COLLEGE BULLETIN 235 ISSUED SEMI-MONTHLY MAY 15, 1916

OREGON AGRICULTURAL COLLEGE BULLETIN

Annual Catalogue 1916-17

WITH LIST OF STUDENTS FOR 1915

CORVALLIS, OREGON

Entered as second-class matter November 27, 1909, at th
Oregon, under the Act of July 16,

CALENDAR, 1916-17

1916

JULY

S	M	T	W	T	F	S
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OCTOBER

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DECEMBER

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1917

JANUARY

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MARCH

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APRIL

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MAY

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JUNE

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CATALOGUE

OF THE

Oregon Agricultural College

FOR

1916-17

WITH LIST OF STUDENTS FOR 1915-16

CORVALLIS, OREGON

MAY 15, 1916

CORVALLIS
COLLEGE PRINT SHOP
1916

COLLEGE CALENDAR, 1916-17

1916

September 18, 19, Monday, Tuesday—Registration and examinations for admission.

September 20, Wednesday—Recitations begin.

October 6, Friday—Quarterly meeting of the Board of Regents.

November 6, Monday—Forestry Short Course begins.

November 29, 30, December 1, 2, Wednesday (noon), Thursday, Friday, Saturday—Thanksgiving recess.

December 23, Saturday (noon)—Christmas recess beings.

1917

Jan 1 - 6, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday—Farmers' and Home Makers' Week and Rural Life Conferences.

January 3, Wednesday—Quarterly meeting of the Board of Regents.

January 8, Monday—Regular exercises resumed. Winter Short course begins.

January 27, 29, 30, 31, Saturday, Monday, Tuesday, Wednesday—First semester examinations.

February 2, Friday—Winter short course ends.

February 1, 2, 3, Thursday, Friday, Saturday—Mid-year vacation.

February 5, 6, Monday, Tuesday—Second semester registration.

February 7, Wednesday—Recitations begin.

February 22, Tuesday—Washington's birthday; a legal holiday.

April 4, Wednesday—Quarterly meeting of Board of Regents.

April 13, Friday—Forestry short course ends.

May ———————— Military inspection day.

May 30, Wednesday—Decoration Day; a legal holiday.

June 3, Sunday—Baccalaureate sermon.

June 4, Monday—Senior Class Day exercises.

June 5, Tuesday—Commencement exercises.

Final examinations for the second semester will be held on Tuesday afternoon, June 5; Wednesday, June 6; Thursday, June 7; and Friday, June 8.

June 11, Monday—Summer session begins.

July 21, Saturday—Summer session closes.

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HON. C. L. HAWLEY, Treasurer.....McCoy

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HON. J. A. CHURCHILL, Supt. of Public Instruction.....Salem
HON. CHARLES E. SPENCE, Master of State Grange.....
Oregon City

APPOINTED BY THE GOVERNOR

	Term Expires
HON. J. T. APPERSON	Parkplace, 1918
HON. J. K. WEATHERFORD	Albany, 1918
HON. C. L. HAWLEY	McCoy, 1918
HON. WALTER M. PIERCE	La Grande, 1921
HON. H. VON DER HELLEN	Wellen, 1921
HON. GEO. M. CORNWALL	Portland, 1921
HON. CLARA H. WALDO	Portland, 1924
HON. N. R. MOORE	Corvallis, 1924
HON. JEFFERSON MYERS	Portland, 1924

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(Arranged in groups in the order of seniority of appointment)

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Professor of Horticulture; Vice-Director and Chief in Horticulture, Experiment Station.

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HENRY DESBOROUGH SCUDDER, B. S.,
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LOUIS BACH, M. A.,
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* The College Council is composed of members of the Administrative Council and other members of the staff with the rank of professor, associate professor, or assistant professor.

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Associate Professor of Mathematics.

* On leave of absence.

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Associate Professor of Entomology; Chief in Entomology, Experiment Station.

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* On leave of absence.

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EDNA MAY FLARIDA,
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BERTHA DAVIS, M. S.,
Instructor in Domestic Science.

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WILLIS DHU AINE PEASLEE, E. E.,
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Instructor in Art.

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GUILFORD LANSING HURD,
Field Organizer, Bureau of Organization and Markets.

* On leave of absence.

JOHN ROBERT MAGNESS, M. S.,
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ELLSWORTH ERWIN,
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Union.

UMATILLA BRANCH EXPERIMENT STATION
Ralph Wilmer Allen, B. S.,
Hermiston.

EASTERN OREGON DRY-FARM BRANCH EXPERIMENT STATION
David Edmund Stephens, B. S.,
Moro.

SOUTHERN OREGON BRANCH EXPERIMENT STATION
Frank Charles Reimer, M. S.,
Talent.

HARNEY VALLEY BRANCH EXPERIMENT STATION
Leroy Breithaupt, B. S.,
Burns.

JOHN JACOB ASTOR BRANCH EXPERIMENT STATION
Glen Howard Roberts, B. S.,
Astoria.

HOOD RIVER BRANCH EXPERIMENT STATION
Le Roy Childs, A. B.,
Entomologist, Experiment Station.
Gordon George Brown, B. S.,
Horticulturist, Experiment Station.
Hood River.

GENERAL INFORMATION

FOUNDATION AND ENDOWMENT

In pursuance of an Act of Congress, approved by President Lincoln, July 2, 1862, a grant of land to the amount of thirty thousand acres, or its equivalent, was made to each state in the Union for each senator and representative in Congress to which the state was entitled by the apportionment of the census of 1860. The proceeds under this Act were to constitute a perpetual fund. The principal of this fund was to remain forever undiminished; but the interest arising from the fund was to be inviolably applied by each state that should avail itself of the benefits of the Act, to the support and maintenance of a "College where the leading objects shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts, in such manner as the legislatures of the states may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life." Ninety thousand acres of land were apportioned to Oregon; and by an Act approved October 9, 1862, the Legislative Assembly of Oregon accepted the provisions of the Congressional law.

The Land-Grant Fund. The subsequent sale of this land has netted the College approximately $200,000. This at present is invested in securities bearing six percent interest. The Act of Congress of 1862 explicitly demands that no part of the funds so appropriated, or the interest arising therefrom, shall be used for the purchase, erection, or maintenance of any building or buildings.

The Hatch Fund. Under an act of Congress, approved March 2, 1887, the College receives $15,000 a year for the maintenance of an Agricultural Experiment Station, "to aid in acquiring and diffusing among the people useful and practical information on subjects connected with agriculture."

The Morrill Fund. On August 30, 1890, an act was passed by Congress "to apply a portion of the proceeds of the public land to the more complete endowment and support of the colleges

for the benefit of agriculture and the mechanic arts established under the provisions of the Act of 1862." This act provides that in 1890, $15,000 should be paid to each of the land-grant colleges, and that the amount so appropriated should be increased by the sum of $1,000 annually for ten years, and that thereafter the amount annually appropriated should continue to be $25,000. Under an act of Congress, approved March 4, 1907, known as the Nelson Amendment, this fund was increased by the sum of $6,000 for the fiscal year ending June 30, 1908, and by an additional $5,000 for each succeeding year until the total annual amount, in 1912, reached $50,000.

