REGISTER
OF THE
VERSITY OF ARIZONA
FOURTEENTH YEAR
1904-1905

ANNOUNCEMENTS
1906-1907

Tucson, Arizona
MDCCCCCV
Map of the Campus
UNIVERSITY
of
ARIZONA.
TUCSON, A. T.
Student Surveys
Scale
240 Feet to 1 Inch.
REGISTER

OF THE

UNIVERSITY OF ARIZONA

FOURTEENTH YEAR
1904-1905

ANNOUNCEMENTS
1905-1906

TUCSON, ARIZONA
F. E. A. KIMBALL, Printer
1905
CALENDAR.

1905.

Sept. 14, Thursday \quad \text{Entrance Examinations.}
Sept. 15, Friday

Sept. 18, Monday \quad \text{Registration Day.}
Sept. 19, Tuesday \quad \text{First Semester begins.}
Nov. 22, Wednesday \quad \text{Thanksgiving Recess begins}
Nov. 27, Monday \quad \text{Instruction resumed.}
Dec. 22, Friday \quad \text{Holiday Recess begins.}

1906.

Jan. 2, Tuesday \quad \text{Instruction resumed.}
Feb. 1, Thursday \quad \text{First Semester ends.}
Feb. 2, Friday \quad \text{Arbor Day: Anniversary of the University.}
Feb. 5, Monday \quad \text{Second Semester begins.}
June 3, Sunday \quad \text{Baccalaureate Discourse.}
June 4, Monday \quad \text{Exhibition Military Dept.}
June 5, Tuesday \quad \text{Exhibition Mechanic Arts Department.}
June 6, Wednesday \quad \text{Commencement.}
BOARD OF REGENTS.

Ex-Officio.

HON. JOSEPH H. KIBBEY...................... Phoenix
Governor of the Territory.

HON. NELSON G. LAYTON...................... Phoenix
Superintendent of Public Instruction.

Appointed by the Governor.

WALTER TALBOT......................... Phoenix
Chancellor.

GEORGE J. ROSKRUGE.................... Tucson
Secretary.

MERRILL P. FREEMAN.................... Tucson
Treasurer.

CHARLES H. BAYLESS, A. M.,............. Tucson
FACULTY.

KENDRIC CHARLES BABCOCK, Ph. D.
President, Professor of History. 1903*.

WILLIAM PHIPPS BLAKE, A. M.
Ph. B., 1852, Yale; A. M., Dartmouth.
Professor of Geology, and Mining; Director School of Mines. 1895†.

HOWARD JUDSON HALL, A. M.
B. S., 1890, Michigan (Agricultural); A. B., Stanford; A. M., 1900,
Professor of English; Dean of the Faculty. [On leave till September 1, 1905.] 1891.

ROBERT HUMPHREY FORBES, M. S.
B. S., 1892, M. S., 1895, University of Illinois.
Director and Chemist Agricultural Experiment Station. 1894.

FRANK NELSON GUILD, M. S.
B. S., 1894, M. S., 1903, Vermont.
Professor of Chemistry and Mineralogy. 1897.

DAVID HULL HOLMES, B. S.
1892-1894, Washington University; B. S., as of 1901, Arizona.
Professor of Mechanic Arts and Drawing. 1898.

GEORGE EDSON PHILIP SMITH, C. E.
B. S. 1897; C. E., 1899, Vermont.
Professor of Physics and Engineering. 1900.

JOHN J. THORNBER, A. M.
B. S., South Dakota (Agricultural); B. S., 1897. A. M., 1901, Nebraska.
Professor of Biology; Botanist, Agricultural Experiment Station. 1901.

IVAN DELASHMUTT, B. S.
B. S., 1901, California.
Professor of Metallurgy. 1904.

*Dates following titles indicate appointment to service in the University.
†Prof. Emeritus after September, 1905.
VERNON A CLARK, B. S.
B. S., 1898, Vermont.
Professor of Agriculture and Horticulture, Agricultural Experiment Station. [Residence, Phoenix.] 1904.

SAMUEL VICTOR McCLURE,
Professor of Military Science and Tactics. 1904.

EDWIN MORTIMER BLAKE, Ph. D.
Mining Engineer. 1890, Ph. D., 1893, Columbia.
Professor of Mathematics and Mechanics. 1904.

SIDNEY CARLETON NEWSOM, A. M.
Assistant Professor of English. 1904.

ORIN ALBERT KATES,
Assistant Professor of Physical Training Director of the Gymnasium and Athletics. 1904.

CHARLES ALFRED TURRELL, A. M.
B. S., 1896, Nebraska; A. M., 1901, Missouri.
Assistant Professor of Modern Languages. 1904.

HENRY B. SLADE, A. B.
A. B., 1895, Brown University.
Associate Chemist, Agricultural Experiment Station. 1904.

MABEL GRAY HOOVER,
Graduate Oread School of Domestic Science.
Instructor in Domestic Science. 1901.

HATTIE FERRIN, B. S.
B. S., 1898, Arizona.
Instructor in English and Latin. 1901.

MARIAN CUMMINGS STANLEY, B. L.
B. L., 1900, California.
Instructor in Latin and Philosophy. 1902.

GEORGE MARK EVANS, LL. B.
LL. B., 1904, Michigan; Ph. B., 1903, Arizona.
Instructor in Mathematics. 1902.
JOHN WILLIAM GORBY, A. M.
A. B., 1901, Marietta, A. M., 1903, Arizona.
Instructor in Public Speaking and Greek. 1902.

GLENN A. WILCOX, B. S.
B. S., 1893, Cornell.
Instructor in Science. 1904.

WILLIAM M. RUTHRAUFF,
A. B., 1902, Wittenburg.
Instructor in Economics and History. 1904.

ESTELLE G. LUTRELL, A. B.
A. B., 1896, Chicago.
Instructor in English; Librarian. 1904.

FREDERICK EDWIN TALMAGE, B. S.
B. S., 1903, California.
Instructor in Stenography and Book-keeping. 1904.

WILLIAM ANGUS,
Instructor in Mathematics. 1904.

OTHER OFFICERS.

FREDERICK EDWIN TALMAGE, B. S.
Secretary to the President. 1904.

HERBERT BROWN,
Curator Territorial Museum.

MRS. CORNELIA M. STEWART,
Preceptress of Young Women. 1903.

MRS. MARY HENRY AITON, M. D..
M. D. Northwestern.
Medical Examiner for Young Women. 1904.

ORIN ALBERT KATES,
Head of Men's Dormitory. 1904.

JOHN WILLIAM LEWIS,
Secretary to the Director of the Agricultural Experiment Station.
ROBERT A. HARRIS,
Superintendent of Buildings and Machinery. 1904.

WILLIAM W. BROSTROM,
Commercial Assayer. 1904.

STUDENT ASSISTANTS.

[Service not continuous through the year in every case.]

O. ELLINOR NORWAY,                W. SCOTT OSBORN,
RALPH BATEMAN,                     WALTER MELLGREN,
J. THOMAS MEEK,                    J. CLYDE HOYT,
S. ARCHIE MOORE,                   MARTHA WILSON,
WILLIAM JAMES PEW,                 ANITA POST,
JESSE H. STEWART,                  FRANCES M. BABCOCK,
GUY EMMONS,                        NORMAN A. ROSE

BURRELL A. HATCHER.
STANDING COMMITTEES.

1904-1905.

The President is ex-officio member of all committees.

EXECUTIVE.

REGISTRATION AND CLASSIFICATION.
Professors Guild, Smith, Newsom, DeLashmutt.

DISCIPLINE.
Professors Smith, Newsom, Kates.

LIBRARY.
Professors Guild, Smith, Turrell, Miss Lutrell.

PRINTING AND PUBLICATION.
Professors Forbes, Newsom, Slade.

ATHLETICS.
Professors Smith, Kates, Thornber, Mr. Ruthrauff.

PUBLIC EXERCISES.
Professor Holmes, Mr. Gorby, Miss Ferrin, Mrs. Stanley.

INTERCOLLEGIATE DEBATE.
Professors Thornber, Newsom, Mr. Gorby, Mr. Ruthrauff.

MANUAL TRAINING.
Professors Holmes, Smith, Miss Hoover.

CO-OPERATIVE ASSOCIATION.
Mr. Evans, Prof. Holmes, Miss Ferrin, Mr. Talmage.

PRIZES.
Professors Guild, Thornber, Mr. Evans.

SUB-COLLEGIATE DEPARTMENT.
Professor Newsom, Mr. Wilcox, Mrs. Stanley.

RHODES SCHOLARSHIPS.
President Babcock, Professors Newsom, Guild.
UNIVERSITY OF ARIZONA

Established By Act of the Legislative Assembly, 1885;
Opened to Students, October, 1891

PURPOSE AND ORGANIZATION.

The University of Arizona is a part of the system of public education established for the Territory, and aims to fill, as head of such system, the same position as that occupied in the States by the State Universities. In general, the organization of the University is in accordance with the Morrill Act of 1862, creating the Land Grant Colleges. The United States has already set apart fifty-seven sections of valuable public land in the northern timber belt, to which the University will receive full title upon the admission of the Territory into the Union. In creating the University, the Legislative Assembly wisely unified under one management the various schools and institutions of higher learning or investigation, which in some States and Territories have been widely and completely separated—the colleges of liberal culture, the schools of Mines and Engineering, the Agricultural College, and the Agricultural Experiment Station. No professional schools of law, medicine, arts or music have yet been organized. On the other hand, while the high schools of the Territory are in the formative period, the desire to make the University serviceable to all, has led to the establishment and maintenance of a sub-collegiate department.

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 provided especially in agriculture, in the mechanic arts, and in mining and metallurgy. The University, by the nature of its situation, frankly lays its strongest emphasis upon the course in mining engineering. It is in reality in a great mining laboratory surrounded as it is on all sides by great mines. Some of these mines developed on a large scale are within a few miles of the city and the number and magnitude of such enterprises is steadily increasing. Probably no University in the United States offers such fine advantages to the students of mining engineering who desire to see the actual operation of great mines, or the development of new enterprises, while carrying on the theoretical and experimental work of the mining course.

The Agricultural Experiment Station, a department of the University, is wholly engaged in investigating and developing the agricultural resources of the Territory.

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, 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
LOCATION AND CLIMATE.

2,400 feet above sea level and is surrounded by mountains. Its dry, mild and equable climate has made Tucson a famous winter resort unsurpassed for healthfulness.

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. Little rain falls during the winter; fogs are all but unknown; cloudy days are rare. The percentage of sunshine throughout the winter is 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.

The University campus consisting of fifty-five acres 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 buildings are lighted by electricity furnished by the city plant.

An abundant supply of unusually good water for household, laboratory and irrigation purposes is drawn from a large well on the Campus from a depth of one hundred and twenty feet.

The grounds have been carefully laid out in drives, lawns and gardens. A large number of palm, olive, umbrella, ash, pepper, bagote and cottonwood trees give the Campus quite the air of a park.
BUILDINGS.

The main building, University Hall, is 200 x 105 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 recitation rooms, laboratories and apparatus rooms of the various departments, an assembly room, and the office and library of the Experiment Station.

The Library and Museum building, costing about $32,000 including furnishings, was occupied in January, 1905. It is a handsome red brick and Bedford sandstone building, with a massive tile roof. The interior finish is in natural oak and pine. The offices of the President and Secretary of the University are on the first floor. The Library reading room is on the second floor, a large, well-lighted room, beautifully furnished with heavy solid oak reading tables, desks and wall cases. The stack-room at the rear is fitted up with the most modern steel stacks. The Museum occupies part of the first floor and the west half of the second floor. Large additions in the shape of new oak and plate glass cases have been made to the furnishings. Six rooms on the first floor remain unfinished. An appropriation of $2,000 has been made for the completion of the building, and the work will be done before September, 1905.

North Hall, a dormitory two stories in height built of gray stone of fine quality, is occupied by the young women. Besides the parlor and rooms of the preceptress, it contains sixteen rooms, each large enough to accommodate two students. During the summer of 1905 the building will be entirely refurnished by means of money appropriated by the Legislative Assembly.
South Hall, a large brick building containing forty rooms, with bath and toilet rooms is the men's dormitory, capable of accommodating seventy-five students.

The Dining Hall, built of red brick and well-equipped, provides ample boarding accommodation for all persons living on the Campus.

The Shop and Assay building is a large substantial brick structure. It contains a commodious drawing room for mechanical and free-hand drawing, a large laboratory for forge work, machine practice and carpentry. Two other rooms are used for lockers, and for the motor and engine. The commercial assaying department occupies a number of rooms fully equipped with a large melting furnace, the necessary muffle furnaces, and other accessories for making complete and accurate assays.

The Mill or Mining Machinery building located to the northeast of the main group of buildings, is a plain wooden structure in which are placed the stamp-mill, jigs, concentrating tables, separators, etc., constituting the mining laboratory.

