the erection of a library and museum building which will also contain administrative offices will be started as soon as this act of the Legislative Assembly shall be approved by Congress.

EQUIPMENT

LIBRARY

The library, containing 7,000 bound volumes and 11,000 pamphlets is open to the use of all students. The books are new and standard. A valuable feature of the library is the collection of complete sets of scientific and literary periodicals, which are of special service in research work.

A complete dictionary card catalogue is maintained.

The reading-room is furnished with about seventy scientific, literary and general periodicals, besides the weekly territorial newspapers.

The Carnegie Library of the city of Tucson is also open to the use of the students of the University.

MUSEUM

The Seventeenth Legislative Assembly of Arizona passed an act establishing a general museum at the University. The object of the museum is to collect materials of all kinds illustrating the resources and development of Arizona, 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 special provision has yet been made by the Legislature for the support of this department aside from a small appropriation for the salary of a curator.

The collections now displayed at the University comprise representative series of minerals, ores and rocks of Arizona. Among these may be particularly mentioned superb specimens from the mines of the Copper Queen at Bisbee. There are also collections of typical rocks and minerals for comparison, and many specimens of ores from different parts of the United States and from abroad. Great numbers of valuable specimens are now stored in trays preparatory to classification and distribution in cases. It is desired to make the collection of ores and minerals fully represent the great mineral resources of Arizona.

The museum is indebted to Mr. Herbert Brown, curator, for a large and valuable collection of skins of the birds of Arizona, which he has deposited in the museum, as well as for a collection of ancient aboriginal pottery and other relics. The fossil skull and teeth of an elephant and other fragmentary remains of extinct animals sent from Yuma by Mr. Brown also deserve special mention.

Historical records of much value are gradually accumulating 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.

The professors at the University have the immediate care of the collections in their respective departments.

BIOLOGY

The biological laboratories occupy three rooms on the second floor of the south wing of the main building. The equipment is such as is required for modern instruction and research in the biological sciences. The library and apparatus are well selected and adapted to the region and the courses offered.

The collections possessed by this department form a very important part of its equipment. The herbarium consists of fully 12,000 sheets of mounted plants, fifty cases of insects, articulate and disarticulate human skeletons, plaster and papier-mâché models of the important structures of the human anatomy, duplicate material for study and dissection. The unique flora and fauna of the mountain, mesa and lowland collecting grounds in close proximity to the institution offer very attractive opportunities for instruction and research.

Of the above herbarium, 2,000 sheets make up the University botanical survey herbarium.

CHEMISTRY

The chemical laboratories are two in number. That used for beginners in the study of general chemistry and qualitative analysis is on the second floor of the main building and is equipped for the experimental and theoretical study of chemical science.

The laboratory for quantitative analysis is on the first floor of the main building. It is provided with analytical and bullion balances of the latest model and is equipped for the teaching of volumetric and gasometric analysis, blow-pipe analysis, metallurgical chemistry, and wet and fire assaying, including apparatus for the electrolytic determination of metals.

The chemical apparatus and collections are adequate and the equipment is good. Both laboratories though fairly adequate for their

work are overcrowded and the time is hoped for when the institution will be possessed of a science building suitably constructed for these purposes.

The laboratory of the Experiment Station occupies three rooms on the first floor, being devoted to analytical work and chemical investigations relating to agriculture. Though not intended for the use of students it is of incidental value to the institution through the investigations which are here conducted.

MINERALOGY

The laboratory for quantitative analysis is used for determinative mineralogy and blow-pipe analysis. The laboratory is supplied with necessary apparatus for student work including glass and wood models for the study of crystallography, hand and reflecting goniometers for the measurement of the angles of crystals, a polariscope for the study of the optical properties of minerals and a type set of 600 minerals.

PHYSICS

Three rooms on the first floor 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 darkened. A beam of sunlight directed by a 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. Adjacent to the lecture room are the laboratory and the apparatus room. Both lecture room and laboratory are supplied with water and gas.

ENGINEERING

In a partly developed territory like Arizona the engineer is called upon for the solution of a great variety of problems in the various lines of civil, hydraulic, mechanical and mining engineering, and in many difficult situations he must depend upon his knowledge and inventive ingenuity to supplement a meager equipment. To prepare the engineering student for such experiences the apparatus in this department has been chosen with a view to giving him the greatest familiarity with the theory, construction and use of those instruments

and machines which observation has shown to be of universal adoption in practical engineering 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; mining transits; engineers' levels; stadia, level and transit rods; aneroid barometers; odometer; automatic water-registers; hook-gauges; three forms of current-meter; 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; a seventy-five light Mather dynamo; a Westinghouse high speed engine; pumps, steam-gauge indicator and calorimeter.

AGRICULTURE AND HORTICULTURE

Because of the situation of the territorial University the educational work in agriculture and horticulture has taken peculiar form, being largely conducted on the correspondence plan, particularly through the "Timely Hints for Farmers" issued under the auspices of the Experiment Station, but of distinct educational value. Three thousand farmers of the Territory are reached regularly twice a month by timely publications on subjects of vital interest.

Small and well selected agricultural libraries of slight cost have been forwarded to a considerable number who have expressed a willingness to receive them.

It is believed that this method of dealing with our situation will become increasingly useful.

The equipment for agricultural instruction is good, consisting of an excellent seed collection, a green-house and gardens for experimental purposes containing many rare and interesting plants, and a well-selected agricultural library.

MINING AND METALLURGY

Attached to the main building is an annex or mill containing machinery and appliances for crushing, sampling, concentrating, amalgamating, leaching, chloriding, cyaniding, and for electrical treatment of various kinds of ore in large or small lots. Power is furnished by a thirty-five horse-power engine.

The mill building has a storage capacity for ore of fifty to one hundred tons. 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 jiggling machines of the Hartz pattern, the finer sizes being jigged upon bottom discharge machines, and the slime worked upon a double Rittinger percussion table, or otherwise as desired. Amalgamation tests may be made upon a working scale by different methods, including plates and riffles, and pans and settlers. A five-stamp gold mill with silver plates and aprons of the latest and most approved construction by Fraser & Chalmers of Chicago permits 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. 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 of from 100 to 500 pounds. It is purposed to rebuild the mill during the coming year and to add to its equipment.

The assay laboratory is equipped with assay furnaces for crucible work, for scorifying and cupeling, and for retorting mercury from amalgam, 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 in qualitative tests of minerals.

MECHANIC ARTS

The mechanic arts building, completed last year largely through the generosity of the Copper Queen Consolidated Mining Company, has a total floor area of 7,900 square feet, divided as follows: Power room and draughting room, each 1,200 square feet; wood-working shop, forge shop and machine shop, each 1,400 square feet; wash room, 600; model room, 400, and store room 300 square feet.

Each shop provides working space for twenty-four students at benches or forges and ample space for machines and tool rooms. The draughting room accommodates thirty-six students.

The power room contains two engines, a dynamo, a blower and an exhauster.

The wood-working shop is equipped with a full assortment of hand tools, four wood-turning lathes, a universal wood-worker, a dimension sawing machine and other modern wood-working appliances.

The forge room contains twenty-four down draught forges, twenty-four anvils, a blacksmith drill-press and all necessary small tools.

The machine shop contains three 14-inch engine lathes, one 24-inch engine lathe, one 16-inch shaper, one 24-inch planer, one 24-inch drill, one universal milling machine, one grinding machine, several smaller machines, vises and a complete outfit of small tools.

The entire building is well lighted and ventilated and the draughting room is heated by steam.

MILITARY

Room O is used as an armory. It is fitted with the necessary gun racks and accessories. The equipment includes 150 old style Springfield rifles, 100 Springfield cadet rifles with complete accoutrements, eight swords and belts, one 3-inch muzzle-loading rifle with carriage and complete equipment, also necessary musical instruments and signal flags.

GENERAL INFORMATION

The departments and courses of study of the University are arranged as follows:

I. COLLEGE OF AGRICULTURE AND MECHANIC ARTS.

A literary course leading to the degree of Bachelor of Philosophy.

A scientific course leading to the degree of Bachelor of Science.

An engineering course leading to the degree of Bachelor of Science.

An agricultural course leading to the degree of Bachelor of Science in Agriculture.

A chemistry course leading to the degree of Bachelor of Science in Chemistry.

II. SCHOOL OF MINES.

A mining engineering course leading to the degree of Bachelor of Science in Mining.

A two years' course in mineralogy and assaying.

A bureau of mines and assaying.

III. AGRICULTURAL EXPERIMENT STATION.

IV. SUB-COLLEGIATE DEPARTMENT.

English, classical and scientific courses.

Manual training and domestic science courses.

Commercial course.

COLLEGE OF AGRICULTURE AND MECHANIC ARTS:
SCHOOL OF MINES

FACULTY

FRANK YALE ADAMS, A. M.,

*President;**Professor of History and Pedagogy.*

WILLIAM PHIPPS BLAKE, Ph. B., A. M.,

*Professor of Geology, Metallurgy and Mining; Director
School of Mines.*

HOWARD JUDSON HALL, A. M.,

Professor of English.

ROBERT HUMPHREY FORBES, M. S.,

Professor of Chemistry.

SHERMAN MELVILLE WOODWARD, M. S., A. M.,

Professor of Mathematics and Mechanics.

FRANK NELSON GUILD, B. S.,

*Professor of Mineralogy and Analytical Chemistry;
Associate Professor of General Chemistry.*

DAVID HULL HOLMES, B. S.,

Professor of Mechanic Arts and Drawing.

GEORGE EDSON PHILIP SMITH, B. S., C. E.,

Professor of Physics and Engineering.

LOUISE H. FOUCAR, A. B., B. Lit.,

Professor of Ancient and Modern Languages.

JOHN JAMES THORNBER, A. M.,

Professor of Biology.

GEORGE WASHINGTON COLE, C. E.,

*(Captain U. S. Army.)**Professor of Military Science and Tactics.*

OPAL LE BARON MCGAUHEY, B. E.,

Instructor in Oratory.

COLLEGE OF AGRICULTURE AND MECHANIC ARTS

The courses offered in the College of Agriculture and the Mechanic Arts provide a liberal training for young men and women along literary and scientific lines, and for young men along engineering, mechanical and agricultural lines. Great latitude of election is given in the literary and scientific courses, but the course in engineering is more rigid in its requirements. Full details of the various courses follow. In all the courses the aim is to combine the practical with the theoretical in instruction. The needs of our young and growing commonwealth are kept in mind, and in all courses some instruction is provided which has for its aim the making of good citizens.

ARIZONA SCHOOL OF MINES

The School of Mines is designed for the education and training of young men in the arts and sciences directly involved in the industries of mining and metallurgy. Especial attention is given to the sciences of mathematics, physics, chemistry, mineralogy, geology, and their applications. The two years' course in Assaying is designed to prepare students as Assayers only. The Bureau of Mines and Assaying, while not directly connected with the work of instruction, affords, with its laboratory and the influx of new material, a valuable object lesson to the advanced students of mining and metallurgy.

REGISTRATION

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 upon entering the University. No student will be registered until the matriculation fee has been paid. After this fee is once paid no farther fee is required for registration. After registration no change in classes can be made without the consent of the committee on registration.

RECORDS

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

Reports of standing in classes are sent each month from the president's office to parents or guardians. 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 expected.

DISCIPLINE

It is earnestly desired that students may be influenced to good conduct by higher motives than fear of punishment. The sense of duty and honor, the courtesy characteristic of ladies and gentlemen are appealed to as the best regulators of conduct. It is the policy of the University to allow as much liberty as will not be abused; but good order will be strictly maintained, and misconduct punished by adequate penalties. Frequenting saloons or billiard rooms, or any conduct harmful to the moral standing of the school will render the student liable to punishment, and in aggravated cases to expulsion. 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. In case of expulsion a student is required by law to surrender to the University his cadet uniform.

Students or classes desiring to make requests of the faculty should file their petition in the president's office before the hour of faculty meeting; class petitions must be presented at least two days before the time of meeting.