The Adams Fund. An act of Congress, approved March 20, 1906, appropriated an initial $5,000 for that year, and $2,000 additional for each year thereafter until the annual amount should reach $15,000. This fund is "to be applied only to paying the necessary expenses of conducting original researches or experiments bearing directly on the agricultural industry" of the State, and therefore supplements the Hatch Fund in the maintenance of the Experiment Station.

The Smith-Lever Fund. This fund was established by the Smith-Lever Agricultural Extension Act approved by Congress May 8, 1914. By its provisions the Oregon Agricultural College received $10,000 from the Federal Government to apply towards the support of the Extension Service for the fiscal year ending June 30, 1915. This sum will be increased annually for seven years until the total amount of $30,200 is reached. This amount will continue as a permanent appropriation as long as an equal sum be "appropriated for that year by the legislature" of the State, "or provided by State, county, college, or local authorities, or individual contributions within the State for the maintenance of the cooperative agricultural extension work provided for in this Act."

Summary of College Funds. The College, therefore, receives annually from the National Government the following income: (a) interest on the land-grant sales fund, $12,000; (b) the Hatch fund, $15,000; (c) the Morrill fund, $50,000; (d) the Adams fund, $15,000; (e) the Smith-Lever fund, (1915-16) $14,446.36.

In addition to this income derived from the National Government, the College is dependent upon the income from the millage-tax, as provided by the State legislature of 1913, which became operative April first, 1915.

HISTORY

As there were no State colleges in Oregon in 1868, the legislature of that year, which provided for the location of the land received under the Act of 1862, gave the interest on the funds derived from the sale of the land to the Corvallis College, a private institution in Benton County, which was then under the control of the Methodist Episcopal Church, South. For a number of years, none of the land granted was sold, and the legislature made small annual appropriations for the support of the school.

In 1885, the church voluntarily relinquished its claim on the funds of the College, and the State assumed entire control of the institution. The legislature of that year provided for the "permanent location of the State Agricultural College at Corvallis, in Benton County," on condition that the citizens of said county should, within four years, erect on the "farm containing thirty-five acres in the immediate vicinity of said city, known as the Agricultural College Farm, brick buildings for the accommodation of said State Agricultural College at a cost of not less than $20,000." During the summer of 1887, the corner stone of the building erected by the citizens of Benton County was laid by the Governor of Oregon amid imposing ceremonies.

This structure, now known as the Administration building, was the nucleus around which other buildings soon began to cluster, as necessity and growing interest demanded. For a year or two there was ample room; but, as the institution grew, more land was needed and provided, and the institution now owns, instead of the thirty-five acres originally comprising the campus and grounds, three hundred and forty-nine acres; and instead of one structure, thirty-six. There has also been a marked increase in the attendance, from ninety-seven to over four thousand students. Twenty years ago, most of the students came from Benton and neighboring counties. Today, every county in Oregon, 32 other states, and 14 territories and foreign countries are represented. The increase in the number of students called for an increase in the number of the faculty. This body, from the number of five in 1884, has grown until it now closely approaches two hundred. Other features usually found in connection with progressive educational institutions have grown in equal ratio. The courses have been strengthened, the standards, both for entrance

and graduation, have been advanced, and other improvements have been made from time to time, which have added to the thoroughness and efficiency of the work.

ORGANIZATION

The Oregon Agricultural College is organized into the three grand divisions that characterize the work of the land-grant colleges throughout the country; namely, Resident Instruction, Experiment Station, and Extension Service. Resident Instruction, which includes all work of teaching students at the institution, is the most distinctive feature of the College life. It has always been regarded as of first importance, and will doubtless continue to be so regarded, in spite of the increasing usefulness of extension work. The Experiment Station, through systematic experiments, investigation, and research, is engaged in a search for fundamental truth. Its work is of great importance; for without it, the work of the other two grand divisions would soon become sterile and ineffective. The Extension Service, which is the newest of the three grand divisions of the College, includes all means of imparting the message of the College to the people in their own communities. It is virtually an effort to make practical and more or less immediate application throughout the State of the available truths worked out by the Experiment Station or used for resident instruction.

GOVERNMENT

The general government of the College is vested primarily in the Board of Regents, and, under their control, in four other administrative bodies—the Administrative Council, the College Council, the Faculty, and the Experiment Station Staff. These bodies, in the exercise of their respective duties, determine the questions of policy and regulate all matters relating to the interests of the institution.

The Board of Regents consists of thirteen members, of whom the Governor, the Secretary of State, the Superintendent of Public Instruction, and the Master of the State Grange, are ex-officio members. The nine other members are appointed by the Governor with the approval of the State senate, and hold office for a term of nine years. Under a law of the State legislature, passed in 1885, the Board of Regents constitutes a body corporate, under the name

of "The Board of Regents of the State Agricultural College, * * * with power to sue and be sued, and to make contracts," and to enact such regulations as may be necessary for the maintenance and development of the College.

The Administrative Council consists of the President of the College, the Director of the Experiment Station, the Director of Extension, the Deans of the different Schools, and the Director of the Summer School. The function of this Council is to consider and determine the larger questions of policy and administration.

The College Council is composed of the President of the College and all officers of administration and instruction with the rank of professor, associate professor, or assistant professor. This body considers all general questions relating to the educational work and policy of the College; arranges and correlates the courses of study, and determines the requirements for admission and graduation. The different committees of the College Council, representing the several schools of instruction, have charge of the enrollment and progress of students in the respective schools, and investigate the records of all candidates for graduation.

The College Faculty comprises members of the Administrative Council and the College Council and all other instructors, including members of the Experiment Station and Extension Service Staffs. It considers routine questions of method and discipline, a function for which it is particularly well adapted, being in close contact with all that pertains to student interests and student life.

The Experiment Station Staff includes the President of the College, the Director of the Experiment Station, the heads of the various departments of the School of Agriculture, and all assistants, engaged in research and experimental work. The members of this staff are engaged in the investigation of problems encountered in the development of the agricultural interests of the State. They also distribute, by means of correspondence, circulars, and station bulletins, information regarding their investigations.

The Extension Service Staff includes the President of the College, the Director of Extension Service, the Secretary of Extension Service, the State Leader and County Agents, the officers in charge of Boys' and Girls' Club Work, Extension Field Specialists in Horticulture, Dairy Husbandry, Agronomy, Animal Husbandry, Poultry Husbandry, Organization and Markets, Highway Engineering, Home Economics, Farm Management Demonstrations,

and members of the Resident Instruction Staff and Experiment Station Staff who assist in extension work.

The Students. The College does not undertake to prescribe in detail either its requirements or prohibitions. Students are met on a plane of mutual regard and helpfulness. Since the advantages of the institution are provided at public expense, the students are under special obligation to perform faithfully all their duties, not only to the College, but also to the community and to the State. Whenever the deportment of any student is such that his influence is inimical to the interests of the institution, he will be relieved from further attendance.

PURPOSE AND SCOPE

The purpose of the College is to provide, in accordance with the acts of Congress under which it is maintained, a liberal, thorough, and practical education—an education that will afford the training required for efficient service in different branches of industry. The distinctive technical work covers the three great fields of production, manufacture, and commerce. Special attention is given to the application of science. All the practical work in the laboratories, in the shops, in the orchards, and on the farm, is based on scientific principles. While the industrial or technical work is emphasized, the importance of a thorough general training, of mind development, and of culture, is recognized in all of the work throughout the institution. The object is to meet the demand for a broad and general education, supplemented by special technical training.