Herring Hall, the Gymnasium, is a very substantial high red brick building, 40x80 feet. It was constructed in 1903, the gift of Professor James Douglas and his associates of the Copper Queen Consolidated Mining Company, through Colonel William Herring after whom it was named.

Three brick residences on the Campus are the homes of the president and professors.

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

MAINTENANCE.

The University is supported by funds supplied by the United States Government and the Territory of Arizona. By the provisions of the Morrill Act of 1890, the University receives annually from the United States the sum of $25,000 for the College of Agriculture and Mechanic Arts, established in accordance with the Act of July 2, 1862. For the support of the Agricultural Experiment Station the University receives from the same source an annual appropriation of $15,000 by the Act of Congress of 1887, known as the Hatch Act. The Territory of Arizona provides the proceeds of a 3-5 mill tax on the assessed valuation of the property of the Territory, which in 1904 amounted in round numbers to $23,000. Besides these sums, the University receives from year to year by special grants of the Territorial Legislative Assembly, appropriations for specific purposes. Thus $20,000 was voted for the years 1905 and 1906, to be devoted to minor buildings, improvements, repairs, publications, etc.

EQUIPMENT.

LIBRARY.

The library containing 10,000 bound volumes and 12,000 pamphlets, is open to the use of all students. 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. This library is the depositary of United States Government documents for the Territory of Arizona.

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 professors at the University have the immediate care of the collections pertaining to their respective departments. 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. It is desired to make the collection of ores and minerals fully represent the great mineral resources of Arizona.

A large amount has been recently spent upon new cases for the Museum in its new quarters and the material thus re-arranged and displayed in good light becomes doubly attractive and useful.
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 that can be gleaned are worthy of preservation, and it is earnestly desired to have them placed at the University, where they will always be accessible for reference.

**BIOLOGY.**

The biological laboratories are located on the second floor of University Hall. They are convenient and well-lighted and 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 12,000 sheets of mounted plants of which number 2,500 are included in the University botanical survey herbarium. 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 especially along ecological lines. The Desert Botanical Laboratory of the
Carnegie Institution supplements in most admirable fashion the facilities of the University for investigation.

In addition to the above there are fifty cases of insects, a large case of seeds, articulate and disarticulate human skeletons, plaster and papier-mache models of the important structures of the human anatomy, and duplicate material for study and dissection.

CHEMISTRY.

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

The laboratory for quantitative analysis is on the first floor of University Hall. It is thoroughly 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 balance room contains analytical and bullion balances of the latest model so arranged as to insure a maximum of stability and accuracy. A lecture and demonstration room fitted with sinks, cabinets, etc., completes an equipment of apparatus and collections adequate for first-class instruction in both theoretical and practical chemistry.

The laboratories of the Agricultural Experiment Station occupy 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, and a polariscope for the study of the optical properties of minerals and a type set of 600 minerals. Three large cabinets of specimen rocks and 500 microscopic sections of rocks have been recently added to the working collections.

PHYSICS.

Three rooms on the first floor of University Hall 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.

An eight-inch Willyoung induction coil with storage and X-ray accessories is used in the study of high-tension electricity. Through the generosity of the Honorable Mark J. Egan, of Clifton, the University has during this year, by importation from Germany, added to its equipment for the study of electricity a fine set of miniature wireless telegraphy apparatus, capable of transmitting messages about two hundred feet.

This department also has a double dissolving arc-light Ideal stereopticon, which is used by various other
departments of the University and for public lectures before the students.

**MATHEMATICS.**

Models are an important aid to the study of mathematics. The collection of the Department includes thread models of about forty ruled surfaces of the third, fourth and sixth orders. These illustrate the theory of surfaces and are also valuable in the study of kinematics and linkages.

The Bulletin and Transactions of the America Mathematical Society, and the Encyklopadie der Mathematischen Wissenschaften are subscribed for by the University Library.

**MINING ENGINEERING AND METALLURGY.**

The Mill or Mining laboratory is equipped for use by the students of mining engineering, in connection with their work in testing ores as to their adaptability for treatment by different processes, both on a large and small scale. The chief features of the equipment are one Fraser & Chalmers five-stamp mill, with 900lbs. stamps; one Fraser & Chalmers three-stamp mill, with 250lbs. stamps; one 7x10 Blake crusher; one pair of Cornish rolls; one new 16ft. Wilfley table of the latest design; three amalgamating pans; and a new thirty-horse power, "type C," Westinghouse motor.

There are also automatic samplers, elevators, trommels, two small cyanide plants, amalgamated plates, percolatiers for leaching tests, etc. A complete assay and chemical outfit supplements them. The student is able to make the necessary determinations on the spot.

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

CIVIL ENGINEERING.

The apparatus in this department has been chosen with a view to giving the student 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 civil engineering work and the allied lines in hydraulic and mining engineering. This apparatus embraces surveyors' and engineers' chains, standard field and pocket tapes; plain 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; planimeter and calorimeter.

MECHANICAL ENGINEERING.

This department has a drafting and recitation room in addition to the regular drawing room of the department of Mechanic Arts. In this room is the catalogue file containing the trade literature of about five hundred leading machinery manufacturers of the United States; the collection of working drawings consisting of over three hundred blue prints; and the sample collection of models, machine parts, valves, electric fittings, insulating materials, abrasives, etc.
The Mechanical and Electrical Laboratory, which is to occupy a large room in the new Pump House, to be erected during the summer of 1905, will be equipped for study and operation of boilers, steam and gasoline engines, hydraulic and electrical machinery. Besides the machinery of the shop and the mill which can be used for experimental purposes and for study of machine design, the University has a 60 H. P. tubular boiler, 35 H. P. Atlas engine, a duplex feed pump, a Cameron pump, a 3 H. P. and a 1-2 H. P. direct current electric motor, an injector, a 500 gallon fire pump, a 300 gallon two-stage centrifugal pump and its electric motor in the University well.

MECHANIC ARTS.

The Mechanic Arts building provided 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 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 power room contains an engine, a new 15-horse-power motor, a blower and exhauster.

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, vices and a complete outfit of small tools.

The entire building is well ventilated and lighted from above as well as from the sides. The draughting room is heated by steam.

**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. The Twenty-second Legislature having made provision for a conductor of Farmers' Institutes, announcement will soon be made in regard to this work, which will probably take the form of short courses in agriculture.

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.

GYMNASIUM.

Herring Hall, the new gymnasium, is fully equipped for the purposes of the department of physical training and athletics. The apparatus is of Standard make, and includes forty chestweights, dumb-bells, bar-bells, wands, Indian clubs, a Medart vaulting-horse, parallel-bars, a horizontal bar, a quarter-circle, an abdominal chair, wrestling maching, wrist machine, finger machine, chest expander, chest developer, climbing rope, flying rings, traveling-rings, striking-bag and drum, jump and vaulting stands, fencing foils and masks, basket balls and goals, five large mats and a set of anthropometric apparatus.

In the basement are located ninety-six lockers and five shower-baths which are supplied with hot water from a heater with large reservoir.

In connection with this equipment are the base ball and foot ball field, out-door basket ball court and three fine tennis courts.

MILITARY.

Room O is used as an armory. It is fitted up with the necessary gun racks and accessories. The equipment includes 150 old style Springfield rifles, 100 Springfield cadet rifles with complete accoutrements, eight sabres and belts, one 3-inch muzzle-loading rifle with carriage and complete equipment and necessary musical instruments and signal flags. A large clear area south of the Library building is kept leveled and smoothed for a drill ground and parade ground. At the rear of the Mill building are the targets for short range practice.
GENERAL ORGANIZATION.

I. COLLEGE OF AGRICULTURE AND MECHANIC ARTS.

In this College are offered courses leading to the following degrees:

1. Bachelor of Philosophy.
2. Bachelor of Science.
   a. (General scientific course.)
   b. In Chemistry.
   c. In Agriculture.

II. THE SCHOOL OF MINES.

A four-year course leading to the degree of Bachelor of Science in Mining.

A short, two-years' course in mineralogy and assaying.

The Bureau of Mines and commercial assaying.

III. THE AGRICULTURAL EXPERIMENT STATION.

IV. THE SUB-COLLEGIATE DEPARTMENT OF MANUAL TRAINING.

English, scientific and classical subjects.
Manual training and domestic science.
Bookkeeping, stenography and business practice.
COLLEGE OF AGRICULTURE AND MECHANIC ARTS.

The courses offered in the College of Agriculture and the Mechanic Arts provide both a liberal training along literary and scientific lines and technical training along engineering, mechanical and agricultural lines. Great latitude of election is given in the literary and scientific courses, but the courses in engineering are more rigid in their requirements. Full details of the various courses follow. The aim in all is to combine the practical with the theoretical in instruction. The needs of our young and growing commonwealth are kept in mind, and a steady attempt is made to develop the adaptability and resourcefulness so necessary to meet these changing conditions.

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 expected to register on registration day at the beginning of the year and at the beginning of the second semester, in the president’s office. Before
making choice of elective subjects the student should in every case confer with the instructors concerned and with the committee on registration. 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 further fee is required for future registration. After registration no change in classes can be made without the consent of the committee on registration.

Students entering from other institutions should present to the committee certified copies of their records in such schools together with certificates of graduation or of honorable dismissal.

TUITION.

Tuition is free to students from Arizona. For all non-resident students, tuition is $10 for each semester. No reduction will be made for late registration or for early withdrawal.

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.

DISCIPLINE.

The disciplinary policy of the University in all its departments is based upon the assumption that the students are young gentlemen and young ladies, who come to the institution with a high determination to utilize to the full the opportunities offered, and with a keen sense of duty, honor and courtesy to each other and to the faculty. Formal and explicit prohibitions and rules are few, but those will be rigidly enforced, with adequate penalties, and good order and discipline main-
tained. The University is a civil, rather than a military, community, and such liberty as will not be abused will be allowed all classes of students. In aggravated cases, such as cheating in University work, frequenting saloons, gambling houses, and other objectionable places, and serious breaches of peace or order, the faculty will not hesitate to proceed to the extreme measure of expulsion. In cases of expulsion, the student is required by regulations of the Regents and faculty to leave the campus immediately, and by Territorial statute to surrender his cadet uniform to the University. In all matters of discipline the faculty and President will strive for fairness, equity and efficacy rather than uniformity.

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. During the past two years the cadet companies have made a practice march of from three to five days, which constituted in reality a third vacation. All legal holidays are observed by the cessation of ordinary University work.

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 so far as possible for furnishing board and rooms to students of both sexes upon the University grounds. Young men have comfortable quarters in South Hall, the Mens’ Dormitory building, which can accommodate about seventy-five students, two in a room. 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.

 Both dormitories are lighted by electricity. 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 mattresses, pillows, sheets, blankets, towels, rugs, brooms and such other articles as they may desire for ornamenting their rooms. They will care for their own rooms under the direction of the head of the dormitory. The Dining Hall of the University has accommodations for one hundred students. It is under the management of a paid steward who is responsible to the President and the Board of Regents. While the charge for board is very low, it is the aim of the management to serve substantial, wholesome, appetizing meals. All students having rooms in the dormitories are required to take their meals at the Dining Hall. Students and members of the faculty, who reside outside the dormitories may board at the Dining Hall.

FEES AND EXPENSES.

<table>
<thead>
<tr>
<th></th>
<th>Lowest</th>
<th>Highest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tuition, free to students from Arizona...</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“ students non-resident in Arizona, each semester</td>
<td>$10.00</td>
<td>$10.00</td>
</tr>
<tr>
<td>Matriculation fee, (paid but once)</td>
<td>5.00</td>
<td>5.00</td>
</tr>
</tbody>
</table>
Maintenance fee (deposit) by students in Mens' Dormitory .................. 3.00
Maintenance fee (deposit) by male students residing intown .................. 1.00
Mining excursions, for advanced students, ........................................... 20.00
Laboratory and shop fees, varying according to courses, per annum............. 1.00
Military uniforms, (for freshmen and sophomores) .................................. 16.25
Books, per annum .................................................................................. 5.00
Board, per month ..................................................................................... 16.00
Lights per room, per month ...................................................................... 50
Napkins...................................................................................................... 50

By resolution of the Board of Regents of the University, board is to be paid in advance on the first of each month. Checks, postoffice or express money orders should be made payable to the President. No reduction in the bill for board will be made for absence for a period of less than one week, except by special arrangement at the office.

Text-books may be obtained directly from the publishers through a book association managed on the cooperative plan under the direction of the faculty. Members of the cadet companies will be required to provide themselves with the prescribed uniform, which will be ordered by the University. The cost of the 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 University year. It may be worn on all occasions, and thus will remove the necessity for additional expenditure
for outer clothing other than overcoats. When the warm weather of spring comes, the students are expected to purchase the regulation khaki uniform and campaign hat, the total expense being about $7.