VACATIONS AND HOLIDAYS

A short recess (see calendar, page 2) is taken at Christmas time. The long summer vacation begins about June first and continues until the middle of September. The Thanksgiving recess extends from the close of the regular exercises on the Wednesday before Thanksgiving to the next Monday morning.

All legal holidays are observed by the cessation of ordinary University work.

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

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

LIVING ACCOMMODATIONS

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

Young men have excellent quarters in South Hall, a new dormitory building.

North Hall, the home of the young ladies, is in charge of an experienced and capable preceptress who has constant supervision of those rooming there.

Rooms contain a clothes-press, and are provided with single bedsteads, table, chairs, mirror, wash-bowl, pitcher and slop-jar. Students will supply their own lamps, brooms, mattresses, pillows, sheets, blankets, towels, napkins, rugs and such other articles as they may desire for ornamenting their rooms. They will care for their own rooms under the direction of the instructor in charge.

FEES AND EXPENSES

	Lowest.	Highest.
Tuition, free		
Matriculation (paid but once)	\$ 5.00	\$ 5.00
Laboratory and shop fees, varying according to courses, per annum	1.00	30.00
Books, per annum	5.00	20.00
Board, per month	15.00	18.00
Lights per room, per month	.25	1.00

By resolution of the Board of Regents of the University, board is to be paid in advance on the first day of each month. Checks, post-office 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 leaving the University before the end of the semester will receive no rebate from fees.

Text-books required are obtained directly from the publisher through a book association managed on the co-operative plan under the direction of the faculty.

Members of the battalion will be required to provide themselves with the prescribed uniform, which may be obtained at the University. The cost of uniform, which must be deposited in advance, during the

present year has been \$16.25. 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 additional expenditure for outer clothing other than overcoats.

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

RAILROAD RATES

The Southern Pacific, the Maricopa, Phoenix & Salt River Valley, the Santa Fé, Prescott & Phoenix, and the Gila Valley, Globe & Northern railways 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 at least two weeks in advance, to enable him to secure the permits from the proper authorities. Tickets may then be obtained by the student on application to his own local railroad ticket agent. Students at the University may secure transportation to their homes and return at vacation time by making application at the office of the president of the University.

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 regular school work.

REQUIREMENTS FOR ADMISSION

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.

Beginning with September, 1903, for admission to the Freshman class, applicants must be at least sixteen years of age and must pass satisfactory examinations in subjects sufficient to give fifteen credits as described below. Until 1903 twelve credits will be accepted. One study pursued satisfactorily for one year, one period a day, as ordinarily taught in high schools, entitles a student to one credit.

For admission to the course leading to the degree of Bachelor of Philosophy the subjects upon which examinations must be passed, and the credits assigned each, are:

	Credits.		Credits.
English	3	Latin	3
Mathematics	3	French, German or Spanish ..	2
General History and Civics ..	1	Science	1
Elective	2		

For admission to the course leading to the degree of Bachelor of Science, including the degrees of Bachelor of Science in Mining, Chemistry or Agriculture, the subjects upon which examinations must be passed, and the credit assigned each, are:

	Credits.		Credits.
English	3	French, German or Spanish ..	2
Mathematics	3	Science	3
General History and Civics ..	1	Elective	3

The scope of work required in these various subjects is as follows:

ENGLISH—A knowledge of English grammar and of the principles of English composition, and an acquaintance with the works named below. These works are divided into two classes, those intended for thorough study and those intended for general reading. The portion of the examination devoted to the former class will be upon subject matter, form

and structure. In addition, the candidate may be required to answer questions involving the essentials of English grammar, and the leading facts in those periods of English literary history to which the prescribed books belong. In the portion of the examination devoted to the latter class, the candidate will be required to present evidence of a general knowledge of the subject matter, and to answer simple questions on the lives of the authors. The form of examination will usually be the writing of a paragraph or two on each of several topics, to be chosen by the candidate from a considerable number—perhaps ten or fifteen—set before him in the examination paper. The treatment of these topics is designed to test the candidate's power of clear and accurate expression, and will call for only a general knowledge of the substance of the books. In preparation for this part of the requirement, it is important that the candidate shall have been instructed in the principles of English composition. No candidate will be accepted whose work is notably defective in point of spelling, punctuation, idiom, or division into paragraphs.

No student will be admitted without examination, except on the statement from his former instructors that the entire requirement has been fulfilled. Substantial equivalents, properly certified, will be accepted.

For thorough study: For 1902, 1903, 1904, 1905. Shakespeare's *Macbeth*; Milton's *L'Allegro*, *Il Penseroso*, *Comus*, *Lycidas*; Burke's *Speech on Conciliation with America*; Macaulay's *Essays on Milton and Addison*.

For general reading: For 1902. Shakespeare's *Merchant of Venice*; Pope's *Iliad*, Books I, VI, XXII, XXIV; the Sir Roger de Coverley Papers in *The Spectator*; Goldsmith's *Vicar of Wakefield*; Coleridge's *Rime of the Ancient Mariner*; Scott's *Ivanhoe*; Cooper's *Last of the Mohicans*; Tennyson's *The Princess*; Lowell's *Vision of Sir Launfal*; George Eliot's *Silas Marner*.

For general reading: For 1903, 1904, 1905, Shakespeare's *Merchant of Venice* and *Julius Cæsar*; the Sir Roger de Coverley Papers in *The Spectator*; Goldsmith's *Vicar of Wakefield*; Coleridge's *Rime of the Ancient Mariner*; Scott's *Ivanhoe*; Carlyle's *Essay on Burns*; Tennyson's *The Princess*; Lowell's *Vision of Sir Launfal*; George Eliot's *Silas Marner*.

MATHEMATICS—Arithmetic as covered in White's *Advanced Arithmetic* to the appendix, but these subjects will be omitted in the entrance

examinations: longitude and time, present worth, stock investments, exchange, equation of payments, compound proportion, partnership and cube root. Algebra, through quadratic equations, as given in Wells's *Essentials of Algebra*, or Wentworth's *New School Algebra*. Plane geometry as treated in the latest editions of Wentworth or Wells.

GENERAL HISTORY AND CIVICS—As much as is included in Adams's *European History* and Fiske's *Civil Government in the United States* or text-books covering equivalent ground.

***LATIN**—As covered by Collar's *First Latin Book* and *Viri Romæ*, together with Allen and Greenough's *Grammar and texts*; sight reading; *Cæsar*, four books or an equivalent; *Cicero*, four orations; *Vergil*, six books; sight reading from *Nepos*, *Cicero* and *Gellius*; *Daniell's* or *Bennett's Prose Composition*.

***FRENCH**—As covered by Whitney's *French Grammar*, parts I and II; composition; *Super's French Reader*; *Halévy, L'Abbé Constantin*; *Merimée, Colomba*; *Molière, L'Avare*, and at least 300 pages from five different authors.

***SPANISH**—*De Tornos, Combined Spanish Grammar*; *Loiseaux, Elementary Spanish Reader*; *Valdis, Jose*; *Maratin, El si de las Niños*; *Alarcón, El Capitán Venó*; *Galdós, Doña Perfecta*; *Cervantes, Don Quixote*.

***GERMAN**—As covered by Whitney's *German Grammar*; composition; *Heath's first year texts*; together with *Riehl, Der Fluch der Schönheit*; *Schiller, Marie Stuart* and *Jungfrau von Orleans*; *Goethe, Hermann und Dorothea, Iphigenia*; *Lessing, Minna von Barnhelm*.

SCIENCE—Under this head may be offered the required number of credits in the following subjects: physical geography, physiology, botany, chemistry, physics, elementary astronomy. At least half the preparation in science should consist of laboratory work. Note-books, covering such laboratory work as has been performed by the student, should be presented for examination.

ELECTIVE—The remaining credits required may be made up from additional subjects ordinarily taught in high schools.

*If any language is offered it must be to the extent of two credits, since a single year's study of a language is not considered of 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 to the satisfaction of the faculty that they are qualified to proceed with the desired work.

Arrangements have been made with the Arizona Normal School at Tempe, and the Northern Normal School at Flagstaff, whereby students from these institutions may have their record transferred to the books of the University with proper credit, upon presentation of a certificate duly signed by the principal. Students of this University may also obtain the equivalent privilege at the Normal Schools 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.

COURSES OF STUDY AND DEGREES

All facilities and privileges of the University are open to qualified persons of both sexes.

The University offers four-year courses of study leading to the degrees of Bachelor of Philosophy and Bachelor of Science, and to these degrees specialized as shown on page 29. In each course the work is partly required and partly elective, as described by schedules later. Each student doing full work is required to take four hours of recitation work each day. In laboratory work a period of from two to two and one-half hours is 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, provided, however, that in all such cases they show to the satisfaction of the instructors in charge that they can take the course with profit to themselves and without detriment to the regular class.

The faculty reserves the right to omit classes in any course of instruction unless a suitable number of students register for the course.

Students who have completed satisfactorily the required work, and the specified amount of elective work as shown in the accompanying schedules will be given the degree of Bachelor of Philosophy or Bachelor of Science. The special character of any course of study may be indicated by adding to the degree the name of the department, as: Bachelor of Science in Mining, or Bachelor of Science in Chemistry.

Each candidate for graduation is required to present an acceptable thesis embodying the results of a special 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 semester 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 will be conferred upon Bachelors, graduates from this University or

from institutions of equivalent grade, who have successfully pursued at the University a course of study marked out by the faculty and requiring not less than one year.

COURSES OF INSTRUCTION

The following schedule shows the courses in which instruction is offered. The courses themselves are explained later.

Military science and tactics or physical culture is required during the Freshman and Sophomore years. If for any reason a student is excused from these exercises, an additional subject having a minimum of three recitation hours per week will be required.

Numbers within parenthesis indicate hours of recitation per week; when no number is given five hours per week is understood.

Numbers outside parenthesis are the numbers of the courses as outlined on page 30 and following.

FRESHMAN YEAR

Military Science and Tactics (4)	German 1, 2
Physical Culture (4)	Spanish 1, 2
English 1, 2	History 1, 2
Mathematics 1, 2	Botany 1, 2
Latin 1, 2	Artistic Drawing 1, 2
French 1, 2	Shopwork and Drawing 1, 2
Oratory 1, 2 (2)	Chemistry 1, 2

SOPHOMORE YEAR

Military Science and Tactics (4)	Botany 3, 4
Physical Culture (4)	Chemistry 3, 4
English 3, 4 (3)	Chemistry 9, 10
Mathematics 3, 4	Mineralogy 3
French 3, 4 (4)	History 3, 4 (2)
Latin 3, 4 (4)	Engineering 1, 2
German 3, 4 (4)	Physics 1
Oratory 3, 4 (2)	Shopwork and Drawing 3, 4
Spanish 3, 4 (4)	

JUNIOR YEAR

Military Science and Tactics (4)	Zöology 1, 2
Physical Culture (4)	Mineralogy 1, 2
English 5, 6 (3)	History 5, 6 (3)
English 7, 8 (2)	History 7, 8 (2)
Mathematics 5, 6	Chemistry, 5, 6
Economics 1, 2 (2)	Engineering 3
Economics 3, 4 (3)	

SENIOR YEAR

Military Science and Tactics (4)	Logic 1
Physical Culture (4)	Logic 2
English 9, 10 (2)	Ethics 1 (3)
English 11, 12 (3)	Chemistry 7, 8
Psychology 1	Engineering 4
Pedagogy 1	Engineering 5, 6
History 9, 10 (3)	Engineering 7, 8
Astronomy and Geology 1, 2	

CREDITS FOR DEGREES

A CREDIT consists of one subject taken five hours per week throughout the year, or an equivalent of five hours per week. Sixteen credits besides Military Science and Tactics or Physical Culture are required for graduation in any course. Credits offered in the different subjects are shown in the following scheme:

	Credits.	GROUP C.	Credits.
English	4	Botany	2
Oratory	1	Zöology	1
Mathematics	3	Chemistry	4
GROUP A.		Met. Chem. and Ass'ng. ..	1
Latin	2	Astronomy and Geology ..	1
French	2	Mineralogy	1½
German	2	Physics	½
Spanish	2		
GROUP B.		GROUP D.	
History	3	Shop and Drawing	2½
Economics	1	Engineering	4
Philosophy	2½		

The credits necessary for the degree of Bachelor of Philosophy are as follows:

I. Required—English, 3 credits; Philosophy, 2 credits; History and Economics, 1 credit.

II. Group Electives—From Group A, 4 credits; from Group C, 2 credits.

III. Free Electives—4 credits.

The credits necessary for the degree of Bachelor of Science are as follows:

I. Required—English, 1 credit; Mathematics, 2 credits.

II. Group Electives—From Group B, 1 credit; from Group C, 4 credits; from Group D, 3 credits.

III. Free Electives—5 credits.

Women desiring the degree of Bachelor of Science may be allowed to substitute two credits in Group C or in Mathematics for two credits of those required in Group D.