The work, therefore, covers a broad field, including technical courses along the different lines of agriculture, forestry, home economics, engineering, mining, commerce, pharmacy, industrial education, and industrial arts; with the necessary training in the basic subjects of mathematics and the natural and physical sciences; and also the general training in language, literature, history, economics, political science, civics, military tactics, and physical education, which constitutes an essential part of a liberal education.

In all the work of the institution, the object is to train the mind, the eye, and the hand to act in unison; to unfold and coordinate the faculties of mind and body; to develop a symmetrical manhood and womanhood, and a just appreciation of clean, upright citizenship.

LOCATION

The seat of the Oregon Agricultural College is Corvallis, a city of six thousand inhabitants, situated at the head of navigation on the Willamette River. As the name implies, it is in the heart of the far-famed Willamette Valley. It is readily accessible by steam and electric railway from all parts of the State; it has free mail delivery; there are many churches and no saloons, and the moral tone is equal to that of any city within the boundaries of the State. It is a city of homes, and its people are justly proud of the great institution in the midst of them, and jealously guard its good name.

Situated on high, well-drained land, open to the invigorating sea-breeze, Corvallis is one of the most healthful cities in the State. It has never been visited by any dangerous epidemic disease, and the possibilities of such visitation in the future appear remote; for the city has a complete modern sewerage system and first-class gravity water system, supplied from springs high up the slope of Mary's Peak, the tallest mountain in the Coast Range, some fifteen miles away to the westward. The city and its environs are conducive to wholesome student and home life. It has an ample supply of pure mountain water for all domestic and sanitary purposes. The atmosphere is purified and the climate ameliorated by almost constant ocean breezes—warm in winter and cool in summer. The surrounding landscape elicits praise from all who behold its delightful charms as viewed in the extensive area of fertile fields, gardens, and orchards. The wooded glens of the near-by foothills, and the lively mountain brooks, or the more pretentious streams frequented by canoe, row-boat, and launch parties, are fruitful sources of recreation; while the magnificent distant views to the eastward, where the fir-clad Cascade Mountains, with their wealth of trees and the perennially snow-capped sentinels—Hood, Jefferson, and the Three Sisters—present a constant panorama of picturesque mountain scenery. With such an environment, the city is truly an ideal location for a college and a home.

GROUNDS AND BUILDINGS

The College Grounds comprise three hundred forty-nine acres. That part of the grounds, ninety-one acres in extent, lying immediately about the several buildings, east of Cauthorn Avenue, and

usually designated as the lawns and campus, is tastefully planted with both native and exotic ornamental trees, shrubs, and herbs. The one hundred and forty-three acres used for the farm, garden, and orchard operations, is so plotted and planted as to meet the demands of the various lines of work and still conform to a general scheme of landscape embellishment. This portion occupies a slightly elevated and gently undulating site wholly within the western limits of the city of Corvallis. In addition to the above plot, one hundred and fifteen acres, comprising the College stock farm, together with the horticultural and poultry tracts, lies just south of the city limits. Broad drives and walks traverse the campus in all directions, thus rendering every objective point easily accessible. The numerous specimen trees, groups of shrubbery, and massed borders are a source of enjoyment as well as of instruction to all those who frequent the grounds. The scheme of planting has been such as to give an air of peaceful activity, orderly effort, earnest purpose, and quiet refinement. Daily association with such scenes for a period of years, during the time when men and women are forming the habits of thought and action that will be theirs through life, is certain to have a deep-seated and enduring influence for good in molding the character of future citizens.

The following brief descriptions will convey a general idea of the principal buildings and the purposes for which they are used:

The Administration Building is a three-story brick structure, 90x120 feet, containing recitation rooms, the library, the offices of the President, the Registrar, the Business Manager, and the Director of the School of Music. Centrally located and on a slight eminence, it commands an unsurpassed view of the campus, the city of Corvallis, and the picturesque Cascades.

Science Hall, situated southeast of the Administration building, and constructed of gray granite and sandstone, covers a ground space of 85x125 feet, has three stories and basement, and contains fifty-five rooms. It is one of the most serviceable buildings on the grounds, and within it, at present, are the School of Forestry, and the departments of Pharmacy and Chemistry, with their various laboratories, recitation rooms, and lecture halls, together with the offices and laboratories of the Experiment Station chemists. The School of Forestry, however, will be moved from this building to the new Forestry building before the opening of the college year 1916-17.

Agricultural Hall, standing southwest of the Administration Building, is the largest structure on the campus. It is an imposing edifice of brick and sandstone, consisting of the central or Administrative building, the north or Agronomy wing, and the south or Horticultural wing.

The central or Administrative building is 66x140 feet, four stories and basement, and contains conveniently arranged and well-lighted class rooms, laboratories, and offices. On the first floor are the offices of the Director of the Experiment Station and Dean of the School of Agriculture, the Professor of Poultry Husbandry, the Director of Extension Service, the State Leader of County Agriculturists, the State Leader of Industrial Clubs, the Editor of Publications, the Editor of Press Bulletins, and the College Exchange. The second floor is occupied by the department of Animal Husbandry, and the department of Industrial Education; the third floor, by the departments of Zoology and Entomology with their respective museums; and the fourth floor, by the departments of Bacteriology and Art.

The north or Agronomy wing is 72x130 feet, three stories high. It is thoroughly modern in all its equipment, and while intended solely for the work in Agronomy, at present accommodates, temporarily, two departments. The first and second floors occupied by the department of Agronomy, contain in addition to the offices of the Agronomy department, rooms variously devoted to laboratory and class purposes in Agrostology, Soil Physics, and kindred subjects. The third floor is used by the School of Commerce.

The south or Horticultural wing is 72x130 feet, three stories high. In the basement are located laboratories for plant propagation, spraying, vegetable preparation, and fruit packing. The basement also contains the general storage rooms for the department, and rooms which are especially adapted for the storage of fruits. The first floor contains the offices of the division of Horticulture, the research laboratory, systematic pomology laboratory, and three large lecture rooms. The second floor contains the offices and museums of the department of Botany and Plant Pathology, recitation rooms, and student laboratories. The third floor contains the horticultural museum and horticultural herbarium, photograph room, large student lecture room, draughting rooms, lecture rooms, and office of the Landscape Gardening section. These rooms are all especially well lighted and contain every convenience for conducting the work with efficiency.

Greenhouses. A new range of greenhouses, modern in every respect, has recently been constructed with a view to aiding the student in his studies in commercial greenhouse work. The range is made up of five even-span houses, three ninety feet long by twenty feet wide, and two thirty-three feet long by twenty feet wide, making the total area under glass 6,720 square feet. A modern hot-water heating apparatus has been installed, with valves and pipes so arranged that different temperatures can be maintained in every separate thirty feet of house in the three long houses. Each of the large houses has been divided into sections thirty feet long, so that the entire space in each may be given up to a single crop. Of the two smaller houses, one is given up to research work, and one to the propagation of plants in general. The central building is large and conveniently arranged for all work that is to be met with in greenhouse establishments. Such crops as carnations, chrysanthemums, violets, palms, ferns, general pot plants, and forced vegetables, like tomatoes, lettuce, and cucumbers, are grown in these houses.