The University has at present no scholarships or loan funds with which to aid students who must earn their way. Various positions about the grounds, buildings and laboratories of the University, paying from $4 to $20 per month, are filled by students who must be self-supporting. The number, however, is not large, and preference is given to students from Arizona and to those who have spent time enough in the University to demonstrate that they are earnest, capable, reliable young men, likely to do this outside work and at the same time maintain a good record as students.

**RAILROAD RATES.**

The Southern Pacific, the Maricopa, Phoenix & Salt River Valley, the Santa Fe, Prescott & Phoenix, the El Paso & Southwestern, 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. This applies only to those parts of these railroads in Arizona. 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 or to the nearest agent in Arizona, e. g. Nogales or Yuma. 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. In case of any misunderstanding with the ticket agent, the student should pay full fare, take the agents receipt and report the matter to the University authorities. The University can not undertake to secure rebates from the railroad companies in cases where full fare has been paid, unless it can be clearly shown that the railroad company's agents or officers are at fault.

requirements for admission.

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

Beginning with September, 1904, for admission to the Freshman class, applicants must be at least sixteen years of age and must satisfy requirements in subjects sufficient to give sixteen credits as described below. A credit is understood to be the equivalent of one study pursued satisfactorily for one year, one period a day, as ordinarily taught in high schools.

Students coming from approved high schools, and presenting a detailed official statement of work completed from the principals of such schools, will be excused by the committee on registration from entrance examinations in those subjects covered by the credentials.

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:

- English ............ 4
- Latin .................. 3
- Mathematics .......... 2
- Science .................. 1
- Latin, French, German or Greek, or History and Civics .......... 2
- Mathematics .......... 2
- Spanish .................. 2
- Elective ................. 2
For admission to the course leading to the degree of Bachelor of Science, including the degrees of Bachelor of science in Mining, Engineering, Chemistry or Agriculture, the subjects upon which examinations must be passed, and the credits assigned each, are:

English ..................... 4  French German or Spanish 2
Mathematics .................. 4  Science (Physics required) 3
General History and Elective ......................... 1
Civics .......... ............ 2

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

ENGLISH—(a) English classics. 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 writing English. A knowledge of grammar is presupposed. (b) English composition. This requirement can be met only by examination of the candidate or by his presenting satisfactory composition books or themes certified by a former teacher as original uncorrected work. The examination will take the form of a theme of five hundred words on some subject familiar to the candidate and will be a practical test of his ability to express himself in writing clearly and consecutively. No candidate will be accepted whose work is notably defective in point of neatness, spelling, punctuation, idiom, or division into paragraphs. Those found lacking in composition will be required to make good the deficiency at once in a special class organized for that purpose.

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

For thorough study: For 1904, 1905, 1906, 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 1904, 1905, 1906, Shakespeare's Merchant of Venice and Julius Caesar; 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. For students in the scientific and engineering courses, solid geometry and advanced algebra, each requiring a half-year of work, will also be required.

HISTORY AND CIVICS—As much as is included in Adams’ “European History” and “Hinsdale’s American Government,” or text books covering equivalent ground. To meet these requirements a large amount of reference work is expected. In place of General History the following will be accepted: History of Greece and Rome as contained in Myers’ histories of Greece and Rome or an equivalent, and Coman and Kendall’s or Larned’s “History of England.”

*GREEK—As covered by Gleason and Atherton’s Beginners’ Greek Book; Xenophon’s Anabasis, four books; Homer’s Iliad, three books, with composition and the use of Hadley and Allen’s, or Goodwin’s Greek Grammar.

*LATIN—As covered by Collar’s First Latin Book and Viri Romae, together with Allen and Greenough’s Grammar and texts; sight reading; Caesar, four books,

*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.
or an equivalent; Cicero, four orations; Virgil, six books; sight reading from Nepos, Cicero and Gellius; Daniell’s or Bennett’s Prose Composition.

*German—As covered by Spanhoofd’s “Lehrbuch der deutschen Sprache,” and the Syntax (part II) of Thomas’ German Grammar, with readings outlined for German 1, 2, 3, 4, (see page 52), or an equivalent.

*Spanish—As covered by Hills and Ford’s Spanish Grammar with readings, etc., outlined for Spanish 1, 2, 3, 4, or an equivalent.

*French—As covered by Fraser and Squair’s French Grammar (Parts I and II), with readings, etc, outlined for French 1, 2, 3, 4 (see page 50), or an equivalent.

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.

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. These certificates must

*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.
be accompanied by statements of honorable dismissal, or leaves of absence.

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 those degrees specialized as shown on page 40-41. 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 not less than sixteen hours of class room work per week. In laboratory work a period from two to three 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.
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.

Military science and tactics or, for women, 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.

Credit toward degrees is given by means of a unit system which assigns to each course of instruction offered a certain number of units of credit. A unit ordinarily represents one class-room hour per week, or its equivalent, for one semester. One hundred twenty-eight units, besides eight units in military science and tactics and physical culture, are required for obtaining a degree in any course.

Any candidate for a degree may present as part fulfillment of requirements for graduation 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 at the opening of the Senior year, and the completed thesis must be presented not later than three weeks before commencement day. The credit value will be determined by the faculty at the time the subject is approved.

The number or units of work offered in different subjects is shown in the following scheme:
COURSES OF STUDY

Units. Group C. Units.
---

English .................. 24 Botany .................. 16
Oratory .................. 6 Zo-ology .................. 8
Mathematics .............. 25 Chemistry .............. 44

GROUP A.
Met. Chem. and Assaying .. 9

Latin .................... 16 Geology .................. 16
Greek ..................... 16 Mineralogy ............. 12
French ................... 16 Physics ................. 8
German ................... 22 Photography .......... 2
Spanish ................... 22

GROUP B.
History ................... 88
Economics ................ 10 Mechanic Arts ......... 20
Philosophy ............... 19 Civil Engineering ...... 39
Sociology ................ 8 Mechanical Engineering... 22

GROUP D.

The units necessary for the different degrees are as follows:

1. Bachelor of Philosophy.
   a Required—English, 24 units, Philosophy, 15 units, History and Economics, 8 units.
   b Group Elective—From Group A, 32 units; Group C, 16 units.
   c Free electives—33 units.

2. Bachelor of Science.
   a Required—English, 8 units, Mathematics, 16 units.
   b Group Electives—From Group B, 4 units; Groups C and D, 56 units.
   c Free Electives, 44 units.

3. For the degrees of Bachelor of Science in Mining, Chemistry, Civil Engineering, and Mechanical Engineering, the same work is required in all for the
first two years, with differentiation during the third and fourth years.

**MINING, CHEMISTRY, CIVIL ENGINEERING, MECHANICAL ENGINEERING.**

<table>
<thead>
<tr>
<th>First year</th>
<th>Second year</th>
</tr>
</thead>
<tbody>
<tr>
<td>English, 1, 2</td>
<td>Mathematics, 3, 4, 6 units</td>
</tr>
<tr>
<td>Mathematics, 1, 2, 10</td>
<td>Physics 1, 2, 8</td>
</tr>
<tr>
<td>Chemistry, 1, 2, 8</td>
<td>Chemistry, 3, 4, 8</td>
</tr>
<tr>
<td>Mech. Arts, 1, 2, 8</td>
<td>Mech. Arts, 3, 4, 4</td>
</tr>
<tr>
<td>32</td>
<td>Civil Engin. 1, 2, 38</td>
</tr>
<tr>
<td>34</td>
<td></td>
</tr>
</tbody>
</table>

**MINING.**

<table>
<thead>
<tr>
<th>Third year</th>
<th>Fourth year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics, 5, 6, 9 units</td>
<td>Metallurgy, 1,3, 4, 8 units</td>
</tr>
<tr>
<td>Mineralogy, 1, 2, 7</td>
<td>Met. (Laboratory) 4</td>
</tr>
<tr>
<td>Geology, 1, 2, 8</td>
<td>Hydraulics, 4</td>
</tr>
<tr>
<td>Civil Engin., 5, 6, 8</td>
<td>Mine Engin. 4</td>
</tr>
<tr>
<td>32</td>
<td>Mineralogy, 3, 4, 4</td>
</tr>
<tr>
<td>3</td>
<td>Heat Engines 3</td>
</tr>
<tr>
<td>30</td>
<td></td>
</tr>
</tbody>
</table>

**CHEMISTRY.**

<table>
<thead>
<tr>
<th>Third year</th>
<th>Fourth year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry, 5, 7, 8 units</td>
<td>Chemistry, 9,10 8 units</td>
</tr>
<tr>
<td>&quot; 7, 8, 8</td>
<td>Synthetic Chem. 4</td>
</tr>
<tr>
<td>Mineralogy, 1, 2, 8</td>
<td>Physical &quot; 2</td>
</tr>
<tr>
<td>Geology, 1, 2, 8</td>
<td>Mineralogy, 3, 4, 4</td>
</tr>
<tr>
<td>32</td>
<td>Economics, 1, 2, 4</td>
</tr>
<tr>
<td>30</td>
<td>Elective 8</td>
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</table>
## CIVIL ENGINEERING

<table>
<thead>
<tr>
<th>Third year</th>
<th>*Fourth year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics, 5, 6,</td>
<td>Civil Eng. 7, 8,</td>
</tr>
<tr>
<td>Civil Eng. 5, 6, 8</td>
<td>8 units.</td>
</tr>
<tr>
<td>&quot; 4, 1</td>
<td>Heat Engines, 3</td>
</tr>
<tr>
<td>&quot; 9, 4</td>
<td>Mech. Engin., 3</td>
</tr>
<tr>
<td>&quot; 12, 2</td>
<td>Elective 8</td>
</tr>
<tr>
<td>Geology, 1, 2, 8</td>
<td>32</td>
</tr>
</tbody>
</table>

## MECHANICAL ENGINEERING

<table>
<thead>
<tr>
<th>Third year</th>
<th>*Fourth year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics, 5, 6, 9 units.</td>
<td>Mec. Eng. Lab. 8 units.</td>
</tr>
<tr>
<td>Civil Engin., 5, 6, 8 &quot;</td>
<td>Machine Design, 4 &quot;</td>
</tr>
<tr>
<td>Mech. Arts, 5, 6, 4 &quot;</td>
<td>Mechanical Eng. 4 &quot;</td>
</tr>
<tr>
<td>Heat Engines 3</td>
<td>Hydraulics, 4</td>
</tr>
<tr>
<td>Mech. Engin., 3</td>
<td>Mine Engin. 4</td>
</tr>
<tr>
<td>Pattern making and Foundry Practice, 4 &quot;</td>
<td>Elective, 7 &quot;</td>
</tr>
<tr>
<td>31</td>
<td>31</td>
</tr>
</tbody>
</table>

*The fourth year’s work in the Civil and Mechanical Engineering courses will not be effective until 1906-7.*
EXPLANATION OF COURSE OF INSTRUCTION

Courses having odd numbers are given in the first semester. Those having even numbers, in the second semester. The hours mentioned show the number of periods per week. The subjects are arranged alphabetically.

BIOLOGY.

PROFESSOR THORNBER.

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

The Desert Botanical Laboratory of the Carnegie Institution of Washington, D. C., has been located in the Tucson mountains adjoining Tucson, with Dr. W. A. Cannon, recently of the New York Botanical Garden, as resident director. In this laboratory, the southwest with its unique and as yet little investigated flora, gains what is destined to be one of the important centers of active, scientific research. The research facilities of the laboratory are all that could be desired, and the investigations upon the desert flora will appeal to students of botany from all quarters. In the light of the above, the importance of the Desert Botanical Laboratory to the University of Arizona and especially to the department of botany will be apparent.

BOTANY 1, 2. GENERAL BOTANY—Botany 1 treats of the general principles of the histology and physiology of plants. Botany 2 completes the year's work with a general survey of plant types from Protophyta to Spermatophyta; also the elementary principles of field botany. Guide, Bessey's Essentials of Botany, supplemented with
other tests and lectures. The laboratory studies will form the basis of all of the work. Open to all students. 5 hrs., or an equivalent, both semesters. 8 units.

**Botany 3, 4. Advanced Botany**—The second year's work is not definitely outlined, but it 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 forms injurious to vegetation in the Southwest, also histology, physiology, and the taxonomy and ecology of the native flora and allied subjects are offered here. Opportunities are offered for research work. Open to all students who have taken Botany 1, 2. 5 hrs., or an equivalent, both semesters. 8 units.

**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, 5 hours, or an equivalent, both semesters. 8 units.

**Chemistry.**

Professor Guild, Professor de Lashmutt.

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.

CHEMISTRY 1. GENERAL CHEMISTRY—Lectures illustrating the chemical properties of the elements and their compounds, supplemented by recitations and laboratory practice. Text-books, Newths' Inorganic Chemistry. Open to all students. 4 hrs., first semester, 4 units.

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. 4 hrs., or an equivalent, second semester, 4 units.