To obtain the degree of Bachelor of Science *in Mining* the following courses must have been elected:

Shop and Drawing, 1, 2; Engineering, 1, 2; Engineering, 3, 4; Engineering, 5, 6; Engineering, 7, 8; Mineralogy, 1, 2; Astronomy and Geology, 1, 2; Chemistry, 9, 10.

To obtain the degree of Bachelor of Science *in Chemistry* the student shall have received four credits in Chemistry and one in Mineralogy.

To obtain the degree of Bachelor of Science *in Agriculture* the following course is required:

FRESHMAN YEAR—English, Solid Geometry, Trigonometry, Higher Algebra, Modern Language, Shopwork and Drawing.

SOPHOMORE YEAR—Higher Algebra, Analytic Geometry, Meteorology, Chemistry, Surveying, Botany, Drawing, Farm Equipment, Soil and Irrigation.

JUNIOR YEAR—Farm Crops, Breeds of Live Stock, Botany, Anatomy, Zoölogy, Entomology, Floriculture, Landscape Gardening, Forestry, Horticulture.

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

EXPLANATION OF COURSES OF INSTRUCTION

(The hours mentioned are the hours of recitation per week.)

ENGLISH

PROFESSOR HALL

The purpose of the courses outlined below is to give a general knowledge of English literature from the sixteenth century to the present time. Chief stress is placed upon the study of a few authors of the most important periods, though the history of our literature is also traced from age to age.

The course in composition aims to develop accurate thought and clear, vigorous expression.

ENGLISH 1, 2. NINETEENTH CENTURY PROSE, COMPOSITION, AND BRIEF HISTORY. *a*—Appreciative, sympathetic criticism of a few prose writers, chiefly Macaulay, Carlyle, Emerson, DeQuincey, Ruskin and the foremost novelists. Lectures and discussions. *b*—Frequent short themes upon assigned and chosen subjects. *c*—A brief survey of the field of English literature. Stopford Brooke's *English Literature, with reading, lectures and discussions*. Open to all students. *Five hours both semesters.*

ENGLISH 3, 4. RHETORIC AND COMPOSITION—Expository and argumentative composition; briefs, themes, essays. Lectures and discussions; Genung's *Practical Rhetoric and Rhetorical Analysis*; Baker's *Specimens of Argumentation (modern)*. Open to students who have taken English 1, 2. *Three hours both semesters.*

ENGLISH 5, 6. ELIZABETHAN LITERATURE—Shakespeare, selected plays; other Elizabethan drama, especially Jonson and Marlowe; Spenser's *Faerie Queene* and shorter poems. Lectures and discussions. Open to students who have taken English 1, 2. *Three hours both semesters.*

ENGLISH 7, 8. EIGHTEENTH CENTURY LITERATURE—From the death of Dryden to the publication of the *Lyrical Ballads, 1700-1798*;

special attention given to the Queen Anne period and the early romantic revival. Lectures and discussions. *Two hours both semesters.*

ENGLISH 9, 10. SEVENTEENTH CENTURY LITERATURE—From the closing of the theaters to the death of Dryden, 1642-1700. Lectures and discussions. Open to students who have taken English 1, 2. *Two hours both semesters.*

ENGLISH 11, 12. NINETEENTH CENTURY POETRY—From the publication of the Lyrical Ballads to the death of Tennyson, 1798-1892. Lectures and discussions; Macmillan's Globe editions. Open to students who have taken English 1, 2. *Three hours both semesters.*

RHETORICALS—The appearance in public rhetorical exercises once during each semester is required of all students taking a University course in English, or taking any course of study leading to a degree.

LATIN

PROFESSOR FOUGAR

The courses below are open to students who have completed the first two years of Latin in the sub-collegiate department, or an equivalent. The aim of the instruction is to impart a comprehensive knowledge of the language and literature. Constant, thorough drills are given in technical grammar and prose composition. In reading, the matter is subjected to grammatical, metrical, rhetorical and historical explanation. The study of the text is made the means of mental discipline, of developing the faculties of observation and critical judgment, and of acquiring habits of thoroughness and accuracy.

LATIN 1, 2. CICERO AND VERGIL—Cicero's Orations, the four Catilinarian; Vergil's Aeneid, six books. Allen and Greenough's texts. Sight-reading from Nepos, Gellius and Cicero; Daniell's Prose Composition throughout the year. *Five hours both semesters.*

LATIN 3, 4. LIVY, HORACE, CICERO—Livy, Book XXI; Horace, selected Odes, Satires; Cicero, De Amicitia and De Senectute; Latin prose composition and sight-reading. Open to students who have taken Latin 1, 2. *Four hours both semesters.*

FRENCH

PROFESSOR FOUCAR

The object of the courses in French is to give the student a practical knowledge of French forms, syntax and pronunciation. Translating from English into French forms a large part of the work. The reading of numerous works of standard authors is designed to enlarge the student's vocabulary, and to give him an appreciative acquaintance with the genius of the language and literature.

FRENCH 1, 2—Whitney's French Grammar, Part I; Super's French Reader; Halévy, L'Abbé Constantin; Mérimée, Colomba; Molière, L'Avare. Open to all students. *Five hours both semesters.*

FRENCH 3, 4—Whitney's French Grammar, Part II; Racine, Athalie; Corneille, Le Cid; Balzac, Eugene Grandet; Daudet, Morceaux Choisis; Hugo, Les Miserables (abridged); Rostand, Cyrano de Bergerac. Open to students who have taken French 1, 2. *Four hours both semesters.*

GERMAN

PROFESSOR FOUCAR

The object of the courses in German is to enable the student to gain rapidly a practical knowledge and use of the German language, a facility in translating, and an intelligent acquaintance with German literature. Special attention is given to grammatical structure, pronunciation, the acquiring of vocabulary and the mastery of idioms. In the reading, the aim is also a study of the form and thought of the works selected.

GERMAN 1 2—Whitney's German Grammar; Heath's first-year texts. Open to all students. *Five hours both semesters.*

GERMAN 3, 4—Riehl's Der Fluch der Schönheit; Lessing's Minna von Barnhelm; Schiller's Marie Stuart, Jungfrau von Orleans; Goethe's Hermann und Dorothea, Iphigenia. Composition; collateral reading; essay writing. Open to students who have taken German, 1, 2. *Four hours both semesters.*

SPANISH

PROFESSOR FOUCAR

The courses outlined below aim to give thorough instruction in Spanish grammar, and in reading, writing and speaking the language.

SPANISH 1, 2—De Tornos's Combined Spanish Grammar; Loiseaux, Elementary Spanish Reader; Valdè, José. Open to all students. *Five hours both semesters.*

SPANISH 3, 4—Maratin, El si de las Niñas; Alarcón, El Capitán Veneno; Galdós, Doña Perfecta; Cervantes, Don Quixote. Open to all students who have completed Spanish 1, 2. *Five hours both semesters.*

HISTORY, POLITICAL SCIENCE AND PHILOSOPHY

PRESIDENT ADAMS

In the work in history emphasis is placed on the social and political development, the relation of cause and effect and the unity of history. The laboratory method is used wherever possible and individual work insisted upon. In political science the historical method is used, and the *subject* rather than any one writer's presentation of it is treated. After a brief presentation of pure economics, the course deals with practical questions. The course in philosophy is arranged with especial attention to the needs of teachers. Upon its completion graduates of the University will receive Territorial Teachers' Certificates.

HISTORY

HISTORY 1, 2. ENGLISH HISTORY—Green's Short History of the English People used as a basis; much assigned reading. A thesis is required. Open to all students. *Five hours both semesters.*

HISTORY 3, 4. AMERICAN COLONIAL HISTORY—A detailed study of the American colonies under Great Britain, and of the United States to the adoption of the Constitution. Lectures and assigned reading. A thesis is required. Open to students who have taken History 1, 2. *Two hours both semesters.*

HISTORY 5, 6. ECONOMIC HISTORY OF THE UNITED STATES—A study of the causes and development of the economic history of the United States. Lectures and assigned reading. A thesis is required. Open to students who have taken History 1, 2. *Three hours both semesters.*

HISTORY 7, 8. SPANISH AMERICAN HISTORY—Spanish settlement and administration during the colonial period; the growth and development of the Southwest, with special reference to Arizona. Lectures

and assigned reading. Open to all students. *Two hours both semesters.*

HISTORY 9, 10. CONSTITUTIONAL HISTORY OF THE UNITED STATES.—A detailed study of the formation of the Union and of the political and constitutional history of the United States, based on letters and speeches of American statesmen, public documents and special histories. A thesis is required. Open to students who have taken History 3, 4. *Three hours both semesters.*

POLITICAL SCIENCE

ECONOMICS 1, 2—A study of the general principles and laws of political economy. Text-book, Walker's *Advanced Political Economy*. Open to Juniors and Seniors. *Two hours both semesters.*

ECONOMICS 3, 4—A study of economic and sociologic problems, such as the currency question, tariff reform, banking, taxation and similar subjects. Lectures and assigned reading. A thesis is required. To be preceded or accompanied by Economics 1, 2. *Three hours both semesters.*

PHILOSOPHY

PSYCHOLOGY 1—A special consideration of the subject as applied to teaching. Lectures, recitations and collateral reading. Open to Juniors and Seniors. *Five hours first semester.*

PEDAGOGY 1—An account of educational evolution, both as a culture fact in the history of civilization and as a foundation for professional work; lectures, giving a brief but comprehensive outline of the school systems of ancient, mediæval and modern countries with a special study of leading educators, such as Socrates, Comenius, Pestalozzi, Froebel, Mann and others; the present trend of pedagogical thought and practice, methods of teaching, school management, art of questioning and school law. Arrangements have been made with the Tucson city schools to use the Holliday school as a practice school for this class. Open to students who have taken Psychology 1. *Five hours second semester.*

LOGIC 1—Text-book, Jevons's *Logic*; reading from Mill, Hamilton, Thompson and others. Open to Juniors and Seniors. *Five hours first semester.*
(Professor Woodward.)

LOGIC 2—A brief history of the development of scientific thought and related philosophical ideas. (Professor Woodward.)

ETHICS 1—Theoretical and practical ethics; view of the histor-

ical development of the science; origin and development of the moral consciousness; application of the principles of ethics to the problems of life. Lectures, discussions and assigned reading. Open to Juniors and Seniors. *Five hours second semester. (President Adams.)*

MATHEMATICS

PROFESSOR WOODWARD, PROFESSOR SMITH.

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 numberless applications where they are indispensable.