Dairy Building. About sixty feet to the northward of the Agricultural building is located the Dairy building. The general scheme of both outside and inside finish is similar to that of the Agricultural building. The structure is 54x141 feet, three stories high. On the first floor are located the offices of the Dairy department and commodious laboratories for butter-making, cheese-making, and market milk instruction, including a well-equipped boiler and engine room and student lockers. On the second floor are the testing laboratory, advanced laboratory, farm dairy and shop rooms, veterinary laboratories, etc. The third floor is temporarily occupied by the department of mathematics, with the exception of a general lecture room, extending across the south end of this floor, and having a seating capacity of two hundred.

The Forestry Building, which is now being constructed, will be ready for occupancy with the opening of the college year 1916-17. Its outside dimensions will be 80x140 feet. The basement floor will be devoted to laboratories containing equipment for logging, milling, and timber preservation, as well as a working collection of manufactured wood products. The first floor will contain the laboratories for forest mensuration and forest protection as well as the offices of the School of Forestry. The second floor will provide space for a large drafting room, laboratories in timber technology, dendrology and silviculture, lecture room, class rooms, reading room, and seminar room.

Home Economics. The first wing, 68x120 feet, of the new Home Economics building is occupied by the departments of Domestic Science and Domestic Art. The building is located directly west from the Dairy building. It consists of three stories above a high basement, and is finely built of brick and stone. The most modern type of heating and ventilating systems are installed, and all provisions are made for the comfort and convenience of the young women carrying the work in Home Economics. Offices for the Professors of Domestic Science and Domestic Art and the assistants in both Domestic Science and Domestic Art, are on the first, second, and third floors.

The food laboratories are on the first and second floors, while the Domestic Art department has all of the third floor of the building and part of the second floor. Ample locker and dressing rooms are provided for the convenience of the students, and hot and cold water is supplied in all parts of the building. The housing and equipment of the School of Home Economics, in short, are thoroughly modern and adequate.

The Mines Building, which is 65x81 feet in dimensions, is located about 100 yards northwest of the Administration building, and is one of the newer buildings on the campus. This building forms the northern boundary of the quadrangle which is planned in the new building scheme on the College campus. It is a fine four-story structure, constructed of brick, trimmed with stone, and similar in type to Agricultural Hall. The first floor of the building contains the main offices, assaying, metallurgical and ore-dressing laboratories. The basement contains the crushing and sampling rooms, the ceramic laboratory, and the stock rooms. On the second floor will be found the Bureau of Mines laboratory and lecture and class rooms. On the third floor is the geological museum, the mineralogical and petrological laboratories, and draughting room. All the laboratories are provided with water, gas, electric lights, and steam heat.

Mechanical Hall, situated about one hundred and fifty yards northeast of the Administration building, is 90x120 feet, two stories high, and constructed of Oregon gray granite and sandstone. It is an attractive, substantial building, well arranged and admirably adapted to the purposes for which it is used. Besides recitation and lecture rooms for the classes in Industrial Arts, Mechanical, Electrical, Civil, Highway, Irrigation, and Experimental Engineering, it contains the Physical and Engineering laboratories.

Mechanical Arts Building is a modern, well-lighted structure of brick, with cement foundations, 52x52 feet, two stories high, flanked by a one-story wing on the east, 40x220 feet, and a similar wing on the south, 40x200 feet. The central portion contains the office of the Dean, a display room for student work, a tool room for the machine shop, and a finishing room for the wood shop. On the second floor is a general draughting room, 30x50 feet, with a commodious blue-print room and a dark room adjoining. The south wing contains the main woodworking shop, 40x97 feet, a stock room, 30x40 feet, a carpenter shop, 20x40 feet, and the College printing plant, 40x50 feet. The east wing contains the machine shop, 40x80 feet, the blacksmith shop, 40x100 feet, store room for coal and iron, lockers, and toilet rooms.

The Foundry, which is located immediately south of the blacksmith shop, is built of brick. It contains one 22-inch Colliau cupola for melting iron, one brass furnace, one portable core oven, one stationary core oven for larger work, one twelve-hundred-pound crane ladle, one eight-hundred-pound crane ladle, and several smaller ladles. It contains also one crucible brass furnace, one two-ton jib crane, one post crane, one No. 2 Delano pulley molding machine, one tumbling barrel for cleaning castings, and a liberal supply of smaller tools, flasks, etc.

The Women's Gymnasium is situated about two hundred yards south of the Administration building, and is erected against a gently sloping bank on Jefferson street. The structure, 70x120 feet, is built of stone and wood, and comprises a high, airy basement, or first floor, facing east, with the main floor above it, having a bank entrance on the west end. The first floor of the building is devoted to locker rooms, dressing rooms, bathrooms, and offices, together with a rest room and a special room for corrective gymnastics. The second floor consists chiefly of one large gymnasium room, which is also frequently used as a lecture hall, assembly room, and social center for moderate-sized gatherings. This room, which comprises 8,000 feet of floor space, is surmounted by a balcony running track, suspended from the trusses. It affords facilities, in a court of 79x54 feet dimensions, for basketball, indoor baseball, tennis, and various winter and indoor games. The building affords ample accommodations for the physical training of all the women of the institution.

The Men's Gymnasium is situated immediately west of Waldo Hall on Jefferson street, adjoining the main athletic field. The structure is to consist of four units, the central part being 90x150 feet, with each wing 52x96 feet in dimensions. The fourth unit will provide a swimming pool 50x100 feet, of modern design and finish. Only two units were completed during 1914, the main hall and the east wing. The main hall is used as a lecture and assembly room, or a place for entertainments when large audiences are to be accommodated. The showers and the baths are of modern design, providing hot and cold water throughout the year. The floor of the main hall with its 13,500 square feet of surface, provides space for three basketball courts, indoor baseball diamond, and space for various winter and indoor games. The east wing provides boxing and wrestling rooms, and an auxiliary gymnasium with special apparatus for use of the individual and for corrective gymnastics. When completed, the building will have accommodations for upwards of 2,000 men.

The Armory is situated about three hundred yards south of the Administration building. It is one of the largest of its kind in the United States and is built of concrete and steel, 126x355 feet. The drill hall portion has an unobstructed area of 36,000 square feet. The arms room, offices, and drill hall afford facilities for the accommodation of 1,000 men.

The New Heating Plant, located at the south end of the Armory, is a one-story reinforced concrete building, with a concrete tunnel and conduits leading to the various buildings on the south side of the campus. It contains three boilers, one two-hundred-ninety, one two-hundred-fifty, and one one-hundred-fifty-five horsepower, with the necessary equipment for heating the buildings connected with it.

The Power Plant, a one-story brick building in the rear of Mechanical Hall, contains the requisite equipment for supplying the various buildings with heat, light, and power. The apparatus installed in this building serves the purpose also of demonstration equipment in these special lines.

Waldo Hall, one of the two halls of residence for women, occupies a commanding site one hundred and fifty yards west of the Armory. It is a large building of striking appearance, with a cement foundation and basement wall, and a cream-colored, pressed-brick superstructure, three stories high. The dimensions

are 96x240 feet; and it contains one hundred and twenty-five rooms for students, besides a kitchen, dining room, and parlors. It is modern in all its appointments and finished throughout in natural grain Douglas fir, stained to conform to the color scheme.