CHEMISTRY 3. QUANTITATIVE ANALYSIS—Laboratory practice with lectures and recitations; the work will be chiefly in gravimetric methods of analysis. Open to students who have taken Chemistry 2. 5 hrs., or an equivalent, first semester. 2 or 4 units.

CHEMISTRY 4. VOLUMETRIC ANALYSIS—A continuation of the work in Chemistry 3, special attention being given to the methods of assaying employed in the West. 5 hrs., or an equivalent, second semester, 2 units, if discontinued March 15th, otherwise 4 units.

CHEMISTRY 5, 6. SPECIAL QUANTITATIVE ANALYSIS—The analysis of water, gases, oils, minerals. Open to students who have taken Chemistry 4. 5 hrs., or an equivalent, both semesters. 8 units.
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. 4 hrs., or an equivalent, both semesters. 8 units.

CHEMISTRY 9. Synthetic Chemistry—The preparation of pure chemical compounds from the crude mineral products. Open to students who have taken Chemistry 4. 2 hrs., or an equivalent, first semester. 2 units.

CHEMISTRY 10. Physical Chemistry—Lectures: Historical introduction leading up to a discussion of modern chemical theories. Open to students who have taken Chemistry 3. 2 hrs., second semester. 2 units.

CHEMISTRY II, 12. Chemistry of the Rare Elements.—The analysis and synthesis of uranium, molybdenum, tungsten, vanadium and cerium compounds. Open to students who have taken Chemistry 6 and 9. 4 hrs., or an equivalent, both semesters. 8 units.

CIVIL ENGINEERING.

PROFESSOR SMITH, MR. —

This course in this department has been arranged with special reference to the engineering development of the Southwest. Especial stress will be laid on surveying, railroad and bridge work, and irrigation engineering. The design throughout the courses is to give the student a thorough and practical knowledge of the essential principles of his profession, and to teach the technical practice of the times so far as possible without sacrificing in other directions. Engineering practice changes from
year to year and a graduate who is thoroughly grounded in the principles of his profession will readily acquire the technical side.

**Civil Engineering 1, 2. Surveying** — Use and care of instruments, including plane and solar compasses, levels, transits; plane land surveying; United States system of land surveys; city, topographical, 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 fieldwork. Textbook, Raymond’s “Surveying.” Open to students who have taken trigonometry. 3 hrs., both semesters and Saturday forenoons. 8 units.

*Civil Engineering 4. Geodesy*— Size and shape of the earth; latitude, longitude and azimuth formulas; baseline apparatus; trigonometric leveling. Lectures and fieldwork. 1 hr., second semesters. 1 unit.

**Civil Engineering 5. Materials of Construction**— Their properties, preparation and use; stone, brick, lime, cement, concrete, timber, iron and steel. Lectures, recitations and laboratory work. 4 hrs., first semester. 4 units.

**Civil Engineering 6. Graphic Statics**— Determination of stresses in bridge and roof trusses by both analytic and graphic methods. Prerequisite, Physics 1. 4 hrs., second semester. 4 units.

*Not given in 1905-6.*
*Civil Engineering 7, 8. Modern Framed Structures—Stresses in the various types of bridges under different systems of loading; graphical investigation of stability of arches and retaining walls; complete design with drawings for a plate girder bridge, and a steel frame building. Text-book, Merriman & Jacoby's "Roofs and Bridges." 4 hrs., both semesters. 8 units.

Civil Engineering 9. Railroad Engineering—Preliminary and location surveys; simple and easement curves; turnouts and switches; principles of economic location as based upon cost of construction, operating expenses, alignment and grades; maintenance-of-way. The fieldwork consists of the surveys for a railroad of sufficient length to secure familiarity with the methods of actual practice. Each student makes a complete set of notes, maps, profiles, calculations and estimates of cost. Open to students who have taken Engineering 1, 2. 4 hrs., until December, one hour and Saturdays through December and January. 4 units.

Civil Engineering 11. Hydraulics—Velocity and discharge from orifices, weirs, tubes, and pipes; flow in sewers, ditches, canals, and rivers; measurement of water power; water wheels of various types. Text-book, Merriman's "Hydraulics." 4 hrs., first semester. 4 units.

Civil Engineering 10. 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

*Not given in 1905-6.
ventilation. Text-book, Ihlseng'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. 4 hrs., first semester. 4 units,

*Civil Engineering 12. Principles of Irrigation—A study of the present condition of irrigation development in the United States; irrigation legislation; methods of establishing rights to water; a brief reference to the engineering principles relating to the construction and maintenance of canals and reservoirs add the various means of diverting and measuring water for use in irrigation. Prerequisite, Engineering 2. 2 hrs., second semester. 2 units.

Economics.

Mr. Ruthrauff.

Economics 1, 2. A study of the general principles and laws of economics based upon Bullock's "Introduction to the Study of Economics." Special attention is given to the study and criticism of socialism, and the problem of municipal and government ownership of natural monopolies and public utilities. 2 hrs. both semesters. 4 units.

Economics 3, 4. A general study of the history and theory of Economics based upon Marshall's "Principles of Economics," with lectures and required reading. This course aims to acquaint the students with the different modern theories, and economic plans for reform. 3 hrs. both semesters. 6 units.

*Not to be given 1905-6.
ENGLISH.

ASSISTANT PROFESSOR NEWSOM

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 and 2. COMPOSITION—Prescribed for all Freshmen.

FIRST SEMESTER: Short weekly themes corrected and rewritten. Selected readings from English and American writers of prose, with written and oral reports.

SECOND SEMESTER: Fortnightly themes illustrating methods in narration, description, exposition, and argumentation. Hill's "Principles of Rhetoric" supplemented by lectures. Selected readings and reports thereon as in the first semester. 3 hrs., both semesters. 6 units.

ENGLISH 3 and 4. NINETEENTH CENTURY PROSE—From the publication of the Lyrical Ballads to the death of Ruskin (1798-1899). Prescribed readings, lectures, discussions, written reports. Primarily for Freshmen in the Ph. B. courses. 2 hrs., both semesters. 4 units.

ENGLISH 5 and 6. ELIZABETHAN LITERATURE—Shakespeare, selected plays; other Elizabethan dramatists, especially Jonson and Marlowe; Spenser's Faerie Queene and shorter poems. Lectures and discussions. 3 hrs., both semesters. 6 units.
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. 2 hrs., both semesters. 4
units.

ENGLISH 9, 10. SEVENTEENTH CENTURY LITERA-
TURE—From the closing of the theaters to the death of
Dryden, 1642-1700. 2 hrs., both semesters, 4 units.

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. 2 hrs., both semesters.
4 units.

FRENCH.

ASSISTANT PROFESSOR TURRELL

FRENCH 1, 2. First Semester: Fraser and Squair's
French grammar (Part I), Aldrich and Foster's French
Reader. Second Semester: Reading of Dumas' "La
Belle Nivernaise," Labiche and Martin's "La Poudre
aux Yeux," Halévy's "L' Abbé Constantin." Compo-
sition and dictation, with drill on the irregular verbs.
5 hrs., both semesters. 8 units.

FRENCH 3, 4. First Semester: Fraser and Squair's
French Grammar (Part II). Merimée's "Colomba,"
Lamartine's "Graziella" or "Jeanne d' Arc," Feuillet's
"Le Roman d'un jeune homme pauvre." Second Sem-
ester: Selected Readings, as DeVigny's "Cinq Mars,"
French Lyrics (Bowen), Victor Hugo's "Les Miséra-
bles" (Super), etc. 5 hrs., both semesters. 8 units.
COURSES OF STUDY

GEOLOGY

PROFESSOR W. P. BLAKE, PROFESSOR TOLMAN.*

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.

GEOLOGY I. GENERAL GEOLOGY — An astronomical introduction followed by a discussion of the formation and composition of the crust of the earth, rock-forming minerals, crystalline and mechanically and chemically formed rocks; erosive agencies, transportation and deposition of rock-forming materials; the origin of soils and their distribution; volcanic formations, metamorphism; stratification; uplifts and depression; folding and complication; origin of mountain chains; the sequence of formations, the geologic record. 5 hrs., first semester. 4 units.

GEOLOGY 2. ECONOMIC GEOLOGY — In the second semester a course of lectures is given upon the nature and origin of mechanically-formed deposits; upon the various theories of origin and the systems of classification, followed by a description in detail of the form of occurrence of useful minerals and ores. The lectures are supplemented by readings and reports.

The lectures are illustrated by ores and specimens from the museum, especially of the Comstock and other lodes in Nevada; of the copper mines in Arizona, includ-

*After September 1, 1905.
ing the United Verde, Copper Queen and others; the
gold mines of the Appalachians, California, Alaska and
Arizona, including the mines of Tombstone, Congress,
Pearce, and Fortuna, the Cananea copper mines and
other mines in Mexico. Text-book, Kemp's Ore De-
posits of the United States. Open to Juniors, Seniors,
and special students who have taken chemistry, miner-
alogy and geology 1. 5 hrs., second semesters. 4 units.

GEOLOGY 3, 4. TOPOGRAPHICAL AND FIELD
GEOLOGY—Field and laboratory work, construction of
maps, sections and models, etc. Prerequisites Geology
1, 2. 3 hrs., both semesters. 6 units.

GERMAN.
ASSISTANT PROFESSOR TURRELL.

GERMAN 1, 2. First Semester: Spanhoofd's "Lehr-
buch der deutschen Sprache," complete. Second
Semester: Reading of easy texts, such as Andersen's
"Bilderbuch ohne Bilder," Storm's "Immensee," von Hil-
leren's "Hoher als die Kirche," Gerstaecker's "Ger-
melhausen." Composition, dictation and continued
grammar drill. 5 hrs., both semesters. 8 units.

GERMAN 3, 4. First Semester: Thomas' German
Grammar (Part II) Reading of Freytag's "Die Journal-
isten," Heine's poems and "Die Reisebilder," Lessing's
"Minna von Barnhelm." Second semester: Goethe's
"Hermann und Dorothea," "Egmont," Schiller's "Wil-
helm Tell," "Maria Stuart." An outline of the history
of German Literature will be given during the year using
Bernhardt's "Deutsche Litteraturgeschichte," with
library readings. 5 hrs., both semesters. 8 units.

GERMAN 5. German Literature in the Nineteenth
Century. Lectures on the Romanticists and their suc-
COURSES OF STUDY

cessors. Class reading of plays of Kleist, Grillparzer, etc. 3 hrs., first semester. 3 units.

GERMAN 6. Recent literary movements in Germany. The rise of naturalism and symbolism. Comparison with the Storm and Stress movement of the eighteenth century. Study of Wildenbruch, Fulda, Sudermann, Hauptmann. 3 hrs., second semester. 3 units.

HISTORY
PRESIDENT BABCOCK, MR. RUTHRAUFF.

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.

HISTORY 1, 2. ENGLISH HISTORY—Gardiner’s Student’s History of England is used as the basis for the work, with much assigned reading and the preparation of reports. Open to all students. 4 hrs., both semesters. 8 units. Mr. Ruthrauff.

*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, assigned reading, and reports. Open to students who have taken History 1, 2. 2 hrs., both semesters. 4 units.

HISTORY 5, 6. 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, down to 1885 based on letters and speeches of American statesmen, public documents and

*Not given in 1904-5.
special histories. Open to students who have taken History 1, 2. 3 hrs., both semesters. 4 units. President Babcock.

LATIN.
MRS. STANLEY.

The courses below are open to students who have completed the first two years of Latin in the sub-collegiate department, or an equivalent. 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 OVID—Six Orations of Cicero. Selected Letters. Gleason's Term of Ovid. Exercises in Prose composition. 4 hrs., both semesters. 8 units.

LATIN 3, 4. [3] VIRGIL.—Six Books [4] Livy Book I, Cicero's De Senectute. Open to students who have taken Latin 1, 2. 4 hrs., both semesters. 8 units.

MATHEMATICS.
PROFESSOR E. M. BLAKE.

MATHEMATICS, 1. COLLEGE ALGEBRA — Four hours per week. GRAPHICAL METHODS. One two hour laboratory period per week. First semester 5 units.

MATHEMATICS 2. PLANE AND SPHERICAL TRIGONOMETRY — Four hours per week. GRAPHICAL METHODS, One two hour period per week. Second semester. 5 units.
'Mathematics 1 and 2 are prescribed for first year students in Mining, Civil, and Mechanical Engineering, and Chemistry. The work in graphical methods is supplementary to algebra and trigonometry and introductory to analytical geometry.

MATHEMATICS 3. ANALYTICAL GEOMETRY.—Pre-requisite Mathematics 1, 2. 3 hrs., first semester. 3 units.

MATHEMATICS 4. DIFFERENTIAL CALCULUS—Pre-requisite, Mathematics 3. 3 hrs., second semester. 3 units.