MATHEMATICS 1, 2. SOLID GEOMETRY; HIGHER ALGEBRA.—Geometry one-third year; text-book, Wentworth's Solid Geometry. Algebra two-thirds year; text-book, Downey's Higher Algebra. Open to all students. *Five hours both semesters.*

MATHEMATICS 3, 4. TRIGONOMETRY; ANALYTIC GEOMETRY.—Trigonometry one-third year; text-book, Wells's Complete Trigonometry. Analytic Geometry two-thirds year; text-book, Nichols's Analytic Geometry. Open to all students who have taken Mathematics 1, 2. *Five hours both semesters.*

MATHEMATICS 5, 6. CALCULUS; MECHANICS.—Calculus first semester, differential and integral, with special reference to their use in the various branches of engineering. Lectures and recitations; text-book, Hall's Differential and Integral Calculus. Mechanics second semester; composition and resolution of forces; energy; revolving bodies; moment of inertia; impact; stress and strain in materials; graphical and analytical determination of stresses in ties, beams, columns, shafting, and in the members of bridge and roof trusses. Open to students who have taken Mathematics 3, 4. *Five hours both semesters.*

BIOLOGY

PROFESSOR THORNER.

The courses which follow are calculated to articulate with the work done in biology in average western high schools.

BOTANY 1, 2. ELEMENTARY BOTANY.—The general principles of plant morphology, physiology and histology; a knowledge of the more important functions in the vital economy of plant life, followed by a study of the types of the more important groups; a general survey of the plant kingdom. Guide, Atkinson's Botany, supplemented by other texts and lectures. The laboratory studies will form the basis of all the work. Open to all students. *Five hours, or an equivalent both semesters.*

BOTANY 3, 4. ADVANCED BOTANY.—The second year's work is not definitely outlined, but is purposely left open to be formulated as the needs of the students applying appear to demand. Courses in general morphology of the fungi; morphology of the fungi with special reference to parasitic forms injurious to vegetation in the Southwest; histology; physiology, and similar subjects are offered here. Opportunities and facilities are offered for research work. Open to students who have taken Botany 1, 2. *Five hours, or an equivalent, both semesters.*

ZOOLOGY 1, 2. Conducted along lines corresponding very closely to those followed in Botany 1, 2. Laboratory studies as in that course are made the main feature of the work which is based upon living, native material where such is available; but some groups are necessarily studied by the aid of preserved specimens. In the study of the Mammalia constant reference is made to human anatomy, so that this portion is made in part a review of the course in anatomy and physiology offered in the sub-collegiate department. Text-book, Parker and Hazwell's Manual of Zoology. Open to all students *Five hours, or an equivalent, both semesters.*

PHYSICS

PROFESSOR SMITH.

It is the object of this course to familiarize the student with the physical principles which underlie the higher courses of mechanics, thermodynamics, chemistry and engineering; and therefore special attention is given to the study of force and work, the physics of liquids and gases, and heat.

PHYSICS 1.—Lectures, recitations and laboratory work. Open to students who have taken a course in elementary physics, and Mathematics 3. *Three hours, or an equivalent, second semester,*

CHEMISTRY

PROFESSOR GUILD.

The instruction in chemistry has two main objects in view: first, to promote general culture; and secondly, to introduce students to technical work, especially in mining. The first two years' work in general chemistry, qualitative and quantitative analysis, places the student in a position to take up advantageously the study of mining, agricultural chemistry or metallurgy. The third year's work, metallurgical chemistry, can be pursued to advantage only by advanced students. The larger portion of the work, being investigative, requires on the part of the student a certain amount of originality and ingenuity in designing and carrying out experiments. The experience which a student may gain in this work is of great value to him in conducting an assay laboratory or in filling the position of superintendent of a metallurgical plant.

CHEMISTRY 1. GENERAL CHEMISTRY—Lectures illustrating the chemical properties of the elements and their compounds, supplemented by recitations and laboratory practice. Text-book, Remsen's Briefer Course. Open to all students. *Five hours, or an equivalent, first semester.*

CHEMISTRY 2. QUALITATIVE ANALYSIS—Practical work in the laboratory, including the analysis of alloys, commercial products, minerals, and like substances. The course is accompanied by lectures and recitations. Text-book, Eliot and Storer's Qualitative Analysis, and various reference books. Open to students who have taken Chemistry 1. *Five hours, or an equivalent, second semester.*

CHEMISTRY 3, 4. QUANTITATIVE ANALYSIS—Laboratory practice, with lectures and recitations; gravimetric, volumetric, gasometric, calorimetric and electrolytic methods of analysis; quantitative analysis of silicates, minerals, and mattes. Text-books, Fresenius' Quantitative Analysis, Sutton's Volumetric Analysis, and various reference books. Open to students who have taken Chemistry 2. *Five hours, or an equivalent, both semesters.*

CHEMISTRY 5, 6. METALLURGICAL CHEMISTRY AND ASSAYING—Assaying of gold, silver and lead by the furnace method; bullion assaying according to the methods employed in the United States Mint; cyanide process for the extraction of gold; the assaying of cyanide solutions, precipitation of gold, and the treatment of the zinc residues; the

chlorination process; the leaching of silver ores by hyposulphite; preparation and analysis of alloys, with a study of their properties; analysis of iron and steel, fuels and furnace gases. Open to students who have taken Chemistry 3, 4. *Five hours, or an equivalent, both semesters.*

CHEMISTRY 7, 8. ORGANIC CHEMISTRY—Lectures on the carbon compounds; laboratory work in organic analysis and the preparation of organic compounds; vapor density and molecular weight determination. Open to students who have taken Chemistry 3, 4. *Five hours, or an equivalent, both semesters.*

CHEMISTRY 9, 10—A course, especially designed for students who desire to take the degree of B. S. in Mining Engineering. It includes parts of the work in courses Chemistry 3, 4 and Chemistry 5, 6. Open to students who have taken Chemistry 2. *Five hours, or an equivalent, both semesters.*

MINERALOGY

PROFESSOR GUILD.

The main object of the course in mineralogy is to familiarize the student with facts and methods that will enable him to determine the character of an ore or mineral by an observation of its physical properties and by the performance of a few simple tests with the blow-pipe. The value of such a course cannot be over-estimated, since these quick methods of analysis are frequently needed in the field and mine when recourse cannot be had to a well-equipped chemical laboratory. The course is of value also to the student of general science, since it adds to the pleasure of a day in the mountains or field, and is necessary to a full appreciation of the study of geology. The course is not only practical, but the theoretical side of the subject receives attention in mineral optics, crystallography and similar topics.

MINERALOGY 1, 2—Lectures and recitations in crystallography and the classification and uses of minerals; laboratory work in blow-pipe analysis and determinative mineralogy; work with the reflecting goniometer in measuring the angles of crystals, and with the polariscope in studying the optical properties of minerals; the study of a type collection of 600 minerals arranged and classified according to Dana. Text-books, Dana's Text-book of Mineralogy and Brush's Manual of Determinative Mineralogy and Blow-Pipe Analysis. Open

to students who have taken Chemistry 2. *Five hours, or an equivalent, both semesters.*

MINERALOGY 3—Lectures and recitations on the classification and uses of minerals; laboratory work in blow-pipe analysis and determinative mineralogy: the study of a type collection of minerals. Text-books; same as in Mineralogy 1, 2. Open to students who have taken Chemistry 2. Especially designed for students in the two years' mineralogy and assaying course. *Five hours, or an equivalent second semester.*

ASTRONOMY

PROFESSOR BLAKE.

A short course of instruction in astronomy, in which are considered the relations of the earth to the solar and stellar systems is given as an introduction to the study of geology. The astronomy being considered a part of geology is granted no independent credit toward any course of study. Open to Seniors. Lectures and recitations.

GEOLOGY

PROFESSOR BLAKE.

The objects of the course of instruction in geology are chiefly general culture and practical advantages gained in agriculture and mining. The student is instructed regarding the changes that have taken place upon the globe; in the formation of rocks, soils and mineral deposits, and in the progress of life and the environment of humanity.

ASTRONOMY AND GEOLOGY 1, 2—Astronomical introduction (see Astronomy above); geognosy—the formation and composition of the crust of the earth, rock-forming minerals, crystalline and mechanically formed rocks; *dynamic geology*—volcanic formations, metamorphism, erosive agencies, transportation and deposition of rock-forming materials; the origin of soils and their distribution; *structural geology*—stratification and the movements to which strata have been subjected; *stratigraphic and historical geology*—the geological record, progress of life, theories of evolution. *Economic geology*; nature of soils, the relation of geology to agriculture and civilization, mineral fertilizers, mineral deposits, veins, occurrence of ores and metals. *Mining and mining machinery*; methods of mining, transportation of ores, mechanical treatment of ores.

Excursions are made when practicable by members of the class in Geology to some of the more important localities of rock formations near Tucson and to some of the mines.

Lectures, illustrated by rocks and fossils in the museum, photographs, maps, drawings, occasional excursions to the field and to prominent mines. Text-books first semester: Todd's New Astronomy; Heilpin's Earth and Its Story; Geikie's Text-Book of Geology and Class-Book of Geology; Dana's Manual of Geology. Text-books and reference books second semester; Kemp's Ore Deposits of the United States and Canada; Rothwell's Mineral Industry; Bowie's Hydraulic Mining; Reports of the United States Geological Survey; Transactions of the American Institute of Mining Engineers. Open to Seniors, to special students and to the public by special arrangement. *Five hours both semesters.*

SHOP AND DRAWING

PROFESSOR HOLMES.

The purpose of the courses of instruction outlined below is to teach the following:

The properties and commercial classification of common materials of construction.

The application of the principles of constructive geometry to the design and production of a variety of common articles of utility.

The manufacture and manipulation of tools.

The representation, by means of drawing, of structural and ornamental forms.

SHOP AND DRAWING 1, 2—(a) Construction of models of surfaces studied in Descriptive Geometry employing joinery, sheet-metal work, moulding and forging; the design and construction of such subjects as rafter bevels, joints used in frame structures, sheet metal cornices, cupolas, and hoppers; construction of warped surfaces; casting in plaster; forging of irregular work and lathe tools; limited use of engine lathe for cylindrical and taper work and thread cutting; (b) drawing forty plates of problems in Descriptive Geometry. Open to students who have taken the sub-collegiate course in Shop and Drawing, or an equivalent, and who have completed Plane Geometry. *Five hours, or an equivalent, both semesters.*

SHOP AND DRAWING 3, 4—Use of engine, lathe, drill, shaper, planer, milling and grinding machines; construction of machine parts from

forgings and castings; elementary machine design; technical mechanical draughting of machine parts; Patent Office drawings, tracing and blue-printing. Open to students who have taken Shop and Drawing 1, 2. *Five hours, or an equivalent both semesters.*

ARTISTIC DRAWING 1, 2—Decorative composition and artistic drawing; a study of design and ornament; rendering in pen, ink and water colors. Open to all students. *Two hours, or an equivalent both semesters.*

(One-half credit in Group D allowed for this course.)

NOTE—Graphical Statics and Kinematics are taught in connection with the engineering courses.

ENGINEERING

PROFESSOR WOODWARD, PROFESSOR SMITH.

The courses offered under this head are selected with reference to the local conditions and needs of the Territory. While they are made as technical as is possible without sacrificing in other directions, yet the fact is constantly borne in mind that engineering practice changes from year to year, and that a graduate who is thoroughly grounded in the principles of his profession will readily acquire the technical side. The former is necessary; the latter desirable.

ENGINEERING 1, 2. SURVEYING—Use and care of instruments, including plain and solar compasses, levels, transits; plane land surveying; United States system of land surveys; city, topographical, railroad and mine surveying; earthwork computations; determination of azimuth, latitude, longitude and time by observations on the circumpolar stars and on the sun. One full half-day each week is devoted to field practice; plots are made of field surveys and a topographic map of some area in the vicinity of Tucson is executed by each student. Lectures, recitations, drawing and field work. Text-book, Raymond's Surveying. Open to students who have taken Trigonometry. *Three hours both semesters and Saturday forenoons. (Smith.)*

ENGINEERING 3. MINE ENGINEERING—Prospecting; exploratory workings; boring with percussion and diamond drills; hand and machine rock drills; explosives; blasting; laying out of workings; timbering; methods of winning the ore; hoisting and hoisting engines; underground transportation; mine ventilation. Text-book, Ihlse's Manual

of Mining supplemented by lectures. A portion of the time is devoted to drawing engineering structures such as shaft timbering and steel headframes. Open to students who have taken, or are taking, Mathematics 5, 6. *Five hours first semester.* (Smith.)