Cauthorn Hall, the second of the women's halls of residence, is a well-proportioned frame building, situated on a commanding spot in the western part of the campus. It is 160x50 feet, has three stories and basement, and contains sixty-two rooms, besides a large kitchen, dining room, and reception rooms. Its furnishings and appointments are adequate, modern, and in harmony with its use. Each floor is supplied with hot and cold water, baths, electric light, and steam heat.

Shepard Hall, the student building under the auspices of the Y. M. and Y. W. C. A., was completed at a cost of something over $22,000. This building contains in the basement a swimming pool, shower baths, lockers, banquet room, kitchen, wood room, and accessories. The first floor contains a large lobby which is used for a reading room, game room for social events, and general assembly. It also contains offices for the General Secretaries, a public office, a cabinet and check room combined, and a room for the Y. W. C. A. The second floor contains six rooms for the use of the literary societies, the Athletic Association, and the staffs of the different College papers. The third floor is devoted for the present to dormitory purposes. The building, known as Shepard Hall, is a fitting tribute to the memory of Clay Shepard, who gave his life to the cause of cleaner, higher, and truer citizenship as exemplified in student life.

Farm Buildings. The College Farm is now well equipped with farm buildings, and modern facilities for conducting practical and scientific work in animal husbandry.

The Dairy Barn is commodious, modern, and attractive in design. It is a frame building, with cement foundation and brick pilasters. The main part is 50x100 feet, two stories high, with two wings extending to the south, each 46x80 feet, one story in height. There is also a milk room, an engine room, and a fuel room. The building is utilized as a general barn, and will accommodate nine horses and seventy cattle, with sufficient space for the storage of feed. On the first floor of the main portion are located the horse stalls, bins for storing the various grains and mill feeds, a seed room, and space for vehicles. The concrete basement

is of sufficient dimensions to permit the storing of about one hundred tons of roots. The second floor has a storage capacity for one hundred tons of loose hay. A prominent feature of the barn is the cow stable. This is strictly modern, well lighted and ventilated, with concrete floor, thirty individual, tubular-iron adjustable stalls, and three commodious box stalls. The aisles are wide, and thus not only furnish an abundance of air space for the animals, but also afford visitors an excellent opportunity to view the stock. The milk and engine rooms are conveniently situated, but sufficiently isolated for proper sanitation. This building is lighted by electricity, well supplied with water, thoroughly sewered, and furnished with an elaborate system of bell traps. Adjoining this stable is a stave silo, built several years ago, and a new concrete silo, completed in 1914, for use of the Dairy Husbandry department.

The old barns were moved and remodeled so as to harmonize with the new structure. They contain rooms for housing machinery, and a commodious piggery.

The New Cattle Barn. The department of Animal Husbandry is fortunate in having been able to erect a modern beef-cattle and sheep barn. It is located just west of the old barns, and has a floor space of 52x120 feet for sheltering stock. The hay loft has a storage capacity for 300 tons of hay and straw. Adjoining the barn are several concrete-floored exercise lots and a new stave silo. Especial conveniences are provided for the feeding, watering, weighing, and handling of live stock. The west half of the barn is at present devoted to beef cattle and the east half to sheep, although it is planned that the entire barn will eventually be used for beef cattle.

The Stock-Judging Pavilion. The Animal Husbandry work of the College is greatly facilitated by a judging pavilion, which provides very comfortable and commodious quarters for all of the demonstration work with live stock. The main room is 40x90 feet, well lighted, and provided with heat. A movable partition is provided whereby this large room may be divided into two smaller ones, each large enough for all ordinary purposes. The live-stock work in the past has been very much handicapped by crowded quarters without heat or good light, but these difficulties are now past and the department is in a position to do much better work than before.

Farm Mechanics Building. A modern building has recently been completed for the Farm Mechanics work. It is an attractive, well-lighted brick building, having a large operating floor, a class room, locker room, shop, and tool room on the first floor. This operating floor is of cement and is roomy enough for demonstration and for the operation of the heavier farm machines. Within this place is reserved space for the very heavy farm tractors. A gallery surrounds this operating floor and provides space for the lighter farm implements such as tillage, haying, and harvesting machines.

The building is equipped with shafting, belting, and power for the operating and testing of the various machines, and a large well is provided for making pump tests. A very complete equipment of the most up-to-date farm machinery is loaned the institution by the leading implement dealers of the Northwest; so that the student has constantly before him and is working with and studying the very best classes of farm machinery of all types.

Representative machines are found in the laboratory as follows: plows, harrows, pulverizers, cultivators, plant-setting machines, corn planters, potato planters, grain and grass seeders, mowers, rakes, binders, sprayers, manure spreaders, potato diggers, wagons, etc. Among the power machines are stationary gasoline engines, various types of pumps and pressure water systems, feed grinders, gasoline tractors, steam tractors, gang plows, and complete threshing machines. All of this expensive equipment is available to students in Farm Mechanics in the regular and short-course work.

The Poultry Houses. On a five-acre tract of land, lying south and west of Cauthorn Hall, there have been erected several buildings especially planned for the needs of the department of Poultry Husbandry. The main poultry building is a three-story structure and is used principally for class, laboratory, and demonstration purposes. It contains a demonstrating room with desks and other necessary equipment; a shop, with the necessary tools, benches, and equipment for practice work in building poultry-plant equipment; storage rooms, office, and wash rooms are also provided. In the basement, rooms are provided for fattening and killing fowls, an incubator room for student use, and a feed room with the necessary machinery for grinding and mixing poultry feeds. Besides the main poultry building there is an incubator house, with a capacity

of twenty-four incubators and complementary apparatus; and a feed-storage building and a brooding house. There are also colony houses for laying and breeding stock and growing chicks. The colony houses are movable and constructed upon a plan that could be adopted by any farmer. The colony brooding coops are also portable, and are used for investigations in both natural and artificial brooding.

COLLEGE ORGANIZATIONS

One of the most important factors in rounding out the results and benefits of a college course is the society, club, or association work. As a result of the diverse interests of college life and the varied tastes of the students, the following organizations, besides many others, are maintained by students and faculty:

The Student Body Assembly. This is an organization of the entire student body, working under a constitution and by-laws approved by the faculty, and having general authority over all student enterprises. In order to secure an effective administration of the business coming within its jurisdiction, there are permanent committees on athletics, publications, oratory and debate, and such special committees as the assembly may by vote determine. Officers are elected yearly, and nominations and elections are conducted in a manner similar to that of the State electorate.

Student Self-Government. A system of student self-government has been established at the College which places the general disciplinary powers of the institution in the hands of the students. The Student Council, an organization made up of thirteen students, seven of whom are seniors, three juniors, two sophomores and one freshman, has been created and vested with such powers as are necessary to enforce the rules and regulations adopted by the students. Members of the Student Council are elected annually by popular vote of the student body.

The Literary Societies. These organizations have the common purpose of promoting literary work among the students. The weekly literary programs and occasional joint meetings tend to this end. The Shakopean is essentially an honorary society, membership depending upon honors won in debate or oratory at the College. To stimulate interest in debate and oratory, there are held during the year intersociety, intercollegiate, and interstate contests. Gold medals and cash prizes are presented to the winners

in the contests, and the successful society in debate receives the "Gatch Cup." This is the silver cup that was presented in 1901 by Dr. Thomas M. Gatch, then president of the College, to the society that had received highest honors in the season's debates. Annually this cup is to go to the successful society in debates, but it is ultimately to become the property of the society winning it three years in succession. Many and determined have been the battles for its possession, but the cup is still without a permanent home.