Mathematics 3 and 4 are prescribed for second year students in Mining, Civil and Mechanical Engineering and Chemistry.

MATHEMATICS 5. INTEGRAL CALCULUS — Pre-requisite, Mathematics 4. 4 hrs., first semester. 4 units.

MATHEMATICS 6. ANALYTICAL MECHANICS—Pre-requisites, Mathematics 5, and Physics 1, 2. 5 hrs., including one laboratory period, second semester. 5 units.

Mathematics 5, 6 are prescribed for third year students in Mining, Civil and Mechanical Engineering.

MECHANIC ARTS.

PROFESSOR HOLMES.

The mechanic arts courses comprise the elements of drawing and shop work. The work consists of lectures, recitations, drawing and tool and machine work. The courses are designed with special regard for the needs of the students in engineering.

MECHANIC ARTS 1. (a) Free hand lettering, one month; Reinhardt’s slanting and upright styles; titles and tabulated data. (b) Mechanical drafting, one
month; care and use of instruments; Reinhardt's "Technic of Mechanical Drafting;" geometrical construction; tracing; blue printing. (c) Descriptive geometry, Church's seventeen problems on lines and planes, two months. Required of students in Engineering. 5 hrs., or an equivalent, first semester. 4 units.

Mechanic Arts 2. (a) Forging, one month; properties of iron and steel, methods of manufacture; care of fire; use or forging tools; tool-making and tempering. (b) Bench work in wood, two months; characteristics and properties of wood; care and use of wood-working tools; principles of joinery. (c) Wood turning, one month; care and use of wood lathe and tools; application of wood turning in pattern making. 5 hrs., or an equivalent, second semester. 4 units.

Mechanic Arts 3, 4. (a) Bench work in iron, one month; wrought and cast iron; use of hammer, file chisel, and scraper. (b) Machine work in iron, two months; use of engine lathe in turning, boring and thread cutting; drilling machine. (c) Planing and milling machines, one month; special study of comparative efficiency of each in producing similar work. Required of engineering students. Open to students who have taken Mechanic Arts 1, 2. 2 hrs., or an equivalent, both semesters. 4 units.

Mechanic Arts 5, 6. Descriptive Geometry; this course is a continuation of Mechanic Arts 1. Church's Descriptive Geometry is the text-book used. The work covers shade, shadow and perspective. Required of engineering students. Open to all students who have taken Mechanic Arts 1, 2. 2 hrs., or an equivalent, both semesters. 4 units.
MECHANIC ARTS 7, 8. Pattern Making and Foundry Practice. Required of Juniors in Mechanical Engineering. 2 hrs., (two 2-hour periods), both semesters. 4 units.

MECHANICAL ENGINEERING

PROF. E. M. BLAKE.

MECHANICAL ENGINEERING, 1. HEAT ENGINES—Principles of thermodynamics as applied to steam and internal combustion engines, and compressed air machinery. Study of the general structural features and methods of operating the more important types of boilers, steam and gasoline engines. 3 hrs., with one weekly laboratory period, first semester. 3 units.

MECHANICAL ENGINEERING, 2. DYNAMO ELECTRIC MACHINERY—Theory underlying the generation, transmission, and utilization of electric currents. Descriptions of the more important types of generators and motors. 3 hrs., with one weekly laboratory periods, second semester. 3 units.

MECHANICAL ENGINEERING, 3, 4. MECHANICAL LABORATORY—Operation inspection and testing of boilers, steam and gasoline engines, compressed air machinery, pumps, water wheels and electric machinery. One lecture and two laboratory periods of three hours each per week throughout the year. 8 units.

*MECHANICAL ENGINEERING, 5. MACHINE DESIGN—Kinematics of machinery, study of machine details, and exercises in design. One lecture and two drafting room periods of three hours each per week, first semester. 4 units.

*MECHANICAL ENGINEERING, 6. MECHANICAL ENGINEERING—Study of power plants and other

*Not to be given 1905-1906.
machinery installations as to arrangement of parts, adaptability to intended work, economy of first cost and operation. Exercises in design of power plants and writing of specifications. One lecture and two drafting room periods of three hours each per week, second semester. 4 units.

**METALLURGY.**

**PROFESSOR DELASHMUTT.**

**METALLURGY 1. INTRODUCTION TO METALLURGY** —Physical properties of metals, alloys, thermal treatment of metals, thermal measurements, fuel, refractory materials, metallurgical processes, furnaces, thermochemistry, metallurgy of iron and steel. Seniors in School of Mines. Lectures and recitations. 4 hrs., for 1 month, first semester. 1 unit.

**METALLURGY 2. FIRE ASSAYING**—Fire assay for gold, silver and lead. Bullion assays. 15 hrs., or an equivalent during March, April and May. Prerequisite Chemistry 3 and 4. 2 units.

**METALLURGY 3. METALLURGY OF GOLD AND SILVER**—Stamp milling, chlorination, cyanidation, pan-amalgamation; Patio, Cazo, Fondon, Kröhnke and Tina processes, hyposulphite leaching practice, etc. Lectures and recitations. Prerequisites, Metallurgy 1 and 2. 4 hrs., first semester. To be given after completion of metallurgy 1. 3 units.

**METALLURGY 4. METALLURGY OF LEAD AND COPPER**—Sampling, receiving, purchasing, roasting, blast furnace methods, reverberatory furnace methods, pyritic smelting, converting, desilverization of base bullion, electrolytic refining, hydro-metallurgy of copper, etc. Lectures and recitations. Prerequisites Metallurgy 1, 2 and 3. 4 hrs., first semester. 4 units.
METALLURGY 5 and 6. METALLURGICAL LABORATORY—Concentration, amalgamation, cyanidation, chlorination, hyposulphite lixiviation, etc., tests together with mill work. 2 hrs., or an equivalent, both semesters. Primarily for seniors in School of Mines. 4 units.

METALLURGY 7. ORE DRESSING—Breaking, crushing, separating, concentrating, sampling, mill processes and management. Lectures and recitations, prerequisites chemistry 3 and 4 and metallurgy 2, 3 hrs., first semester. 3 units.

METALLURGY 8. Metallurgy of zinc, cadmium, nickel, mercury, bismuth, tin, antimony, cobalt, platinum, tungsten, molybdenum. Lectures and recitations. Prerequisites. Metallurgy 1, 2, and 3. 2 hrs., second semester. 2 units.

MILITARY SCIENCE AND TACTICS.

LIEUTENANT MCCLURE.

PRACTICAL COURSE—Infantry Drill Regulations, through the school of the battalion in close and extended order. Advance and rear guards, and outposts. Marches. The ceremonies of battalion review, inspection, parades, guard mounting, and escort of the colors. Infantry target practice. Instruction in First Aid to the Injured. Required of all able-bodied male students throughout the Freshman and Sophomore years except that students who have satisfactorily completed four years of drill at the end of Freshman year may be excused from further work in the department. Elective during the remainder of the course. Juniors who elect this course may receive credit to the extent of two units. Three hours, both semesters.

THEORETICAL COURSE—The Infantry Drill Regulations covered by the practical instruction. The
Manual of Guard duty. Small-Arms Firing Regulations, Parts I, II and VII. The Articles of War. One lecture on camps and camp hygiene. Lectures on other military subjects. Required of all commissioned and non-commissioned officers. One hour, both semesters.

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, according to the principles governing such selection at the United States Military Academy.

Each member of the military organization will be required to provide himself with the required uniform upon 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.

MINERALOGY.
PROFESSOR GUILD.

The main object of the course of mineralogy is to familiarize the students 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 blowpipe. The value of such a course cannot be over estimated, since these quick methods of analysis are fre-
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quently 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. 4 or 5 hrs., both semesters. 7 or 8 units.

Mineralogy 3. Advanced crystallography and microscopic study of the rock-forming minerals. Open to students who have taken a course in elementary Geology, Mineralogy 2, and Physics 2. 3 hrs., or an equivalent, first semester. 2 units.

Mineralogy 4. Petrology—The preparation of thin sections of rocks for microscopic study, rock analysis, and the study of a type selection of rocks. Textbook, Harper's Petrology for Students. Open to students who have taken Mineralogy 3. 3 hrs., or an equivalent, second semester. 2 units.
MINING ENGINEERING.

MINING ENGINEERING 1. See Civil Engineering 10.

MINING ENGINEERING 2. PRACTICAL MINING—Before entering upon the work of the Senior year, all students who are candidates for the degree of B. S. in mining, must have spent at least four weeks in practical underground mining. The fulfillment of this requirement must be evidenced by the certificate of the mine superintendent or foreman, and by notes and sketches of the processes observed, to be presented to the faculty of the School of Mines, and discussed with them.

MINING EXCURSIONS.

In connection with the courses in Mine Engineering, Metallurgy, and Mineralogy, trips will be made to mining districts of Arizona and Sonora, usually one in December and one in March. These trips are required of all candidates for the degree of B. S. in Mining.

The purpose of these trips is to afford the mining students an opportunity for close study and inspection of mining and metallurgical plants, and of rock formations and minerals of commercial value. The students are accompanied by two professors, and every effort is made to make the trips of the greatest practical value. The visits are carefully scheduled and notes, with sketches, measurements and photographs are taken, and elaborated into a comprehensive report by each student after the return. These trips are of incalculable assistance to the lecture, text-book and draughting room work.

The subjects of special consideration are transportation, both above and below the surface, mine surveying, methods of stoping and timbering, the best treatment for each ore, assaying and furnace charges, smelting prac-
tices, concentration of low grade ores, power generation, pumping and water supply, and mill construction.

During 1903-4 the mining districts of Tombstone, Bisbee, and Cananea, and the metallurgical plants at Douglas were visited in this way. The thanks of the University are due to the superintendents of the various plants visited for their efforts and care in acquainting the students with the works under their management.

**PHILOSOPHY AND SCIENCE.**

MRS. STANLEY.

*PHILOSOPHY 1. HISTORY OF PHILOSOPHY—A study of the basal concepts and fundamental problems of philosophical thought as developed historically. Lectures, recitation and assigned reading. Text-book Schwegler’s History of Philosophy. 2 hrs., both semesters. 4 units.

*PHILOSOPHY 2. EVOLUTION—A study of the term in its widest extension, as the law of the cosmic process. Its significance in the various departments of science and its bearing on philosophical and ethical thought. Reading in Fiske’s Cosmic Philosophy; Le Conte’s Evolution and its Relation to Religious Thought; Wallace’s Darwinianism; Spencer, Principles of Sociology; Bagehot’s Physics and Politics, and Howison’s Limits of Evolution. Lectures and discussions. 2 hrs., both semesters. 4 units.

PHILOSOPHY 3. PSYCHOLOGY—A special consideration of the subject as applied to teaching. Lectures, recitations and collateral reading. Open to Juniors and Seniors. 4 hrs., first semester. 4 units.

PHILOSOPHY 4. PEDAGOGY—An account of educational evolution, both as a culture fact in the history

*To be omitted 1905-6.
of civilization and as a foundation for professional work; lectures, giving a brief but comprehensive outline of school systems, a special study of leading educators such as Commenius, Pestalozzi, Froebel, Mann and others; methods of teaching, school management, 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 Philosophy 1. 4 hrs., second semester. 4 units.

PHILOSOPHY 5. LOGIC — Text-book, "Jevon's Logic;" reading from Mill, Hamilton, Thompson and others. Open to Juniors and Seniors. 4 hrs., first semester. 4 units.

PHILOSOPHY 6. ETHICS—Theoretical and practical ethics; view of the historical 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. 3 hrs., second semester. 3 units.

PHYSICAL CULTURE
DIRECTOR KATES.

This department is organized to supply the opportunity for such physical work as experience has shown to be necessary under modern conditions, to counteract the deleterious effects of close application to mental work and to favor the attainment by the student body of a high state of physical efficiency.

Class work in Physical Culture is required of all freshmen, two periods per week. It is intended that a thorough physical examination; including an examination of the eyes, heart and lungs, shall preface the work of every student in physical cul-
ture. This examination will be made as soon as possible after the student enters the University and at intervals during his or her course for safety and for determining the results of the work. Anthropometric cards and charts are platted for students when desired. In special cases the University reserves the right to require a complete physical examination by a designated physician at the expense of the student.

In addition to the regular class drill a certain part of which consists of training and contests in athletic sports, the University is represented by teams in football, baseball, track and field, tennis, basket-ball, and indoor gymnasium work. Every facility is provided for track and field athletics. The field on the campus contains grid-iron, baseball diamond, tennis and basket-ball courts, sprinting path, jumping and vaulting pits.

The course for women consists of systematic exercises for the harmonious development of the entire body, besides a course for the development of grace of movement and the production of symmetry of physique. Special corrective machinery is supplied for this department, so that even the weakest student may be given proper and healthful exercise.