ENGINEERING 4. METALLURGY OF IRON AND STEEL, COPPER AND LEAD. (a)—Production of pig iron, wrought iron and steel; thorough study of the blast furnace, its construction, management, charge, and products; direct process for wrought iron; puddling, Bessemer, open hearth and crucible processes. (b)—Copper; the preparation and roasting of ores; smelting; converting of mattes; refining; general arrangement of plant. (c)—Lead; sampling and purchasing of ores; smelting in the various types of furnaces; desilverization of base bullion. Drawing is made a feature of this course as of Engineering 3. Open to students who have taken Mathematics 5, 6. *Five hours second semester.* (Smith.)

ENGINEERING 5, 6. (a)—Engineering construction one-third year; masonry construction; piers, dams, retaining walls, arches; graphical investigation of stability; use of concrete; pile foundations. (b)—Hydraulics one-third year; velocity and discharge from orifices, weirs, tubes and pipes; flow in sewers, ditches, canals, and rivers; energy of a jet; measurement of water power; water wheels of various types. Text-book, Merriman's Hydraulics. (c)—Ore dressing one-third year; crushing and pulverizing machinery; sizing; hydraulic classifiers; jigs, vanners, and tables; magnetic separation. Lectures and experimental work with concentrating machines. Open to students who have taken Mathematics 5, 6. *Five hours both semesters.* (Smith.)

ENGINEERING 7, 8. Kinematics of machinery; elementary thermodynamics; theory of the steam engine; types of engines; steam valves and valve diagrams; theory and use of the indicator; compound engines; heat and combustion of fuel; types and management of boilers; design of chimneys; gas, oil, and hot-air engines; solar engines; compressed air machinery; pumps; wind and water as natural sources of power. Lectures, recitations, drawing, and exercises in the shops and laboratories. Text-book, Kinealy's Steam Engines and Boilers. Open to students who have taken Shopwork and Drawing 3, 4 and Mathematics 5, 6. *Five hours both semesters.* (Woodward.)

The value of the engineering courses, especially in designing, is enhanced by a collection of blue-prints of actual constructions. The University is indebted to Fraser & Chalmers of Chicago and the Union

Iron Works of San Francisco for gifts of blue-prints of mining machinery, including roasters, smelters, converters, hoisting frames and engines, and stamp mills.

The Cambria Steel Company of Johnstown, Pa., has recently presented to the institution a collection of the different grades of iron and steel, giving all the chemical and physical data regarding each, and also a series of samples, each six inches long, of structural steel shapes.

MINING EXCURSIONS

In connection with the courses of study in Engineering 3 and 4, together with the courses in mineralogy and chemistry, visits for study and inspection are made to different mining districts of the Territory. The trip for 1902 was taken in February, and was to the copper district of Clifton and Morenci. The University is especially indebted to Mr. Jas. Colquhoun, superintendent of the Arizona Copper Co., for his efforts and care in acquainting the students with the plant under his management, as well as for transportation over the A. & N. M. Ry. which was made a gift to the school.

ORATORY

INSTRUCTOR M'GAUHEY.

The object of this course is to give instruction and training in the principles of expression. Special attention is paid to developing the voice, to strengthening all the powers of the voice and body and to bringing these powers into perfect harmony, that the student may adequately express his ideas. This training is to afford means for general culture, to induce more careful study of and a deeper insight into the meaning and purpose of the great masters of literature.

ORATORY 1, 2—Physical training, laws of health, respiration, voice culture, articulation, orthoepy, physiology of the voice, cure of faults of voice and manner; gesture, rendition, emphasis, grace, deportment. Various styles of recitations committed to memory by each student for delivery before the class. Open to all students. *Two hours both semesters.*

ORATORY 3, 4—Analysis and interpretation of higher forms of literature. Study of great orators and their productions. Preparation and delivery of original orations, To achieve the best results a student

must have a knowledge of rhetoric, logic, psychology and English literature. Lectures and class drill. Open to students who have completed Oratory 1, 2. *Two hours both semesters.*

PHYSICAL CULTURE

INSTRUCTOR M'GAUHEY

The course in physical culture affords a means for the acquisition of health, strength and grace. The practical part of the work consists of free gymnastics and exercises with light apparatus. Special attention is given to exercises for correct carriage of the body in sitting, standing and walking. Lectures in physiology, hygiene, food, and dress furnish the theoretical part of the course. Open to all lady students. Required of all below the Junior year, unless they be excused on account of physical disability; those so excused are required to elect a subject in place of physical culture.

MILITARY SCIENCE AND TACTICS

CAPTAIN COLE.

PRACTICAL COURSE—Exercises on the drill ground covering (a) Infantry exercises in the schools of the soldier; company and battalion; extended order movements, target practice, reviews and parades. (b) Military signaling with flag; telegraphy. Required of all able-bodied male students throughout the Freshman and Sophomore years and elective during the remainder of the course.

THEORETICAL COURSE—Recitations covering the Infantry drill regulations with lectures on military law, discipline, military history, and allied topics. Required of all commissioned and non-commissioned officers.

Students claiming exemption from drill will be required to secure a certificate of disability from a physician designated by the faculty unless the disability is apparent. Those so excused will be required to elect a subject in place of this course. The officers will be appointed from an eligible list determined by examination, both scholarship and class standing being taken into account.

Each member of the military organization will be required to provide himself with the required uniform within six weeks after his entrance. A deposit covering the cost of the uniform should be made upon registration. The uniform consists of cap, coat and trousers of cadet gray cloth trimmed with black braid and closely resembles the undress uniform of the United States Military Academy at West Point.

	MONDAY	TUESDAY	7	WEDNESDAY	THURSDAY	FRIDAY
8:00-9:00	Mathematics 5, 6	†Engineering 3, 4 *Engineering 5, 6	Mathematics 5, 6	Mathematics 5, 6	Mathematics 5, 6	
I 9:00-9:50	English 1, 2 *History 5, 6 †Psychology 1 †Pedagogy 1 †Engineering 3, 4 *Engineering 5, 6	English 1, 2 *German 3, 4 *History 7, 8 †Psychology 1 †Pedagogy 1 †Engineering 3, 4 *Engineering 5, 6	English 1, 2 *German 3, 4 †History 7, 8 †Psychology 1 †Pedagogy 1 †Engineering 3, 4 *Engineering 5, 6	English 1, 2 *German 3, 4 †History 7, 8 †Psychology 1 †Pedagogy 1 †Engineering 3, 4 *Engineering 5, 6	English 1, 2 *German 3, 4 *History 7, 8 †Psychology 1 †Pedagogy 1 †Engineering 3, 4 *Engineering 5, 6	English 1, 2 *German 3, 4 *History 5, 6 †Psychology 1 †Pedagogy 1 †Engineering 3, 4 *Engineering 5, 6
II 9:50-10:40	English 3, 4 Spanish 3, 4 *Economics 3, 4 Mathematics 1, 2, 3, 4 Chemistry 7, 8 †Drawing 1, 2	†History 3, 4 *Economics 1, 2 Mathematics 1, 2, 3, 4 Chemistry 7, 8 †Drawing 1, 2	English 3, 4 Spanish 3, 4 *Economics 1, 2, 3, 4 Mathematics 1, 2, 3, 4 Chemistry 7, 8 †Drawing 1, 2	English 3, 4 Spanish 3, 4 *Economics 1, 2 Mathematics 1, 2, 3, 4 Chemistry 7, 8 †Drawing 1, 2	†History 3, 4 Spanish 3, 4 *Economics 1, 2 Mathematics 1, 2, 3, 4 Chemistry 7, 8 †Drawing 1, 2	English 3, 4 Spanish 3, 4 *Economics 3, 4 Mathematics 1, 2, 3, 4 Chemistry 7, 8 †Drawing 1, 2
III 10:40-11:30	English 5, 6 *French 1, 2 Botany 3, 4 Chemistry 3, 4 Shop and Drawing 1, 2 *Engineering, 7, 8 Chemistry, 7, 8	English 7, 8 *French 1, 2 Botany 3, 4 Mineralogy 1, 2 Shop and Drawing 1, 2 *Engineering, 7, 8 Chemistry, 7, 8	English 5, 6 *French 1, 2 Botany 3, 4 Shop and Drawing 1, 2 *Engineering, 7, 8 Chemistry, 7, 8	English 7, 8 *French 1, 2 Botany 3, 4 Chemistry 3, 4 Shop and Drawing 1, 2 *Engineering, 7, 8 Chemistry, 7, 8	English 7, 8 *French 1, 2 Botany 3, 4 Chemistry 3, 4 Shop and Drawing 1, 2 *Engineering, 7, 8 Chemistry, 7, 8	English 5, 6 *French 1, 2 Botany 3, 4 Mineralogy 1, 2 Shop and Drawing 1, 2 *Engineering, 7, 8 Chemistry, 7, 8
IV 11:30-12:15	English 11, 12 †German 1, 2 Spanish 1, 2 †Ethics 1 Botany 3, 4 Astronomy and Geology 1, 2 Shop and Drawing 1, 2 Chemistry, 3, 4	English 9, 10 †German 1, 2 Spanish 1, 2 Botany 3, 4 Astronomy and Geology 1, 2 Shop and Drawing 1, 2 Chemistry, 3, 4	English 11, 12 †German 1, 2 Spanish 1, 2 †Ethics 1 Botany 3, 4 Astronomy and Geology 1, 2 Shop and Drawing 1, 2 Chemistry, 3, 4	English 9, 10 †German 1, 2 Spanish 1, 2 Botany 3, 4 Astronomy and Geology 1, 2 Shop and Drawing 1, 2 Chemistry, 3, 4	English 9, 10 †German 1, 2 Spanish 1, 2 Botany 3, 4 Astronomy and Geology 1, 2 Shop and Drawing 1, 2 Chemistry, 3, 4	English 11, 12 †German 1, 2 Spanish 1, 2 †Ethics 1 Botany 3, 4 Astronomy and Geology 1, 2 Shop and Drawing 1, 2 Chemistry, 3, 4
V 1:00-1:50	Latin 1, 2 Spanish 1, 2 †Logic 1 Zoology 1, 2 †Physics 1 *Engineering 1, 2 Mineralogy 3	Latin 1, 2 Spanish 1, 2 †Logic 1 Zoology 1, 2 †Physics 1 Mathematics 5, 6 Oratory 1, 2 Mineralogy 3	Latin 1, 2 Spanish 1, 2 †Logic 1 Zoology 1, 2 †Physics 1 *Engineering 1, 2 Mineralogy 3	Latin 1, 2 Spanish 1, 2 †Logic 1 Zoology 1, 2 †Physics 1 *Engineering 1, 2 Oratory 1, 2 Mineralogy 3	Latin 1, 2 Spanish 1, 2 †Logic 1 Zoology 1, 2 †Physics 1 *Engineering 1, 2 Oratory 1, 2 Mineralogy 3	Latin 1, 2 Spanish 1, 2 Zoology 1, 2 †Physics 1 Mathematics 5, 6 Mineralogy 3
VI 1:50-2:40	Latin 3, 4 †French 3, 4 *History 9, 10 Botany 1, 2 Zoology 1, 2 Chemistry 1, 2 Shop and Drawing 3, 4 Chemistry, 5, 6, 9, 10	Latin 3, 4 †French 3, 4 Botany 1, 2 Zoology 1, 2 Chemistry 1, 2 Shop and Drawing, 3, 4 Chemistry, 5, 6, 9, 10	Latin 3, 4 †French 3, 4 *History 9, 10 Botany 1, 2 Zoology 1, 2 Chemistry 1, 2 Shop and Drawing 3, 4 Chemistry, 5, 6, 9, 10	Latin 3, 4 †French 3, 4 *History 9, 10 Botany 1, 2 Zoology 1, 2 Chemistry 1, 2 Shop and Drawing 3, 4 Chemistry, 5, 6, 9, 10	Latin 3, 4 †French 3, 4 Botany 1, 2 Zoology 1, 2 Chemistry 1, 2 Shop and Drawing 3, 4 Chemistry, 5, 6, 9, 10	Latin 3, 4 †French 3, 4 *History 9, 10 Botany 1, 2 Zoology 1, 2 Chemistry 1, 2 Shop and Drawing 3, 4 Chemistry, 5, 6, 9, 10
VII 2:40-3:30	History 1, 2 Botany 1, 2 Chemistry 1, 2, 5, 6, 9, 10 Shop and Drawing 3, 4	History 1, 2 Botany 1, 2 Chemistry 1, 2, 5, 6, 9, 10 Shop and Drawing 3, 4 Oratory 3, 4	History 1, 2 Botany 1, 2 Chemistry 1, 2, 5, 6, 9, 10 Shop and Drawing 3, 4	History 1, 2 Botany 1, 2 Chemistry 1, 2, 5, 6, 9, 10 Shop and Drawing 3, 4	History 1, 2 Botany 1, 2 Chemistry 1, 2, 5, 6, 9, 10 Shop and Drawing 3, 4	Botany 1, 2 Chemistry 1, 2, 5, 6, 9, 10 Shop and Drawing 3, 4 Oratory 3, 4