The Christian Associations. The Young Men's Christian Association was organized in the Oregon Agricultural College as a part of the International Brotherhood in 1890. Since that time it has grown until it includes in its membership nearly one-half the men in the Student Body. The erection by the Y. M. C. A. of Shepard Hall, the student community building, which contains a swimming pool, reading, social, and game rooms, has greatly increased the scope and added to the effectiveness of the work. The Association aims to provide a high moral atmosphere and pleasant social advantages for its members and their fellow students. Members are trained in executive and committee service in work for their fellows and the community. Meetings are held in Shepard Hall each Tuesday evening; Bible, Mission, and social-study classes are regularly conducted; visitation committees call on students who are ill or disheartened; school boys of Corvallis are organized into clubs and Boy Scout patrols; regular socials are held in conjunction with the Women's Association; and extension work is conducted in vicinities near Corvallis. On registration days, committees are on hand to assist students in securing comfortable quarters in good homes and in adjusting their work satisfactorily. Those who make their way through College will find the employment bureau of the Association always ready and glad to assist them as far as possible in securing positions.

The Y. W. C. A. aims to cooperate with all the forces of the College in promoting among the women students a well-developed life. The rooms of the organization are located in Shepard Hall, the student community building. On registration days committees are appointed to meet incoming students and to help them in adjusting their work. Those who wish to earn their way through College will find the employment department ready and glad to assist them as far as possible in procuring positions. Weekly

meetings are held in Shepard Hall on Thursday, and there is a Sunday Vesper service to which all women are welcome. Bible and Mission Study classes, social service work, socials and teas, all tend to make up the program for the year's work. Three-fourths of the women in College are members of the Y. W. C. A. and more than that number are enrolled in voluntary Bible Study.

The Athletic Association. This organization, maintained by the students through the student body assembly, encourages wholesome competition in the various outdoor and indoor sports and pastimes. It has charge of all details pertaining to the conduct of intercollegiate athletics in which the College may be interested. A committee of the faculty has general supervision over the whole subject of athletics, thus insuring a sound and conservative management.

College Folk Club. This club was organized in October, 1908. Membership is open to all women of the faculty and other women employees of the institution, and to the women members of the immediate families of the faculty and other employees. The object of the club is social diversion, general culture, and the promotion of the best interests of the College and the community. The organization at this time is divided into three sections: Sociology Section, Mothers' Section, and Dramatic Section. Aside from the semi-monthly meetings of the various sections, the general club convenes on the first Saturday of each month, at which time an address is given by an outside speaker, or a musical or literary program is furnished by members of the club. In January, 1913, the organization became affiliated with the Oregon State Federation of Women's Clubs. It is the purpose so to extend the work of the club as to effect the greatest possible good to the College and to the city.

The Mask and Dagger. This club was organized for the purpose of offering special training in dramatic art. A semi-annual "try out" is held in which all students of the institution may participate, and any who possess talent in this direction may be elected to membership in the club. No student, however, will be permitted to take part in a public production who has not an average for all of his College work, at the time the play is being prepared, of 75 percent. Platform exhibitions will be given and standard pl ys presented during the College year.

The Oratorical Association. This body has immediate charge of all business pertaining to the competitive work in oratory and

debate. Schedules, dates, prizes, conditions of competition, and all similar matters are in its care.

Intercollegiate Debate and Oratory. Each year the Oregon Agricultural College has three intercollegiate debates, putting into the field six teams, three supporting the negative and the others the affirmative of the same question. The College sends one representative each year into the old-line State Oratorical Contest in which eight colleges take part. Gold medals are awarded to the men who represent the College in these events. Each year also the College sends a representative to the State Peace Oratorical Contest, where two prizes of $75.00 and $50.00 respectively are awarded for first and second place.

Local Debate and Oratory. A local peace oratorical contest is held annually, to the winner of which the Cosmopolitan Club of the College presents a cash prize of ten dollars. There are also interclass contests in Declamation, Debate, Oratory, and Extempore Speaking, prizes being awarded by the Oratorical Association to the winners of these events. These latter contests are forensic events in the annual Interclass Forensic-Athletic Championship Contest, wherein the four classes compete for individual prizes and three loving cups—the Shakopean Cup, which becomes the permanent property of the highest individual forensic point-winner of the class winning the championship; the Orange O Cup, which becomes the property of the best athlete in that class; and the Barometer Cup, which is held one year by the class winning the interclass championship.

The Sphinx. This is the senior honor society. Membership is acquired by election based on prominence in student activities and excellence in scholarship.

The Forum. This society was organized by the junior and senior classes in the spring of 1914, its primary purpose being to recognize efficiency in scholarship among junior and senior students. Election is made to the society by its own members. The fact that high standards of general excellence have been set by charter members makes it a decided honor to any student to be elected to membership.

The Cosmopolitan Club. This is an organization of foreign and American students. It is a local chapter of the Association of Cosmopolitan Clubs of the World. Its purpose is to provide social and educational advantages for its members and to promote inter-

national friendship. At present, nine nations are represented in the local chapter.

The Agricultural Club. This club was established for the purpose of advancing interest in the various phases of agriculture, and promoting the investigation and discussion of both general and special agricultural subjects. Suitable programs are prepared for each meeting, and whenever practicable, leading authorities on practical agriculture are engaged to address the members.

The Lewelling Club. This is the Horticultural Club conducted under the auspices of the Horticultural department. There is no regular organization, except an executive committee, which has power to transact such business as requires action on the part of the club. It is open to all students interested in horticulture.

The Withycombe Club. Membership in this club is open to all students taking Animal Husbandry work. The meetings of the club are devoted to discussion of Animal Husbandry topics not ordinarily covered in formal class-room instruction.

Delta Theta Sigma. There is established at the College a local chapter of this national honorary agricultural fraternity. The aim of the society is to advance the study of agricultural subjects by giving honorable recognition to students taking the lead in this work. Elections to membership are made from the junior and senior classes by the members of the local chapter.

The Forest Club. This is an association of students and instructors "formed for the purpose of promoting the forestry interests of the State." In order to carry out its purposes, it meets twice each month. The first meeting of each month is purely of a social nature, with each alternate meeting for the discussion of current forestry literature, magazine articles, news items, legislation, and general progress movements pertaining to forests, forest service, forest products, forest industries, lumbering, and the lumber trade.

The Civil Engineering Club. This is an organization within the departments of Civil and Highway Engineering. The active membership is drawn from the junior and senior classes, and the privileges of associate membership is extended to the members of the two lower classes. It meets weekly for the discussion of subjects of interest to the civil and highway engineer.

The Electrical Engineers. This is a College branch of the American Institute of Electrical Engineers. The aim of the organ-

ization is to discuss the topics contained in the monthly proceedings of the A. I. E. E., and in this way develop in the student an intimate knowledge of the activities of the national organization, thereby coming into closer touch with the practical problems in the engineering world and becoming better fitted for their life work.

The Miners' Association. This body has for its object the discussion of technical engineering subjects; the review of current mining literature; the presentation of original papers by the active members; and occasional lectures on special mining topics by men outside of the College.