Those pursuing this course are required to provide themselves with a gymnasium suit, consisting of a blouse waist and divided skirt with the regulation gymnasium shoes. The suit requires four yards of double width, 54-in. dark blue serge. The waist has a sailor collar trimmed with white braid. The Butterick pattern may be used or ready-made suits may be had at the Gymnasium for $3.75.
The plan of work for men is three-fold: general graded class work, corrective work and elective athletic work. The athletic work is taken in combination with the class work in order that the student by this combination may obtain the best possible development. The corrective work is given under special supervision to all those who are in need of special development, and, also, to those who are unable to do the regular class work.

The students doing work in the Gymnasium are required to wear the regulation gymnasium shoes and suit. The average cost of this suit is about $3.75.

**Physics.**

Professor Smith, Mr. Wilcox.

The object of this course is to acquaint the student with the physical principles which underlie the higher courses of chemistry, mechanics, and engineering. Special attention is therefore given to the study of force and energy, the physics of liquids and gases and heat. One third of the course is devoted to the study of electricity, for which the laboratory is especially well equipped.

Physics I, 2. Lectures, recitations and laboratory work. Open to students who have taken a course in elementary physics and Mathematics I. 4 hrs., or an equivalent, both semesters. 8 units.

**Public Speaking.**

Mr. Gorby.

The object of these courses 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. The 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.

*PUBLIC SPEAKING 1, 2. Study of the philosophy of expression, analysis of voice, quality, force, stress, pitch, besides thorough training in the art and practice of extempore speaking. Text-book, Fulton and Trueblood’s Practical Elocution. 2 hrs., both semesters. 3 units.

*PUBLIC SPEAKING 3, 4. ADVANCED COURSE—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 Juniors and Seniors who have completed Public Speaking 1, 2. 2 hrs., both semesters. 3 units.

SOCIOLOGY.

MR. RUTHRAUFP.

SOCIOLOGY 1. ELEMENTS OF SOCIOLOGY—A study of the characteristic concepts of sociological thought designed to acquaint the student with the current theories of social interpretation, the conditions of social progress. Fairbank’s Introduction to Sociology will be used as a guide, and supplemented by lectures, collateral reading, and reports. Open to Juniors and Seniors. 3 hrs., first semester. 2 units.

SOCIOLOGY 2. CHARITIES AND CRIME—A consideration of social pathology, including an examination of the origin and nature of the dependent, defective, and

*To be omitted 1905-6.
delinquent classes. A study will be made of the principles and methods of relief; causes of crime; prison systems; juvenile offenders; preventive measures, etc. Guide "Warner's American Charities". Prerequisite, Sociology 1. 3 hrs., second semester. 2 units.

**SPANISH.**

**ASSISTANT, PROFESSOR TURRELL**

**SPANISH 1, 2.** First Semester: Hills and Ford's Spanish grammar complete. Second Semester: "Cuentos Castellanos" (Carter and Malloy), Alarcón's "El Capitán veneno," or "Novelas escogidas," etc. Composition, dictation and oral work. 5 hrs., both semesters 8 units.


SHORT COURSE OF INSTRUCTION IN MINERALOGY AND ASSAYING.

In order to meet the needs of persons who desire to learn the art of assaying the common ores and who have not the time required for a full four years' course of study, the Board of Regents has approved a short course of instruction in practical assaying, mineralogy, metallurgy, and allied subjects.

This course commences with the first semester in each year and requires at least two years. Students are advised, however, to take the regular course in engineering and mining, if possible, since in two years they cannot expect more than to make a beginning in these subjects.

REQUIREMENTS FOR ADMISSION

Those desiring to take this course are required to be at least eighteen years of age, to have good health, and to have a knowledge of English, physics and algebra to quadratics, sufficient to enable them to pursue the course with advantage. This knowledge will be tested by examinations.

The fees and tuition are the same as for other departments. (See p. 20.) Each student is required to pay the cost of materials, glassware, and apparatus used by him. For this purpose a deposit of ten dollars will be required in advance each semester and any balance will be refunded.

The right is reserved to vary this course according to the aptitudes or necessities of those concerned.
FIRST YEAR.

General Chemistry, one semester.
Qualitative analysis, one semester.
Mathematics, two semesters.
English or Spanish, two semesters.
Practical free-hand drawing and shopwork, or physics, two semesters.

SECOND YEAR.

Mineralogy and blow-pipe analysis, two semesters.
Assaying, one semester.
Qualitative analysis and wet assaying, one semester.
Mathematics, two semesters.
Geology, two semesters.
BUREAU OF MINES AND ASSAYING.

A separate department of the School of Mines, under the name of "The Bureau of Mines and Assaying" has been established to receive and work ores, and to make assays and analysis of ores, minerals, mineral waters and petroleum.

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, as shown upon the accompanying plan.

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 regular laboratories of the University.

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.

In accordance with the Legislative enactment approved March 3, 1899, the rates for assaying hereto-
fore 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 laws, the Regents of the University of Arizona have established the following rates for assaying ores.

### Assaying Ores from Arizona

<table>
<thead>
<tr>
<th>Commodity</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silver and Gold, or either</td>
<td>$1.00</td>
</tr>
<tr>
<td>Silver, Gold and Copper</td>
<td>2.00</td>
</tr>
<tr>
<td>Copper</td>
<td>1.00</td>
</tr>
<tr>
<td>Lead</td>
<td>1.00</td>
</tr>
<tr>
<td>Zinc</td>
<td>1.00</td>
</tr>
<tr>
<td>Iron</td>
<td>1.00</td>
</tr>
<tr>
<td>Gold, Silver, Copper and Lead</td>
<td>2.50</td>
</tr>
<tr>
<td>Gold, Silver, Copper and Iron</td>
<td>2.50</td>
</tr>
<tr>
<td>Gold, Silver, Copper and Zinc</td>
<td>2.50</td>
</tr>
</tbody>
</table>

### Assaying Ores from Without the Limits of Arizona

<table>
<thead>
<tr>
<th>Commodity</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silver and Gold, or either alone</td>
<td>$1.00</td>
</tr>
<tr>
<td>Copper</td>
<td>1.00</td>
</tr>
<tr>
<td>Lead</td>
<td>1.00</td>
</tr>
<tr>
<td>Zinc</td>
<td>1.00</td>
</tr>
<tr>
<td>Iron</td>
<td>2.50</td>
</tr>
<tr>
<td>Silica</td>
<td>1.50</td>
</tr>
<tr>
<td>Alumina</td>
<td>5.00</td>
</tr>
</tbody>
</table>

And for other determinations and analytic work, 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 therefore is paid. Remit-
Arizona School of Mines

Plan of the Special Assay Laboratory for the Commercial Assaying of Tucsan, Arizona

Arizona School of Mines
stances 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 determinations 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 with 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.

**BULLION ASSAYS.**

Special attention is given to the retorting and melting of bullion and the assays of gold bars for shipment.

**ANALYSIS OF WATER.**

The Bureau is prepared to undertake the analysis of ordinary or mineral waters.

**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. The express company does not deliver parcels at the University, hence delay often results from sending by express. Delays also 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.

Special rates for freight on consignments to the "Director of the School of Mines," are granted by the Southern Pacific railroad 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,

KENDRIC C. BABCOCK, Pres.

Tucson, Pima Co., Arizona.
THE AGRICULTURAL EXPERIMENT STATION.

STATION STAFF.

Kendric Charles Babcock,
President of the University.

Robert H. Forbes, M. S. - - Director and Chemist
Vernon A. Clark, B. S. - - Agriculturist and Horticulturist.
- - - - - - Animal Husbandman
John James Thornber, A. M. - - Botanist
Henry B. Slade, A. B. - - Associate Chemist
T. D. A. Cockerell - - Consulting Entomologist
John W. Lewis - - Secretary to the Director

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 station 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 and libraries 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 of location for the work undertaken—the Experiment Station farm has been maintained and strengthened at Phoenix. Salt River Valley is intermediate in elevation, in situation, and in mean yearly temperature between the 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, conducted in cooperation with the United States Department of Agriculture, 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. Another orchard has just been planted on a tract near Yuma.

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, co-operating with the United States Department of Agriculture.

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 are intended to be immediately applied to advantage in the betterment of agricultural practice. In the second place, these writ-
ings 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 distributed 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.

An appropriation of eleven thousand dollars, made for the use of the Station by the Twenty-second Legislature, very satisfactorily attests the estimation in which the work of the Station is held. This appropriation is intended for the improvement of the date orchard; for purchasing livestock and buildings for the farm, and for issuing publications and holding farmers' institutes and short courses of instruction throughout the Territory.

Provision therefore, is made for the symmetrical development of this work in the Territory, both experimentally and educationally; and, prospectively, "the farmers' college" bids fair to increase in usefulness to the growing agricultural interests of the Territory.
SUB-COLLEGIATE DEPARTMENT.

INSTRUCTORS.

KENDRIC CHARLES BABCOCK Ph. D., President, Civics.

DAVID HULL HOLMES, B. S., Shopwork and Drawing.

JOHN JAMES THORNBER, A. M., Botany, Biology.

CHARLES A. TURRELL, A. M., French, German Spanish.

SIDNEY CARLETON NEWSOM, A. M., English.

ORIN ALBERT KATES, Physical Training.

LIEUT. SAMUEL V. McCLURE, Military Science and Tactics.

HATTIE FERRIN, B. S., English, Latin.

MABEL GRAY HOOVER, Domestic Science.

MARION CUMMINGS STANLEY, B. A., Latin.

JOHN WILLIAM GORBY, A. M., Public Speaking, Greek, English.

WILLIAM M. RUTHRAUFF, A. B., History.

GLENN A. WILCOX, B. S., Science.

IVAN DE LASHMUTT, B. S., Chemistry.

GEORGE MARK EVANS, Ph. B., LL. B., Mathematics.

ESTELLE LUTRELL, A. B., English.

FREDERICK E. TALMAGE, B. S., Bookkeeping, Stenography, Typewriting.

WILLIAM ANGUS, Mathematics.

GENERAL INFORMATION.

In this department the University offers the work of a well-organized high school, with the added advantages of shopwork and drawing and of domestic science. The general library and the gymnasium are open to all students in this department.
The equipment of the scientific laboratories is available for use in this sub-collegiate work, whenever 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 departments, 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.

**ADMISSION.**

Admission to regular standing in the first year of the sub-collegiate course presupposes the completion of the work of the eighth grade of the public or parochial schools. Students who do not bring certificates showing the completion of this work, must take examination to test their ability to pursue profitably the work of the first year.

All students entering the preparatory department will be required to take an examination in oral reading. To remedy notable deficiency in this subject, the University will require extra work in addition to other studies.

In all cases in which the preparation of a student in a particular subject proves to be deficient, the University reserves the right to require the student to secure at his own expense the help of an approved coach until the deficiency is remedied.

**COURSE OF STUDY.**

The following course of study will be required of all students who fit themselves at the University for entrance to the Freshmen class in 1905. Such varia-
tions 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 is required of all able-bodied male students throughout the course. Physical training is required of all students, unless they are excused by the President upon presenting a certificate from one of the University physicians. The young men have drill three times per week and exercise in the Gymnasium twice. The young women have physical culture three times a week.

The language begun in the second or third year must be pursued for at least two years in order to secure credit toward graduation.

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. The wishes of parents will always be given careful consideration in making up the schedule of work for each student, but the final decision in the matter must rest with the committee on registration, which is composed of persons who have had long experience in secondary and collegiate teaching. 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.