Courses marked thus † were given in 1901-02, and will be given each alternate year. Courses marked * will be given 1902-03 and each alternate year thereafter. Military Science is held 8.00 a. m. on Monday, Tuesday, Wednesday and Thursday, Physical Culture begins at 8:30 on the same days. Assembly for all students is held at 8:30 a. m. on Friday.

BUREAU OF MINES AND ASSAYING

In accordance with the Act of the legislature of the Territory, approved March, 1897, and amended in March, 1899, assays of ores and minerals are made for the prospectors and miners of Arizona, and for others, at fixed rates established by the law, and tabulated below. To meet the requirements of this work a special laboratory building of brick has been erected and maintained. It is fitted up as a complete assay office, and is provided with a double large brick coke-furnace, a melting furnace and gasoline furnaces in a fire-proof room. There are in addition, a parting and wet assay room, a balance room, and office.

Extreme accuracy and excellence of work are considered of more importance than pecuniary profits. All assays are made in duplicate and if not accordant are repeated. A special expert assayer is employed, and the assays are not made by students, who receive their instruction in the laboratories of the main building.

The money received for assaying is deposited monthly to the credit of the assay fund which is used to pay the assayer and the cost of materials and apparatus.

SCHEDULE OF RATES FOR ASSAYING AND WORKING ORES

In accordance with the Legislative enactment approved March 3, 1899, the rates for assaying heretofore in force under the law of 1897, have been changed. The fifty-cent rate is no longer in force. Former circulars and schedules of rates are revoked and withdrawn. Under the provisions of the new law, the Regents of the University of Arizona have established the following rates for assaying ores taken from deposits and mines in the Territory of Arizona:

ASSAYING ORES FROM ARIZONA

Silver and Gold, or either.....	\$1.00
Silver, Gold and Copper.....	2.00
Copper.....	1.00
Lead.....	1.00
Zinc.....	1.00

SECOND YEAR.

Mineralogy and blow-pipe analysis, two semesters.

Assaying, one semester.

Quantitative analysis and wet assaying one semester.

Mathematics, two semesters.

Geology, two semesters.

TEXT-BOOKS.

The following text-books and others are used:

Chemistry—Remsen, Eliot & Storer, Fresenius.

Assaying—Ricketts, Brown, Furman, Aaron.

Mineralogy—Dana; Brush's Determinative Mineralogy, revised by Penfield.

Geology—Dana, LeConte, Geikie.

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Silver, Gold and Copper.....	2.00
Copper.....	1.00
Lead.....	1.00
Zinc.....	1.00

UNIVERSITY OF ARIZONA

Iron	\$1.00
Gold, Silver, Copper and Lead	2.50
Gold, Silver, Copper and Iron	2.50
Gold, Silver, Copper and Zinc	2.50

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. Remittances may be made by check or money order; or the money, securely wrapped, may be sent with the sample.

RATES FOR SAMPLING AND WORKING ORES

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
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, ton,	20.00
Large lots proportionately less; small lots more in proportion.	

CYANIDE PROCESS

The School of Mines is prepared to make experimental tests of ores and 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 pounds).....	\$15.00
500 pounds to 1 ton.....	20.00
Each additional ton.....	7.00

GRATUITOUS QUALITATIVE TESTS

The determination of the nature of rare and peculiar minerals, not requiring a chemical analysis, or an assay, is made gratuitously. 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. Samples may be sent by mail at the rate of one cent per ounce. They should be distinctly labeled inside the package by the name of the sender, and a letter should be posted at the same time giving the full name and address, and inclosing a stamp for the reply. This offer of free examination is intended to apply to minerals unknown to the sender and does not cover special tests for precious metals or for any metal the presence of which is usually determined by an assay.

HOW TO SEND SAMPLES

For small samples, under four pounds in weight, the most expeditious and cheapest way is to send by the ordinary mail. If samples or letters containing the postal order are sent by registered mail, a delay of from one to three days is caused, as notice of arrival is given first and then the registered parcel must be sent for. A similar delay results from sending by express. The express company does not deliver parcels at the University. Delays often result from the want of identification. Sometimes the only clue to the name of the sender is the comparison of the handwriting upon the sample and that upon the letter. The postal laws permit the name of the sender to be written and inclosed in the package. Each sample should be labeled by a slip of paper, inside, giving the name and locality of the claim and the name of the sender.

The name of the claim is desired in order that the value and distribution of the mineral wealth of the territory may be better known.

NEW ASSAY LABORATORY

Samples are now received and the assays are made in the new laboratory for mining and qualitative work. The laboratory is independent of and apart from the laboratory for students.

Special rates for 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, checks and money orders should be addressed to the

ARIZONA SCHOOL OF MINES,

WM. P. BLAKE, Director

TUCSON, Pima Co., Arizona.

THE AGRICULTURAL EXPERIMENT STATION

STATION STAFF

THE PRESIDENT OF THE UNIVERSITY

R. H. FORBES, M. S.,	-- -- --	Director and Chemist
A. J. McCLATCHIE, A. M.,	-- -- --	Agriculturist and Horticulturist
G. H. TRUE, B. S.,	-- -- --	Animal Husbandry
JOHN J. THORNER, A. M.,	-- -- --	Botanist
W. W. SKINNER, M. S.,	-- -- --	Assistant Chemist
T. D. A. COCKERELL,	-- -- --	Consulting Entomologist
S. M. WOODWARD, A. M.,	-- -- --	Consulting Meteorologist
W. O. HAYES,	-- -- --	Clerk

ORGANIZATION AND WORK

The Agricultural Experiment Station is a legally constituted department of the University, whose purpose is "to aid in acquiring and diffusing * * * useful and practical information on subjects connected with agriculture, and to promote scientific investigation and experiment respecting the principles and applications of agricultural science."

With the above objects in view, the organization of the Station includes the departments of administration, agriculture and horticulture, animal husbandry, botany and chemistry, the whole or a major portion of the time of one or more members of the Station staff being devoted to each department of the Station work. Provision is made for meteorological and entomological work also, though to a less degree.

Owing to the wide variation in agricultural conditions in Arizona, it has been found of advantage to distribute the work so that each department is located, so far as possible, in the situation most favorable to the accomplishment of its own special results. According to this principle, the various lines of Experiment Station work have been distributed as follows:

The Director's office and the departments of botany and chemistry are maintained at Tucson in the University buildings. Through this arrangement, the Experiment Station profits by the buildings, libraries

and associations of the University, while the University is benefited from time to time by the teaching ability of members of the Station staff. It has been found that from this base of operations the three great agricultural districts of the Territory—Salt River valley, the lower Colorado, and the upper Gila—are accessible with equal convenience for field work and observations.

On the same grounds—fitness in location for the work undertaken—the Experiment Station farm has been maintained and is being constantly strengthened at Phoenix. Salt River valley is intermediate in elevation, in situation, and in mean yearly temperature between the other two important farming districts above mentioned, and for this reason the agricultural and horticultural results obtained there are capable of the most general application in the Territory at large.

On the same principle again, the date palm orchard is located in the alkaline district south of Tempe, where a successful demonstration of this palm as a commercial fruit producer will be of the greatest value, creating use for great areas of alkaline land in the arid Southwest.

The range station also, for the study of worn-out range country with a view to its reclamation to usefulness, is located in a typical district near Tucson, and is conducted under the auspices of the department of botany.

The services of specialists in various subjects, such as entomology, meteorology and soil survey work have also been secured from time to time.

The results of the Experiment Station work are made public at frequent intervals in the bulletins and reports of the Station. These publications are made in two series: first, the longer and more technical bulletins, stating in considerable detail the investigations as they mature, and secondly, the "Timely Hints for Farmers," which are brief writings issued at the time when they will be most useful, written in plain language, and presented in popular form. The annual reports also are for the most part written popularly, and afford a convenient and reliable summary of each year's work as it comes to completion.

The Experiment Station work conducted and published on the lines indicated above has a two-fold value. In the first place, the suggestions made or derived from the investigations of the Station are of direct material profit to the agricultural public and may often be immediately applied to advantage in the solution of agricultural problems. In the second place, these writings are intended to serve an

educational purpose, inasmuch as they are so presented as to constitute lesson sheets for the benefit of the careful reader. It may therefore be considered that the Experiment Station reaches a class of some thirty-five hundred readers in the Southwest at frequent intervals by means of its "Timely Hints" and other publications. The operations of the range study tract at Tucson, the Experiment Station farm at Phoenix, the date palm orchard at Tempe, and the sugar beet plots on the upper Gila serve also as an object lesson to the adjacent public.

It is believed that this distribution and mobile organization is especially effective, not only for the purposes of the Experiment Station, but also for those of the University as well, since it allows the Station to conduct its work in localities suitable for the accomplishment of results; and again, it causes the public to become better acquainted with the territorial University, of which the station is a department.

ACKNOWLEDGEMENTS

Thanks are due various publishers and individuals for a number of valuable books given to the library.

The museum has received during the past year many valuable specimens of rocks and minerals, and is especially indebted to Mr. Herbert Brown, of Yuma, for gifts of specimens in natural history, for rare Arizona fossils and remains of extinct animals.

Mr. J. E. Drane of Mesa, has presented a collection of bones, stone implements and other prehistoric remains.

Dr. B. B. Mœur of Tempe has offered a medal to be competed for annually in debate by students of the Tempe Normal School and of the University.

SUB-COLLEGIATE DEPARTMENT

INSTRUCTORS

FRANK YALE ADAMS, A. M., President
ROBERT HUMPHREY FORBES, M. S., Chemistry
SHERMAN MELVILLE WOODWARD, A. M., Geometry
DAVID HULL HOLMES, B. S., Shopwork and Drawing
GEORGE EDSON PHILIP SMITH, B. S., C. E., Physics
JOHN JAMES THORNER, A. M., Physiology
GEORGE WASHINGTON COLE, C. E., Mathematics, Physical Geography
LOUISE H. FOUCAR, B. Lit., French, Spanish
HATTIE FERRIN, B. S., English, Latin
OPAL LE BARON MCGAUHEY, B. E., English Reading, Physical
Culture
MABEL GRAY HOOVER, Domestic Science
NORA TOWNER, Stenography, Typewriting
ELBERT JOHN HOLLINGSHEAD, Bookkeeping, Civics, Commercial Law

GENERAL INFORMATION

In this department the University offers the work of a model High School, with the added advantages of shopwork and drawing and of domestic science.