Mechanical Engineers. This is a local College society of students and faculty people interested in Mechanical Engineering The purpose of the association is to keep in touch with the practical problems of the engineering world.

Sigma Tau. This is a local chapter of the national honorary engineering fraternity, chapters of which exist at nearly all of the recognized technical schools of the United States. Membership in the fraternity is restricted to junior and senior students in Engineering and Forestry, election to membership being based principally upon excellence in scholarship.

The Home Economics Club. This is an organization for the purpose of bringing all the women of the School of Home Economics into closer touch with one another than is possible without a central organization. The aim of the club is to give, by a series of monthly meetings, a general survey of Home Economics questions not covered in regular class-room work. The aim is carried out by means of well-directed discussions and by securing outside lecturers who by virtue of their training and experience are considered authorities on subjects relating to Home Economics.

Theta chapter of Alpha Kappa Psi, a national fraternity devoted to the profession of Commerce, was organized during the school year of 1913-14. The purpose of the fraternity is to promote investigation along scientific lines in all phases of commercial work. Membership is open only to students in the junior and senior year in the School of Commerce; and in order to become a member, the student must have shown himself a leader both in scholarship and in student activities.

The Commercial Club. This is a student organization within the School of Commerce. The purpose of the club is to bring its members into close relation with current methods and events in the commercial world. This is accomplished by discussions of

topics pertaining to commerce by members of the club, and by addresses at various times during the year by men prominent in the fields of law and business. Active membership is open to all members of the School of Commerce.

The Pharmaceutical Association. The main purpose of this organization, which consists of the pharmacy students, is to bring its members into closer relation with the current events of the pharmaceutical world. This is brought about by discussions in the meetings of topics pertaining to pharmacy, and by addresses at various times during the year by prominent pharmacists and salesmen of the State.

The Easterners' Club. Membership in the Easterners' Club is open to all students and faculty people who have at any time resided in those states situated east of the Mississippi River, or in those provinces of Canada east of Manitoba. The objects of the club are to promote the interests of the College throughout the East, to encourage prospective students from the East and to offer social diversion to its members by providing occasions for the mingling of ideas on such current events as the sports and politics, which are represented by the various states included within the membership.

The Eastern Oregon Club. This is an organization effected for the purpose of promoting the mutual interests of the College and the people of the eastern part of the State. Its members are afforded many social and intellectual advantages from the regular club meetings. Membership is open to all students from Eastern Oregon.

The California Club and **The Washington Club** are, as the names imply, composed of students whose homes are in California or Washington. It is for the purpose of bringing "Californians" and "Washingtonians" together socially that the clubs meet.

The Portland Club is composed of all of the students registering at the College from Portland, the primary object of the club being social diversion among those students who have been associated in their high-school work in previous years.

COLLEGE PUBLICATIONS

Two classes of publications are issued from the College; one official, published by the College authorities; the other, unofficial, published by the various student organizations.

The College publications include:

The Catalogue. The General Catalogue, published in the spring, contains much general and specific information as to the courses of study, equipment, and instruction, and gives a list of faculty members and students registered up to the time of publication.

The Alumni Directory. This publication gives in each edition revised information as to the name, year of graduation, degree, present occupation, and present address of each graduate of the College. The publication is issued every other year.

The Bulletins of the Summer School. These announcements contain specific information of expenses, courses of instruction, character of the work presented, and the requirements that prospective students must meet.

The Bulletins of the Winter School. These announcements carry such information regarding the winter courses as may fully present the advantages of these courses to the public.

Extension Bulletins. These bulletins consist of monographs on the various phases of Agriculture, Domestic Science and Art, Engineering, Mining, and Commerce, together with the bulletins and circulars issued in connection with the Industrial Club work for boys and girls in the public schools. They are written in such style as to be easily understood, thus meeting the popular demand for scientific knowledge and giving it in such form that the people of the State may profit by its application to the problems of everyday life.

The Station Bulletins. These publications include reports upon research problems and upon experimental investigations in agronomy, horticulture, dairying, animal husbandry, poultry husbandry, insect pests, plant diseases, domestic science, and special subjects of interest to the husbandman, conducted at the home Station or the several branch stations.

STUDENT PUBLICATIONS

The student publications comprise:

The Barometer. In March, 1896, the literary societies of the College began the publication of a monthly periodical, the "O. A. C. Barometer." The enterprise has met with deserved success, and "the organ of the student body" is now issued as a four-page, six column semi-weekly. It publishes the "news of the College," and is of general public importance as representing the interests, char-

acter, and accomplishments of the student body at the College. By action of the Board of Regents, resulting from a unanimous recommendation of the Student Body, a portion of the regular semester student fee of $2.50 will be devoted to the "Barometer," and every student will regularly receive the paper.

The Beaver. This is the annual publication of the junior class, and made its initial appearance as "The Orange," in 1907. It is a high-class publication, substantially bound, and fully illustrated with photoengravings, pen and ink sketches, line and wash drawings. It is a full-dress carnival of the year's life, representing the dignity, the beauty, the versatility, the gaiety, the traditions, the sentiment, and the solidarity of the Oregon Agricultural College.

The Oregon Countryman. This is an illustrated monthly magazine, published by the Agricultural and Home Economics students under the supervision of the faculties of these courses. It is designed to be of special service to the farm home. Besides dealing with the work of the various College departments in a practical manner, it contains articles of scientific value contributed by the Experiment Station workers. Successful men and women of the State contribute articles for each issue.

The Student Engineer. This is a magazine devoted to engineering and mechanic arts. Its purposes are to record the engineering progress in the Northwest; to furnish news; to discuss methods relating to the mechanic arts; to publish records of scientific work done by the students in this institution; and to publish any matter of special technical and scientific interest. Items of interest will be found for civil, mining, mechanical, and electrical engineers, for foresters and others engaged in technical pursuits. The journal is under the supervision of the faculties of the Schools of Engineering, Mining, and Forestry, but the work and responsibilities of the publication are borne by the staff, elected by the students of the school concerned.

The Commercial Print. This magazine, published each semester by the students of the School of Commerce under the supervision of the faculty of the school, is devoted to the commercial interests of the College and State. Articles of merit are contributed for each issue by students, faculty, and prominent business men of the State. One distinguishing feature of the magazine is the publication each semester of a complete directory of all the members of the institution, students, faculty, and employees.