**FIRST YEAR.**
(The figures represent recitations per week).

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>5</td>
</tr>
<tr>
<td>Algebra</td>
<td>5</td>
</tr>
<tr>
<td>Greek and Roman History</td>
<td>2</td>
</tr>
<tr>
<td>Physical Geography</td>
<td>3</td>
</tr>
<tr>
<td>or Domestic Science</td>
<td>5</td>
</tr>
</tbody>
</table>

**SECOND YEAR.**

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>5</td>
</tr>
<tr>
<td>*French (first year)</td>
<td>5</td>
</tr>
<tr>
<td>*Spanish (first year)</td>
<td>5</td>
</tr>
<tr>
<td>European History</td>
<td>4</td>
</tr>
<tr>
<td>*Drawing and shop work</td>
<td>5</td>
</tr>
<tr>
<td>*Latin</td>
<td>5</td>
</tr>
<tr>
<td>*German (first year)</td>
<td>5</td>
</tr>
<tr>
<td>*German (second year)</td>
<td>4</td>
</tr>
</tbody>
</table>

**THIRD YEAR.**

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>5</td>
</tr>
<tr>
<td>*French (second year)</td>
<td>4</td>
</tr>
<tr>
<td>Plane Geometry</td>
<td>5</td>
</tr>
<tr>
<td>*German (first year)</td>
<td>5</td>
</tr>
<tr>
<td>*German (second year)</td>
<td>4</td>
</tr>
<tr>
<td>*Drawing and Shop work</td>
<td>5</td>
</tr>
<tr>
<td>*Spanish (first year)</td>
<td>5</td>
</tr>
<tr>
<td>*Spanish (second year)</td>
<td>4</td>
</tr>
<tr>
<td>*Greek (first year)</td>
<td>5</td>
</tr>
<tr>
<td>*Public Speaking</td>
<td>3</td>
</tr>
<tr>
<td>*French (first year)</td>
<td>5</td>
</tr>
<tr>
<td>*Stenography (8 hours)</td>
<td></td>
</tr>
</tbody>
</table>

**FOURTH YEAR.**

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>5</td>
</tr>
<tr>
<td>*Greek (second year)</td>
<td>4</td>
</tr>
<tr>
<td>Civics</td>
<td>3</td>
</tr>
<tr>
<td>*French &quot; &quot; &quot; &quot;</td>
<td>4</td>
</tr>
<tr>
<td>Physiology</td>
<td>2</td>
</tr>
<tr>
<td>*German &quot; &quot; &quot; &quot;</td>
<td>4</td>
</tr>
<tr>
<td>*Solid Geometry and</td>
<td></td>
</tr>
<tr>
<td>*Spanish &quot; &quot; &quot; &quot;</td>
<td>4</td>
</tr>
<tr>
<td>*Public Speaking</td>
<td>2</td>
</tr>
<tr>
<td>*Greek (third year)</td>
<td>4</td>
</tr>
<tr>
<td>*Physics</td>
<td>5</td>
</tr>
<tr>
<td>*English History</td>
<td>4</td>
</tr>
</tbody>
</table>

*Subjects thus marked are elective. One elective must be chosen in the second year. In the third year and in the fourth year, electives making up at least nine hours must be chosen.
ENGLISH.

The English of the sub-collegiate course is based upon what are known as the entrance requirements of New England colleges. The work is in general divided into three parts: classics, studied in class, composition and grammar work done partly in class and part outside, and supplementary reading done largely outside the class-room. All these parts of the work may be carried on at the same time, as the circumstances of the class seem to require, the classics and supplementary reading forming the basis of a large part of the work in grammar and composition. Throughout the course, however, a primary aim is to develop the student's individual power of expressing himself in words. The time allotted to these three phases of English varies from year to year, increasing attention being paid to the appreciative and critical faculty as the course advances. In the fourth year a brief outline history of English and American literature occupies about one-third of the year's work in English.

The four years' sub-collegiate English is conducted under the following general outline. Five hours each week are given to English throughout the course.

Selections from the following list are made at the discretion of the teacher, preference being given to the New England College Entrance Requirements, which are marked by an asterisk *

FIRST YEAR.

One half of the time is devoted to the study of English Grammar and Composition.

CLASSICS. Longfellow's Tales of a Wayside Inn, Bryant's Water Fowl, Planting of an Apple Tree,

Supplementary Reading. Scott’s Talisman, Hughes’ Tom Brown at Rugby, Cooper’s Last of the Mohicans, The Spy, Hale’s A Man Without a Country, Hawthorne's The House of the Seven Gables, Howells’ A Boy’s Town.

SECOND YEAR.

Composition and Grammar. As in first year with attention to figures of speech, reproducing the work of classic authors, elementary etymology, exercises in exposition, narration and description.

Classics. *The Vision of Sir Launfal, *The Ancient Mariner, and The Ballad Book (Bates), and *The Idylls of the King, studied as in first year.

Supplementary Reading. Deserted Village, Lorna Doone, selections from Burroughs, Quentin Durward, The Cricket on the Hearth.

THIRD YEAR.

Composition and Rhetoric are continued with emphasis on elementary argumentation and exposition.

Classics. Julius Cæsar, *The Merchant of Venice, The Princess, *Sir Roger de Coverly, Poems of Burns, Carlyle’s Essay on Burns. These are for general reading as in the first and second years. For careful reading are the following: *Milton’s L’Allegro, Il Penseroso, Comus, Lyricidas, Macaulay’s Essay on Milton. Special attention will be given to the author, his times and surroundings, and his style.

Supplementary Reading. Sesame and Lilies, Backlog Studies, Treasure Island, Kidnapped.
FOURTH YEAR,

COMPOSITION AND GRAMMAR. Exercises in narration and description for flexibility and ease of expression and general preparation for entrance requirement "b" on page 33 of this Register.

CLASSICS *Burke's Speech on Conciliation, Macaulay's *Life of Johnson, Essay on Addison, *Macbeth. These are all for thorough study.

HISTORY OF ENGLISH LITERATURE. From the earliest times, with text-book as guide, with a review in chronological order of the classics studied during the four years of the course, to prepare for examination in entrance requirement "a" on page 32 of this Register. Special attention is paid to Keats, Shelley, Tennyson and other representative poets of the nineteenth century.

SUPPLEMENTARY READING. Our Old Home, Making of an American, The Newcomes, Oliver Twist, American Orations and Addresses.

MATHEMATICS.

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 the algebra through quadratic equations.

Plane geometry occupies the third 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.

Solid geometry and the completion of the algebra through occupy the fourth year.
MECHANIC ARTS.

This 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 sketching in perspective and orthographic projection. Reinhart's lettering, free-hand working drawings.

Shop-work—"Sloyd," including wood-carving, care and use of wood-working tools.

SECOND YEAR. Drawing—Mechanical drawing, geometrical problems, first seventeen problems in Church's descriptive geometry.

Shopwork—Forging, joinery, wood-turning.

SCIENCE.

It is the object of the courses 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. To insure better results in the notebooks, they will all be passed upon by one of the instructors in English.

PHYSICAL GEOGRAPHY. This course, combining the laboratory method with the text-book, aims to give the pupils training in exact observation of familiar phenomena, like distance, weight, pressure of liquids and gases, temperatures, winds, clouds and the habits of plants and
animals. The natural forces producing erosion, formation of soils and rocks, the processes of nature as seen in seed germination and plant growth (with demonstrations with the microscope) will be discussed, with frequent experiments and field excursions.

CHEMISTRY. A year's work with the text and in the laboratory.

PHYSICS. A thorough course consisting of three recitation periods and four laboratory periods per week, carried along the lines laid down for the senior year in secondary schools.

PHYSIOLOGY. This course aims to combine careful laboratory instruction, with application of the knowledge to practical personal hygiene. This work will be coordinated with that of the department of Physical Culture. For part of the instructions the young men and women will meet in separate sections.

DOMESTIC SCIENCE. The course in domestic science for young women 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, nursing and food for the sick, marketing, and the management of servants.

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.

Social duties and customs of society are considered with peculiar care. The students have access in the domestic science library to all the best authorities.
HISTORY

The aim of 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 discriminating reading.

The work of the first year will consist of a survey of the development and characteristics of the Greek and Roman civilizations. A text such as Wolfson's or West's will be supplemented by collateral reading and a notebook.

The work of the second year includes mediaeval 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' European History is used, supplemented by the reading of references contained therein.

Hart's "Actual Government" 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 subjects of special investigation and study.

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

LATIN, GREEK, FRENCH, SPANISH AND GERMAN

For an outline of the courses in Latin and Greek see page 34, under requirements for admission.

For an outline of the courses in French, Spanish and German see pages 50, 52 and 68.

BOOKKEEPING AND COMMERCIAL PRACTICE.

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. Students are made familiar with different filing cabinets, the filing of letters, the use of card ledgers, the copying and indexing of letters and bills in copy books. The course includes instruction in commercial law, with special emphases laid on the ordinary forms of commercial paper and the different endorsements. The department is equipped with the latest vertical files, cabinets, letter press, and office sundries. All students in bookkeeping are required to take some other branch of mathematics and must show proficiency in English.

**STENOGRAPHY AND TYPEWRITING.**

A complete course in stenography is offered. The Gallagher-Marsh system, a system which has received the highest endorsement of leading court reporters on the Pacific Coast and which has been adopted by the Boards of Educations in the largest cities of California, has recently been adopted. The amount of time allotted for this work has also been increased from five hours to eight hours per week. The object of the course is to train students so that they may become practical stenographers. With this end in view particular stress is laid upon neatness, filing, copying, and indexing. This branch of the commercial department is equipped with up-to-date filing cases, office sundries, and six typewriters, four of which are Remingtons, and two the L. G. Smith Visible. All of the typewriters are new with the exception of one. Students taking this work are required to have had one year of English, and to take English with this course.
ALUMNI ASSOCIATION.

The Alumni Association of the University of Arizona was organized on the second day of June, 1897.

The object of this society as expressed in its constitution is: "To promote the interests of the University to secure unity among its graduates and to foster an attachment to our Alma Mater."

Concerning the last two clauses of this declaration it may be said that the organization is carrying out their meaning in a manner which leaves little if anything to be desired. There is no doubt regarding the loyalty of the graduates to the University of Arizona and no question of their unanimous desire for the prosperity of the institution.

The first clause of the above declaration, however, deals with a matter which in a sense admits of more growth than those just mentioned, and the members of the association realize that there is room for further progress in the accomplishment of this purpose.

In the past the alumni organization has been small in numbers and efforts to "promote the interests of the University" have necessarily been somewhat feeble. As however, the membership is now fairly large and will be considerably augmented in yearly is the conviction of the alumni that the time has come for more clearly defined and decisive work in behalf of our Alma Mater.

So far the activity of the society has been shown in two ways. First by assuming charge of the work of securing suitably framed photographs of the members of the graduating classes, from year to year, and presenting
these to the University for preservation on its walls, thus forming a pictorial record of the work of the institution. Secondly, by giving an annual banquet at Commencement to the graduates and members of the faculty, thereby creating a fraternal feeling between the old and new members of the association and also keeping the instructors and graduates in touch with each other from year to year. However commendable and important these enterprises may be it is the belief of the society that now with numerous members scattered throughout Arizona actively engaged in the industries, arts and sciences the time has come to take up additional work.

The members of the association realize that there yet are many people in the Territory who are not fully aware of the educational opportunities afforded by the University. Some of these are sending their children to other States to receive an education which might be obtained equally well in this Territory. It should be realized that the more the people patronize their own institution the better will become the courses which it can offer. In one sense the degree of development of the University depends only on the measure of support given to it by the citizens of the Territory.

Another feature which is commended to the careful consideration of our wealthy citizens is that the University of Arizona has not one cent of endowment. Through the generosity of one of the largest mining companies in Arizona the institution has received two substantial gifts of money to aid in the erection and furnishing of buildings, but other than this nothing has been received from private individuals. Institutions to
the east and west of us have endowments of thousands of dollars; why should not the University of Arizona be endowed also?

In pursuance of the foregoing lines of thought it will be the aim of the alumni association to endeavor to create a deeper feeling of interest and pride in the University of Arizona among the people of the Territory.

1895
Charles Oma Rouse, B. S., Superintendent of Schools, Pima County, Tucson, Arizona.
Mercedes Anna Shibell, B. S., (Mrs. A. J. Gould), Tucson, Arizona.
Mary Flint Walker, B. S., (Mrs. Pearl Adams), Benson, Arizona.

1897
Clara Cramond Fish, B. S., Tucson, Arizona.
George Ojeda Hilzinger, B. S., Teller in Bank, El Paso, Texas.
Mark Walker, B. S., Metallurgist, Tombstone, Arizona.

1898
Hattie Ferrin, B. S., Instructor in University of Arizona, Tucson, Arizona.
Minnie Watts, B. S. (Mrs. W. B. Smith), Altaville, Cal.
John Desha Young, B. S.
Died April 8, 1899.
1899
Robert L. Morton, B. S., Assayer, Yuma, Arizona.

1900
Ida Clarissa Flood, B. S., (Mrs. G. Dodge) Oakland, Cal.
Samuel Pressly McCrea, B. S., A. B., Teacher of High School, San Jose, Cal.
Charles Pierce Richmond, B. S., Cyanide Manager, La Union, Salvador, Central America.
Florence Russell Welles, B. S., (Mrs. Wm. Angus), Tucson, Arizona.

1901
Rudolph Castenada, B. S., Surveyor, Tucson, Arizona.
Clara Ferrin, B. S., Teacher, Tucson, Arizona.
George Millard Parker, B. S., Denver, Colo.
David Hull Holmes, B. S., (nunc pro tunc) Professor of Mechanic Arts and Drawing, University of Arizona, Tucson, Arizona.

1902
Ruth Brown, Ph. B., Teacher, Tucson, Arizona.
Rosa Belle Barrott, Ph. B., Teacher, Roseburg, Oregon.
Philip Matthew Reilly, B. S., Assayer, La Cananea, Sonora, Mexico.
Bertram L. Smith, B. S., Surveyor and Assayer, Mayer, Arizona.
Bessie Smith, Ph. B., Teacher, Tucson, Arizona.
Walter James Wakefield, Assayer, Tucson, Arizona.