Students of sufficient age who have finished the study possible to them in their home schools are enabled to continue their preparation for college, at the University, under the most favorable circumstances.

The equipment of the scientific laboratories is available for use in this sub-collegiate work, wherever it can be used advantageously, and makes possible strong work in elementary science. The instructors in this department are assisted by the professors of the college department, several of whom regularly conduct sub-collegiate classes. By reference to the course of study which follows, it will be seen that it offers a comprehensive training for those who may not be able to pursue their studies farther, while it gives a good preparation for college.

While the subjects are for convenience grouped by years in the following schedule, yet the departmental method will be followed. In the description of courses following, the subjects are arranged by groups or departments in the consecutive order in which they are

taken up and students will be required to take them in this order. Aside from this sequence the ability of each student must determine what subjects are pursued at any given time, due regard being given to the proper balance of subjects. Parents are asked to remember that the teachers in this department have had long experience in both public school and collegiate work, and, while the wishes of parents will be followed as far as possible yet in the end the decision rests with the teacher. Individual attention will be given to the needs of each student.

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

COURSE OF STUDY

The following course of study will be required of all students who fit themselves at the University for entrance to the Freshman class in 1903. Such variations from it will be made during the next year as will adapt it to the case of students already in the sub-collegiate department.

Military drill or physical culture is required of all able-bodied students throughout the course.

FIRST YEAR

English and English Reading	7	Elementary Science	5
Commercial Arithmetic	3	Drawing and Shopwork	}
American History	2	or Domestic Science	

SECOND YEAR

English and English Reading	4	*Latin	5
Algebra	5	*Agriculture	5
*Bookkeeping	5	Drawing and Shopwork	}
General History	3	or Domestic Science	

THIRD YEAR

English and English Reading	5	*French	5
Plane Geometry	5	*Spanish	5
Civics	2	*German	5
Parliamentary Practice	1	*Stenography	5
*Physiology $\frac{1}{2}$, Chemistry $\frac{1}{2}$	5	*Drawing and Shopwork	}
*Latin	5	or Domestic Science	

FOURTH YEAR

English and English Reading	6	*Latin	--	--	--	--	4
Algebra $\frac{1}{2}$, Higher Arith. $\frac{1}{2}$	4	*French	--	--	--	--	4
Parliamentary Practice	--	*Spanish	--	--	--	--	4
*Physics	--	*German	--	--	--	--	4
	5	*English History	--	--	--	--	3

Numerals indicate number of recitations per week. Subjects marked * are elective. Two subjects from the electives must be chosen each year for the last three years.

MATHEMATICS

The course in arithmetic begins with percentage and includes a thorough review of the remainder of the subject. Special stress is laid on thoroughness and accuracy and a comprehension of the unity of the subject. Much time is given to the mental examples in order to develop accuracy and rapidity in all mental operations.

In algebra special attention is given to the transition from arithmetic to algebra, to the fundamental operations and especially to factoring. The course includes as much as is found in any good text-book of algebra through quadratic equations.

Plane geometry occupies one year. This is so taught as to develop orderly habits of thinking and of investigation. To that end much original work is required, including practical problems involving the application of the principles learned.

ENGLISH AND ENGLISH READING

The course in English embraces grammar, composition and rhetoric, besides a critical study of assigned classics. It begins with a systematic study of grammar. Throughout the whole course attention is paid to work in composition, the aim being to enable the student to express himself clearly, accurately and with ease. In rhetoric much attention is paid to the principles of style and expression. The English classics studied in this department are those required for entrance to the University, as mentioned on page 23.

Under the general head of English reading the students are given drill in the elementary principles of reading and elocution. Much of the required work in preparatory English is done under this head.

The course in English reading aims to enable the pupil to comprehend the best thoughts of the best authors and to acquire a taste for good literature.

The work includes a thorough study of the elements of modulation,

emphasis, and an elementary training of the voice. By far the greater part of the time is devoted to a somewhat careful study of selected classics.

The text-books in use during 1902-3 are those of the entrance requirements in English, page 23.

HISTORY

The aim of all the work in history is to lead the pupil to see the development of races and nations along political, social and religious lines, and to arouse in him a love for the subject and a habit of broad and discriminate reading.

American history is reviewed during the first year. Montgomery is used as a text-book with Smyth's Topical Manual, but much collateral reading is required and the institutional side of the history is made prominent.

The work of the second year includes ancient, mediæval and modern history. The aim is to give the student an idea of the essential unity of history and the leading facts in the political development of races and nations. Adams's European History is used supplemented by the reading of references contained therein.

Fiske's Civil Government in the United States is the text-book in civics. The historical development of the subject is made prominent while practical problems, such as taxation and municipal government, are made the subject of special investigation and study.

Coman and Kendall's History of England is used as the text-book in the fourth year.

LATIN, FRENCH, SPANISH AND GERMAN

For an outline of the course in Latin see page 24, under requirements for admission.

For an outline of the courses in French, Spanish and German see pages 32, 33.

DRAWING AND SHOPWORK

This course in Manual Training is the preparatory course leading up to the College Mechanic Arts course described on page 40. The work consists of both drawing and shop work, between which subjects the student's time is about equally divided. The course covers three years and is designed to furnish a thorough elementary knowledge of Manual Training as taught in the sub-collegiate schools of the country.

First Year—*Drawing*: freehand; lettering; geometrical designs; historic ornament.

Shopwork: wood carving; geometrical designs; historic ornament.

Second Year—*Drawing*: instrumental; geometrical constructions; orthographic projections.

Shopwork: joining and wood turning; cabinet work and woodenware.

Third Year—*Drawing*: mechanical draughting; shop drawings; free-hand drawing; freehand working sketches, and sketching from nature; lettering.

Shopwork: Forging, pattern-making, and moulding.

DOMESTIC SCIENCE

The course in domestic science is arranged to give instruction in the science and art of home economics, and to raise home making to a higher plane. It includes all branches of home science, hygiene, chemistry of cooking and cleaning, preparation of all food stuffs, both fancy and elementary.

Two courses are offered in sewing. The first year includes fancy needle work, and the second year drafting, cutting and dressmaking. The course includes laundering of laces and ribbons, nursing and food for the sick, marketing, management of servants. Social duties and customs of society are considered with particular care. The students have access in the domestic science library to all the best authorities.

BOOKKEEPING, STENOGRAPHY AND TYPEWRITING

Bookkeeping is taught by the modern budget system. The work is individual and each student may progress as fast as his time and ability permit. The course is thorough in all the details of office practice. The course includes instruction in commercial law. A complete course in stenography is offered, the Pitman system being used. The department is equipped with Remington typewriters.

PARLIAMENTARY PRACTICE AND DEBATE

The two higher classes in the sub-collegiate department devote one period of each week to work in parliamentary practice and debate. The classes are organized under a regular constitution and by-laws.

Instruction is given in parliamentary law, Roberts's Rules of Order being used as a text-book. The members are required to introduce resolutions and prepare debates upon them. They are also given practice in performing the duties of secretary and in presiding in the meetings.

SCIENCE

It is the object of the course in science to initiate the student into the processes and methods used in laboratory work; to teach close observation, careful manipulation and logical deduction; to acquaint the student with the fundamental facts of the various branches of science and to give full practice in the use of good English in describing various observations and experiments.

An introductory laboratory course is given in the first year. The third year is given half to physiology and half to chemistry, pursued on the laboratory plan. During the fourth year a rigid course is given in physics, fully covering college preparatory physics with ample experimental work. Abundant apparatus and laboratory facilities are supplied for all these courses.

AGRICULTURE

It is not intended here to anticipate the work prescribed in the regular college course in agriculture but rather to present certain practical, elementary phases of the subject found to be of especial value in this region. The course will deal with many of the varied problems which confront the Arizona farmer and will be of exceptional benefit to those who have spent some time on an Arizona farm and are accordingly acquainted with existing agricultural methods. The "Timely Hints" published by the Experiment Station will be closely followed when applicable, the bulletins of the various stations carefully examined as the subjects may demand and the student will be encouraged to preserve for future use valuable references in the way of bulletins and other agricultural works.

Such subjects as the following will be discussed and to the extent possible, illustrated by means of experiments:

Weeds, their means of propagation and dissemination, their frequency and abundance, with methods of eradication. Life-history of fungi causing common plant diseases with methods of control. Treat-

ment of insect pests. Collection, preservation and germination of seeds of economic trees and shrubs, with proper methods of tree planting and proper trees to plant for forest, fruit or ornament. Irrigation of gardens and fields; things that must be known before successful irrigation is possible. Practicability of constructing dams to hold storm water for agricultural and grazing purposes. Forage plants of the Territory, including grasses, salt bushes and other plants, their reproduction and conservation; study of these plants from the Experiment Station grass garden. Range reclamation and restoration; study of Experiment Station range reserve. Soils, treatment of, also adaptability to various plants.

MILITARY ORGANIZATION 1901-02

COMMANDANT OF CADETS, CAPT. GEORGE W. COLE, U. S. A.

STAFF

Adjutant	-- -- -- -- --	Captain Roy G. Mead
Sergeant-Major	-- -- -- -- --	Roy W. Moore
Chief Trumpeter	-- -- -- -- --	Philip L. Macomb

COMPANY "A"

Captain	-- -- -- -- --	Edward S. Stafford
First Lieutenant	-- -- -- -- --	Courtland F. Day
Second Lieutenant	-- -- -- -- --	Kirk T. Moore
First Sergeant	-- -- -- -- --	Thomas K. Marshall
Sergeant	-- -- -- -- --	Bard L. Cosgrove
Sergeant	-- -- -- -- --	Ralph Cadwell
Sergeant	-- -- -- -- --	Oliver Scow
Corporal	-- -- -- -- --	H. Clay Parker
Corporal	-- -- -- -- --	Ernest Jones
Corporal	-- -- -- -- --	Edward M. Riggs
Corporal	-- -- -- -- --	Francis D. Crable
Musician	-- -- -- -- --	Hiram S. Corbett
Musician	-- -- -- -- --	Elwood R. Wager

COMPANY "B"

Captain	-- -- -- -- --	Elbert P. Drumiler
First Lieutenant	-- -- -- -- --	Walter E. Hadsell
Second Lieutenant	-- -- -- -- --	William D. Whipple
First Sergeant	-- -- -- -- --	Allan C. Bernard
Sergeant	-- -- -- -- --	Ross M. Russell
Sergeant	-- -- -- -- --	William W. Dickinson
Sergeant	-- -- -- -- --	Sheldon Ijams
Corporal	-- -- -- -- --	Fred H. Bernard
Corporal	-- -- -- -- --	Roy B. Kilgore
Corporal	-- -- -- -- --	Willis H. Buehman
Corporal	-- -- -- -- --	Monte Mansfield
Musician	-- -- -- -- --	Arthur Ferrin
Musician	-- -- -- -- --	Chester Drumiler

ALUMNI ASSOCIATION

ORGANIZED JUNE 2, 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 an association 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 the association must be made at a regular meeting, and have the assent of two-thirds of the members present.

ALUMNI OF UNIVERSITY OF ARIZONA

1895

Charles Oma Rouse, B. S., Clerk of Board of Supervisors of Pima county, Tucson, Ariz.

Mercedes Anna Shibell, B. S., (Mrs. M. A. Green), Teacher, 2103 Thompson Street, Los Angeles, Cal.

Mary Flint Walker, B. S., (Mrs. Pearl Adams), Benson, Ariz.

1897

Clara Cramond Fish, B. S., Teacher, Tucson, Ariz.

George Ojeda Hilzinger, B. S., Teller in Bank, El Paso, Texas.

Mark Walker, Jr., B. S., Metallurgist, Tucson, Ariz.

1898

Hattie Ferrin, B. S., Instructor, University, Tucson, Ariz.

Granville Malcom Gillett, B. S., Draughtsman, Surveyor General's Office, Phoenix, Ariz.