1903

George Mark Evans, LL. B., Instructor in University of Arizona, Tucson, Arizona.
Georgia Ann Holmesley, Ph. B., Clifton, Arizona.
Edward Horton Jones, B. S., Assayer, Magdalena, Sonora, Mexico.
John Williard Prout, Jr., B. S., Superintendent Mowery Mine, Patagonia, Arizona.
Thomas Edward Steele, B. S., Assayer, La Cananea, Sonora, Mexico.

1904

William Burnham Alexander, B. S., County Surveyor, Pima County, Tucson, Arizona.
Frank Caleb Kelton, B. S., Surveyor, Tucson, Arizona.
Estella Markham Prout, Ph. B., Denver, Colorado.
John Williard Prout, Jr.; B. S. (Mining). See 1903.
MILITARY ORGANIZATION 1904-5.

UNIVERSITY OF ARIZONA CADET BATTALION,
NATIONAL GUARD OF ARIZONA.

Commandant of Cadets.................................
Lieutenant S.V. McClure, U. S. A.; Major, N. G. A.

STAFF.

Adjutant....................First Lieutenant J. Elmer Johnson.
Quartermaster........Second Lieutenant John S. Brown.
Sergeant Maor.........................William F. Drew.

COMPANY A.

Captain........................................Hugh M. Wolflin.
Second Lieutenant...................Albert R. Buehman.
First Sergeant............................Burrell R. Hatcher.
Sergeant..............................Andrew P. Martin.
Sergeant.................................Sheldon A. Reed.
Corporal.................................Charles O. Brown.
Corporal.................................Dan Angius.
Corporal..................Frank W. Rose.
Corporal.......................Harold D. Steinfeld.

COMPANY B.

Captain........................................W. Scott Osborne.
First Sergeant.........................J. Clyde Hoyt.
Sergeant............................Robert B. Murphey.
Sergeant..............................Fletcher M. Doan.
Corporal.............................Lynne F. Hazzard.
Corporal............................Clifford H. Cassiday.
Corporal..............................Thomas S. O'Connell.
TRUMPETERS

Corporal.............................Horace R. Holbrook.
Private.................................Sidney F. Mashbir.
Private.................................Max M. Henley.
Private.................................Julian Huddleston.
Private.................................Carlos Castaneda.
REGISTER OF STUDENTS.
1904-05.

POST GRADUATE STUDENTS.

Drane, Richard Lamar, B. S. Univer. of Ariz., Engineering .............................................................. Tucson
Evans, George Mark. Ph. B. Univ. of Ariz., Mathematics and Chemistry............................... Tucson
Ferrin, Clara, B. S. Univ. of Ariz., German. .... Tucson
Meek, James Thomas, A. B. Arkadelphia Methodist College, Mathematics .................... Roosevelt
Murphey, Carobel, A. B. Cox College, Botany, .. Tucson
Williams, David Carl, B. L. McMinnville College, Economics and Philosophy ............... Tucson

SENIORS—4.

Ganz, Sylvan Cleveland .................................. Phoenix
Mead, Roy Gibbons, ........................................ Tucson
Norway, Ora Elinor, ....................................... Tucson
Reid, Ida Christina ....................................... Tucson

JUNIORS—4.

Bateman, Ralph Lowell, .............................. Fort Grant
Bonillas, Ygnacio Safford, .......................... Nogales, Mexico
Kilgore, Roy Bartley ................................... Williams
Wooddell, Minnie Louise ................................ Tucson

SOPHOMORES—9.

Brown, Harriet Estella .................................. Tucson
Crable, Francis Drake .................................... Tombstone
Moore, Roy Webb ....................................... Tucson
Purcell, Weda Ina ....................................... Tucson
Osborn, Winfield Scott ........................... Phoenix
Pierson, A. Romeyn, Jr. .......................... Glen Ridge, New Jersey
Samuels, Kathryn .................................. Tucson
Walker, Leland Ross .............................. St. Louis, Mo.
Wolflin, Hugh Maupin ............................. Tucson

FRESHMEN—8.

Fitch, Constance ................................. Tucson
Holbrook, Horace Rolland ....................... San Bernardino, Cal.
Moore, Leon G. ................................. Tucson
Murphey, Robert Bivins ........................ Phoenix
Ruthrauff, John Mosheim ........................ Tucson
Scow, Oliver ..................................... Dos Cabezas
Williams, Edwin Eugene ......................... Sandusky, O.
Wooddell, Charles Edward ....................... Tucson

UNCLASSIFIED—COLLEGE—8.

Angus, William—Engineering and Chemistry, ... Tucson
Babcock, Frances Myra—English and French, ... Tucson
Bradford, Hubert—Assaying Course, ............ Tucson
Brostrom, William—Metallurgy, .................. Tucson
Jacobus, Mrs. Preston N.—Spanish, ............. Tucson
Lowrie, Phoebe—Spanish and Economic, ........ Tucson
Wilcox, Mrs. Emma Kester—English and Economics,
............................................. Tucson
Willson, Martha Edna—English ................... Tucson

SUB-COLLEGIATE—FOURTH—18.

Brown, John Stephenson ....................... Tucson
Brown, Clara Agnes ............................. Tucson
*Buehman, Albert Rex. Tucson
Childs, Ruby Claire. Chicago, Ill.
*Doan, Fletcher M., Jr. Florence
*Drew, William Franklin. Mesa City
Francis, Mary Agnes. Tucson
*Hatcher, Burrell R. Douglas
*Johnson, Joel Elmer. Mesa City
Kane, Mae Dolores. Tucson
La Baree, Grace Ysabel. Berkeley, Cal.
*Mellgren, Walter Give. Tombstone
Pease, Ione Gertrude. Tucson
*Pew, William James. Mesa City
Rogers, Pauline. Tucson
Stewart, Jesse Hobson. Mesa City
White, Edward Willard. Tucson
Wilkerson, Mabel. Yuma

SUB-COLLEGIATE—THIRD—23.

Angius, Daniel. Bisbee
Brown, Charles Owen, Jr. Tucson
Carpenter, Leslie Lucile. Tucson
Cole, Rena Ann. Fort Lowell
Culley, Edith Emily. Tucson
Erb, Aimee Myrtle. Yorktown, Texas
Evans, Evelyn Mamie. Tucson
Grossetta, Warren Arthur. Tucson
Hazzard, Lynne Franklin. Tucson
Hoyt, Joseph Clyde. Jerome
Kohler, George William. Tucson
Leslie, Beppie Lee. Tucson
Martin, Andrew Philip. Tucson

*Permitted to register in at least one freshman subject.
McNelly, Benjamin Arthur............................Globe
Moore, Sylvester Archie..............................Tucson
O'Connell, Thomas Sarsfield.........................Tucson
Post, Anita Calneh..................................Yuma
Reed, Sheldon Alanson...............................Tucson
Scholefield, Helen Mar..............................Tucson
Samuels, Agnes Huntington..........................Tucson
Soto, Rafaela Augusta...............................Wilcox
Steinfeld, Harold Donau.............................Tucson
Tonkin, Ruth Anna....................................Tucson

SUB-COLLEGIATE—SECOND—47.

Adams, David Lee.....................................Dragoon
Angius, John.........................................Bisbee
Bernard, Edwin Price.................................Tucson
Cassiday, Clifford Harry..............................Tucson
Cheyney, Mary Neal..................................Tucson
Clark, Florence Elsie.................................Bisbee
Coleman, Mabel May..................................Tucson
Contraman, Robert William...........................Tucson
Conwell, Albert Lee..................................Douglas
Dannemiller, Charles Raymond.......................McCabe
Detloff, Albert John..................................Bisbee
Donnelly, Albert Francis.............................Tucson
Drachman, Myrtle Augustine..........................Tucson
Duffy, Mary Margarite.................................Tucson
Elster, Lulu Louise..................................Tucson
Estabrook, Ethelind May.............................Tucson
Ford, Emmet Tomlinson.................................Tucson
Francis, Margaret Elizabeth.........................Tucson
Goldtree, Estella Esther..............................Tucson
Gorby, Eva............................................Tucson
Gregory, Minnie Hortense.............................Tucson
Gungl, Edward Joseph .................. Fort Huachuca
Henley, Max Morrell .................. Quijano, Mex.
Hoeffer, Albert Herbert ............. Hermosillo, Mex.
Holliday, Leonidas Morris ........... Tucson
Lulley, Alex Gray .................... Nogales
McCloskey, Pearl Louise ............. Tucson
McLean, John William ................. Metcalf
Miller, Leslie Creighton .......... Tucson
Montijo, Manuel Jr. ............... Tucson
Murphey, Elizabeth.................. Tucson
Nutt, Anne ................................ San Diego, Cal.
Ochoa, Sarah Edna .................... Tucson
Purcell, Ivy May ...................... Tucson
Rose, Frank Winfred ............... Young
Sine, Eva Jessie ..................... Tucson
Soldini, Amelia Bernice ............ Tucson
Sparks, Leona May ................... Tucson
Strong, Leon Henri .................. Tucson
Tate, Joseph McLane ................ Bisbee
Thompson, Lillian Virginia ......... Tucson
Tomlinson, Edward Lorraine ........ Prescott
Trippell, Alfred Alexander ........ Tucson
Varney, Erling Alexander ......... Tucson
Wheeler, Charles A ................... Tucson
Wheeler, Winifred ................... Tucson
Wright, W. E. ........................ Tucson

SUB-COLLEGIATE—FIRST—60.

Allen, Laura Chase .................... Tucson
Attix, Mary Starr ..................... Tucson
Baffert, Peter Edward ................ Tucson
Batte, Homer Benjamin ............... Tucson
Beck, Charlotte Ellen ............................................ Tucson
Bell, Sylvester D .................................................. Tucson
Bennie, Florence Mary ........................................... Clifton
Bohannan, Mary Selene ........................................... Tucson
Bonn, Frances Clara ............................................... Tucson
Brown, Margaret Bernice ....................................... Tucson
Brown, Kenneth Brooke ......................................... Tucson
Brown, Rollin ....................................................... Tucson
Browne, Earle George ........................................... Tucson
Buehn, Louis Fred ................................................ Tucson
Cassiday, Robert Maxwell ........................................ Tucson
Castenada, Carlos ................................................ Benson
Clayshulte, Julia Cole ........................................... Tucson
Clayshulte, Nelson ............................................... Tucson
Corda, Mary Wilhelmina ......................................... Olive Camp
Cox, William Ernest ............................................ Jerome
Culin, John Harding ............................................ Tucson
Davis, Charles Martin .......................................... Hereford
Decker, Hazel Fern ............................................... Tucson
Detloff, John James George ................................... Bisbee
Dial, William Porter ............................................ Safford
Donohue, John Bernard ........................................ Cananea, Mex
Duffy, Alice E. Elizabeth ....................................... Tucson
Duffy, Harriett Loretta ......................................... Tucson
Emmons, Guy ....................................................... Pearce
Estill, Howard Wilmot .......................................... Tucson
Firth, Charles Abraham ......................................... Aravaipa
Fryer, Joseph Kent ............................................... Tucson
Goodell, Joe ....................................................... Tucson
Guerry, Marquis LaFayette .................................... Tucson
Heney, Ruth Easter ............................................... Tucson
Hepburn, Harold Mettick ....................................... Tucson
Huddleston, Julian ............................................... Tucson
Jones, Leita ........................................... Tucson
Judd, Bessie ........................................... Tucson
Kohler, Barbara Hess ................................ Tucson
Long, Robert Kistner ................................ Tucson
Mashbir, Sidney A. ..................................... Safford
Mason, Ernest Shanklin ................................. Tucson
McClure, John Clarendon ............................... Tucson
McNeil, Clara May ..................................... Tucson
Miller, Edward Burkhalter .............................. Tucson
Nielsen, Hilda Dagmar ................................ Tucson
Nielsen, Gwynne Eleanor ............................... Tucson
Potter, Delbert Dorsey .................................. Clifton
Purcell, Marie Ellen .................................... Tucson
Pusch, Henrietta Louise ................................. Tucson
Rose, Norman Allan ..................................... Young
Schneider, Elizabeth Sophia ............................ Tucson
Sine, Janet Volume ..................................... Tucson
Skinner, Ida Bella ..................................... Tucson
Smith, Felicia Grace ..................................... Clifton
Thompson, Lucille ...................................... Tucson
Trippel, Amy Irene .................................... Tucson
Wooddell, Florence .................................... Tucson

SUB-COLLEGIATE—UNCLASSIFIED—7.

Ainsworth, Sallie E.—Stenography ..................... Tucson
Clayton, Martha—Stenography, Bookkeeping, Spanish,
.............................................................. Calabasas
Lewis, John William—English ................................ Tucson
Spires, Leila Martha—History and English ............ Tucson
Spires, Alice—History and Civics ........................ Tucson
Spires, Laura—History and English ........................ Tucson
Wright, William Edward—English and Latin .......... Tucson
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