Minnie Watts, B. S., (Mrs. Dr. W. B. Smith), Teacher, Altaville, Cal.

*John Desha Young, B. S., Assayer, Elkhart Mining Co. Chloride, Ariz.

1899

Robert L. Morton, B. S., Assayer, Yuma, Ariz.

1900

Ida Clarissa Flood, B. S., Teacher, Tucson, Ariz.

Samuel Pressly McCrea, B. S., Student Stanford University, Palo Alto, Cal.

*Died April 8, 1899.

Charles Pierce Richmond, B. S., Student, University of California,
Berkeley, Cal.

Florence Russell Welles, B. S., Teacher, Tucson, Ariz.

1901

Rudolph Castañeda, Surveyor, Benson, Ariz.

Clara Ferrin, Teacher, Tucson, Ariz.

George Millard Parker, Student, University of California, Berkeley
Cal.

DEGREES CONFERRED

1901

BACHELOR OF SCIENCE

Rudolph Castañeda

Clara Ferrin.

George Millard Parker

David Hull Holmes, *nunc pro tunc*

REGISTER OF STUDENTS

1901-1902

POST GRADUATE STUDENTS

Akin, Andrew Gilbert (A. B. St. Lawrence University)	
Chemistry.....	Lisbon Center, New York
Barnes, Mrs. Baron S. (B. S. Iowa State University)	
French.....	St. Louis, Missouri
Fish, Clara Cramond (B. S. University of Arizona)	
Oratory.....	Tucson
Walker, Mark Jr. (B. S. University of Arizona) Surveying.....	Tucson

SENIORS

Andrews, Edwin Harold.....	San Francisco, Cal
Blumenkranz, Moses.....	St. Louis, Missouri
Brown, Ruth.....	Tucson
Haynes, Felix Grundy.....	Casa Grande
Parrott, Rosa Bell.....	Roseburg, Oregon
Reilly, Philip Matthew.....	New York City
Smith, Bertram L.....	Phoenix
Smith, Bessie.....	Tucson
Steele, Thomas Edward.....	Wilcox
Wakefield, Walter James.....	Tucson

JUNIORS

Alexander, William Burnham.....	Melrose, Mass
Christy, Fred Chase.....	Phoenix
Drane, Richard Lamar.....	Mesa City
Fleming, Anna M.....	Lincoln, Missouri
Gillett, Leslie Alexander.....	Phoenix
Hollingshead, Elbert John.....	Phoenix
Jones, Edward Horton.....	Tucson
Kleton, Frank Caleb.....	St. Albans, Vermont
Prout, Estelle Markham.....	Denver, Colorado
Prout, John Willard, Jr.....	Denver, Colorado
Reid, Ida Christina.....	Tucson

SOPHOMORES

Bley, John Payson	Pasadena, Cal
Calderwood, Martin Harrison	Phoenix
Damon, John Churchill	Concord, Mass
Guild, Marilla Merriman	Tucson
Heflin, Theodore Turner	Phoenix
Holmesley, Georgia Ann	Tempe
Johnston, Robert E.	Grand Haven, Mich
Katzenstein, Alma Fanny	Tucson
Mead, Roy Gibbons	Tucson
Norway, Ora Elinor	Tucson
Parker, Henry Clay	Phoenix

FRESHMEN

Anderson, Quintus James	Tucson
Castañeda, Henry Elias	Benson
Day, Courtland Francis	Duncan
Drumiler, Elbert Perl	Congress
Fish, Florence	Tucson
Gebb, John Wesley	Jerome
Hess, Arthur George	Ottawa, Illinois
La Baree, Grace Ysabel	Berkeley, Cal
Marshall, Thomas K	Mammoth
Moore, Kirke Tonner	Tucson
Murphy, Carobel	Tucson
Owen, James Edward	Albuquerque, N. M.
Roberts, Norman John	Benson
Russell, Ross Moody	Phoenix
Stafford, Edward Sarterlie	Safford
Tompkins, Ethel	Boonville, Missouri
Whipple, William Dominicus	Clifton

UNCLASSIFIED

Abbott, Lottie Fuller, Assaying	Tombstone
Bronson, George Gordon, Assaying	Wyoming, Iowa
Buel, Joseph Fishel, Chemistry	Oakland, Cal
Compton, Rowena Ula, Spanish	Orleans, Indiana
Daily, William H., Chemistry	Carthage, Illinois
Darcy, Leah Fraser, Spanish	Los Angeles, Cal
Goodwin, James Cooper, Assaying	Tempe

REGISTER OF STUDENTS

67

Guild, Mabel Aenella, Botany	Tucson
Hadsell, Walter Elias, Assaying	Buckeye
Hawley, Fred Graham, Assaying	Tucson
Holmes, William E., Surveying	Austin, Texas
Lee, Tung Yung, Assaying	Tucson
Lindsey, John Merton, Assaying	Oakdale, Cal
Martin, Ida Reyner, English	Tucson
Mitchell, Catharine, English	Tucson
Richins, Osburn, Assaying	Mesa City
Ryan, Thomas Francis, Geology	Tucson
Sibley, Alice F, Geology	Tucson
Sibley, Frank J., Geology	Tucson
Yaeger, Harlow Alonzo, Spanish and Shop	Phoenix

SUB-COLLEGIATE—FOURTH

Barry, Edward Rains	Safford
Bernard, Allan Chouteau	Tucson
Bernard, Fred Horton	Tucson
Cadwell, Ralph	Wilcox
Colton, Georgiana	Florence
Cosgrove, Bard L	Chicago, Illinois
Dickinson, William Wallace	Little Rock, Arkansas
Feldman, Mabel	Tucson
Guild, Roy	Tucson
Ijams, Sheldon	Safford
Kilgore, Roy Bartley	Williams
Mead, Minnie Jean	Tucson
Minus, Clarence Amos	Bisbee
Moore, Nino	Tucson
Moore, Roy Webb	Tucson
Morfoot, Charles Roy	Bisbee
Murphey, Robert Bivins	Tucson
Olney, Claborn Clanton	Safford
Pendleton, Rose	Globe
Priest, Raymond Marshall	Yuma
Scow, Oliver	Dos Cabezas
Thomas, Samuel Pierce	Tucson

SUB-COLLEGIATE—THIRD

Aldridge, Conrad Milton	Tucson
Batchelder, Mae	Tombstone

Bayless, Zebulon Vance.....	Oracle
Bell, Elizabeth.....	Tucson
Bell, Helen.....	Tucson
Bernard, Noah Curry.....	Tucson
Bonillas, Ygnacio Safford.....	Nogales, Mexico
Brena, Pedro.....	Tucson
Brown, Harriet Estella.....	Tucson
Brown, James Kilroy.....	Tucson
Buehman, Willis Harry.....	Tucson
Cheyney, Frances.....	Tucson
Cole, Leah Margaret.....	Phoenix
Contreras, Stephana.....	Tucson
Crable, Francis Drake.....	Tombstone
Davis, Hattie Louisa.....	Tucson
Drachman, Lucille.....	Tucson
Ferrin, Arthur Harry.....	Tucson
Fiske, Fanny May.....	Globe
Fitch, Constance.....	Tucson
Garner, Lillian Bertha.....	Tucson
Gebb, William Stanley.....	Jerome
Godfrey, Frank Ray.....	Bisbee
Hauser, Julius.....	Wilcox
Jones, Ernest.....	Tucson
Mansfeld, Phyllis.....	Tucson
Marlar, William Edward.....	Phoenix
Nelson, Ada M.....	Chicago, Illinois
Page, Alfonso Glide.....	Tucson
Perry, Mary Emma.....	Tucson
Purcell, Teresa.....	Tucson
Purcell, Weda.....	Tucson
Redd, Paul Chester.....	Tucson
Samuels, Katharine.....	Tucson
Schneider, Gustav von Hemet.....	Tucson
Shanley, Nannie.....	Globe
Smith, Christopher Andrew.....	Arizona
Spinas, Nellie.....	Florence
Steinfeld, Irene.....	Tucson
Stratton, Elmer Willis.....	Tucson
Tarbox, Birdie Evaline.....	Tucson
Taylor, Clara.....	Guaymas, Mexico

Walsh, Nellye May	Tucson
Whomes, Arthur	Los Angeles, Cal
Wimberly, Willie	Lordsburg, New Mexico
Winchester, Robert Schnor	Tucson
Wood, Leslie Margaret	Bonita
Woods, Mary Etta	Tucson
Zellweger, Elsie	Tucson
Zellweger, John	Tucson

SUB-COLLEGIATE—FIRST

Altenburgh, Birdie	Phoenix
Boscha, Alfred Arthur	Congress
Brown, Clara Agnes	Tucson
Brown, John Stephenson	Tucson
Buehman, Albert Rex	Tucson
Castro, Felipe	Magdalena, Sonora, Mexico
Clarke, Edna May	Tucson
Coles, Henry Oliver	Bisbee
Corbett, Hiram Steven	Tucson
Dial, Harry	Safford
Drumilier, Chester Arthur	Congress
Fetterly, Zena Ownby	Tucson
Flood, Edna Lurania	Tucson
Francis, Mary	Tucson
Fulton, Alma Riggs	Tucson
Gallen, George Cleveland	Tombstone
Grove, Isabella	Ottawa, Illinois
Gruninger, Ora	Tucson
Harley, James Wardner	Nogales
Hoover, John Fred	Phoenix
Hughes, Samuel	Tucson
Johns, Albert Arthur	Prescott
Johns, Pauline Anita	Prescott
Kirsch, Karl	El Paso, Texas
Kohler, George William	Tucson
Langpaap, Charles	Tombstone
Lindsey, John Merton	Oakdale, Cal
Lovell, Ira Welch	Tucson
Macomb, Philip Livingston	Fort Huachuca
Mansfeld, Monte	Tucson
Marlar, Claud George	Phoenix

Marrs, John Silas.....	Tombstone
McKenna, Manuel Sosa.....	Tucson
McNelly, Benjamin Arthur.....	Globe
Menager, Lucy.....	Tucson
Myers, Emma.....	Tucson
Ochoa, Mary Louisa.....	Tucson
Owen, Blanche Elizabeth.....	Tucson
Parks, Harry Oscar.....	Wilcox
Pease, Ione Gertrude.....	Tucson
Pesqueira, Roberto.....	Hermosillo, Mexico
Pusch, George.....	Tucson
Reay, Miles William.....	Thatcher
Riggs, Edward Murray.....	Wilcox
Rose, Maud.....	Globe
Smith, William Robert.....	Prescott
Soldini, Chorlotte Virginia.....	Tucson
Steele, Earl.....	Wilcox
Stratton, Elmer Willis.....	Tucson
Suarez, Benito Guadalupe.....	Solomonville
Sutherland, Frank Otto.....	Tucson
Sutherland, William Ray.....	Tucson
Thomas, Harry Bryson.....	Tucson
Trenberth, Edwin Hercules.....	Providence
Villaescusa, Phillip.....	Tucson
Wager, Elwood Roy.....	Jerome
Ziemer, Grace Lillian.....	Prescott

UNCLASSIFIED

Arthur, Chester Moore, Stenography.....	Tucson
Beach, Bessie Nell, English Reading.....	Tucson
Brown, Clara Beatrize, Physical Culture.....	Tucson
Bulla, Mrs. Mary E. L., Stenography.....	Tucson
Case, Mrs. Carrie E., Spanish.....	Tucson
Clack, William Luke, Stenography.....	Henderson, North Carolina
Culver, Emma Louise, Stenography.....	Tucson
Gardiner, Mrs. Kate, Stenography.....	Tucson
Gung'l, John Carl, Commercial.....	Tucson
Harrison, Eleanor Hargrove, Stenography.....	Tucson
Myers, Gertrude Adelaide, Stenography.....	Tucson
Olwell, Julia, English Reading.....	Central Point, Oregon
Ricks, Mrs. Mira Neal, Stenography.....	Tucson

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