STUDENT EXPENSES

GENERAL FEES

Tuition is free to all students, regardless of the place of residence. The regular College fees, required of all students, with the exception of special students in music who take no other College work, are as follows:

Entrance fee, payable annually on registration	$5.00
Incidental (Student) fee, payable each semester	2.50
Diploma fee on graduation	5.00
Binding fee for graduation thesis	1.00
Vocational certificate fee	1.00

LABORATORY FEES AND DEPOSITS

Students are charged small fees in the different laboratory courses to cover the cost of material used; and deposits are required to cover cost of breakage in laboratory courses where breakages are likely to occur. These fees are payable at the beginning of each semester. At the end of the semester, deduction is made for actual breakage, and the balance of the deposit is refunded to the student. The fees and deposits charged each semester in the different courses are as follows:

	Fees	Dep.
Animal Husbandry:		
Courses A, 1, 16	.25	
Courses 101, 102, 210, 220, 230, 240	.50	
Courses B, E, 2	1.50	
Art and Architecture:		
Art		
Courses 102, 103, 204, 205, 206, 305, 306, 411, 412, 505, 506	.50	
Courses 600, 601, 602, 603	1.00	2.00
Courses 413, 414	1.00	
Architecture		
Courses 507, 508, 509, 512, 513, 515, 519, 533, 535, 536	.50	
Courses 501, 502, 510, 511, 516, 517, 601, 602, 603, 604, 701, 702	.75	
Courses 537, 538	1.00	

Health Service. Since this portion of the catalogue was printed, arrangements have been completed for the inauguration of a student Health Service at the College, and for a more complete organization of student activities. Upon petition of the Student Body, the Board of Regents of the College at the meeting held on January 5, 1916, increased the student-body, or incidental, fee from $2.50 to $5.00 each semester. The payment of this fee entitles students to all the privileges of the Health Service, subscription to the Barometer (the student semi-weekly pulication), and to free admission to such student contests and entertainments as all athletic games on the campus, oratorical and debating contests, and the entertainments of the lyceum course. Details concerning the health service will be announced before the opening of the College, September 18, 1916, after the arrival of Mr. Wendell J. Phillips who has been employed as Medical Adviser.

	Fees	Dep.
Bacteriology:		
Courses 102, 203, 204, 302, 406, 701	2.00	
Courses 101, 201, 202, 205, 300, 301, 401, 501, 502	3.00	
Courses 111, 112, 116	4.00	
Chemistry:		
All Laboratory Courses		
Fees	One dollar per credit hour	
Deposits	Two dollars per course	
Commerce:		
Courses B, C, 100, 101, 102, 103, 107, 404, 405, 413	1.00	
Courses 400, 401, 402, 403, 410, 411, 412,	2.00	
Dairy Husbandry:		
Courses 1, 6, A. P.	1.00	2.00
Courses 3, 7, B, D	1.00	.25
Courses C, 4		.25
Domestic Art:		
Courses 101, 102, 201, 202, 203, 204, 501, 502, 601, K, L, N	.50	
Courses 301, 701	1.00	
Courses 401, 404	4.00	
Domestic Science:		
Courses K, 510	.50	
Course 120	1.00	
Course M, 190, 191, 202	2.00	
Course 180	2.50	
Courses C, D, 101, 102, 103	3.00	
Courses 104, 105	3.50	
Course 201	4.00	
Courses H. I	6.00	
Drainage and Irrigation:		
Courses A, B	1.00	
Courses 1, 2	1.00	1.00
Courses 3, 4, 8, 11	.50	1.00

	Fees	Dep.
Engineering:		
Civil		
Courses 107, 111, 511	.50	
Courses 222, 223, 225, 232, 233, 242, 243, 252, 254, 272, 274, 513, 514, 515, 516, 555, 557	1.00	
Electrical		
Courses 201, 202, 203, 204, 403	2.50	3.00
Experimental		
Courses 210, 238, 255, 262, 265, 272	2.00	
Courses 201, 202, 203, 204, 205, 206, 207, 208, 231, 232, 233, 235, 240	3.00	
Courses 291, 292 arranged according to work undertaken.		
Irrigation		
Courses 204, 303, 402, 501, 701, 802	1.00	
Mechanical		
Course 316	.75	
Mining		
Courses 135, 138, 161, 171	1.00	
Courses 111, 112	3.00	
Course 401	7.50	
Courses 212, 323		2.00
Courses 301, 324, 330, 423		5.00
Entomology:		
Courses 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312	1.00	
Farm Management:		
Courses 2, 11	1.00	
Course 1	.50	
Farm Mechanics:		
Courses 1, 5	1.50	1.00
Courses 2, 3, 11	2.00	1.00
Course 4	1.00	1.00
Field Crops:		
Courses 101, 103, 104, 105, 106, 107, 109, 111	.50	
Forestry:		
Courses C, D, E, F, 201, 202, 203, 204, 506	1.00	
Courses 302, 304, 305, 503, 504, 601, 603, 607	1.50	
Courses 301, 303, 501, 502	2.00	

	Fees	Dep.
Horticulture:		
Course 123	.50	
Courses 101, 103, 104, 105, 201, 401	1.00	
Course 125	3.00	
Soils:		
Courses A, 4	1.00	1.00
Courses 1, 2, 3, 5, 11	1.00	2.00
Courses 6, 8	.50	
Industrial Arts:		
Courses 106, 133, 202	1.50	2.00
Courses 152, 153	1.50	
Courses G, 105, 110, 111, 112, 113, 116, 131, 132, 134, 137, 203, 206, 207, 208, 209, 212, 213	3.00	2.00
Courses L, 151, 154, 155, 156, 158, 171, 173, 175, 230, 270	3.00	
Courses C1, C2, C3, D1, D2, D3, E1, E2, E3, F1, F2, F3, T1, T2, T3, U1, U2, U3	6.00	2.00
Courses J1, J2, J3, K1, K2, K3, M1, M2, M3, N1, N2, N3, P1, P2, P3, Q1, Q2, Q3	6.00	
Courses 103, 104, 135, 136, 205	4.50	2.00
Course 174	4.50	
Industrial Education:		
Course 165	1.50	
Course 164	.50	
Pharmacy:		
Courses 130, 131, 140, 141, 230, 231, 240, 241	1.00	
Courses 118, 151, 170, 218, 251, 270	6.00	1.00
Courses 121, 221	3.00	
Courses 160, 161	3.50	
Physical Education:		
All courses	1.50	
(All students using the Gymnasium pay the fee of $1.50 per semester, for which they are given use of all equipment, baths, and are furnished with towels, soap, and medical supplies for injuries.)		
Physics:		
All courses	2.00	

	Fees	Dep.
Poultry Husbandry:		
Courses 1, 2, A, B	1.00	1.00
Course 6		1.00
Veterinary Medicine:		
Courses 3, 4, 11, 14, C, B	.50	
Courses 2, 5, 6	1.00	
Course 1	2.00	
Zoology:		
Courses 101, 102, 103, 108, 109, 114, 115, 116, 201, 202, 204, 207, 208, 211	1.50	1.00
Courses 104, 105	2.00	3.00
Courses 110, 111	1.00	1.00
Courses 112, 113, 205, 209		3.00
Courses 106, 107, 120	.25	

BOARD AND ROOM

Women's Dormitories. Waldo Hall and Cauthorn Hall, with their large airy parlors and halls, are pleasant residences for the young women who come from distant homes. The buildings are supplied throughout with pure mountain water, both hot and cold, electric lights, steam heat, and all modern conveniences. The rooms are furnished with an iron bedstead, a mattress, a chiffonier, a table, and chairs. Such other materials as are needed to make the furnishings complete, including pillows, pillow cases, sheets, blankets, bedspread, and towels, are furnished by the student; and many of the students prefer to make the rooms more homelike by bringing rugs, curtains, pictures, sofa cushions, etc. These latter articles, however, are not at all necessary. The rooms are cheerful and comfortable without additional furniture. The bedrooms average about 12 feet by 15 feet, with one window 3 feet by 7 feet. Many of the rooms are larger, and a few of them have two windows. Most rooms are furnished with single beds, but a few double ones are available. There are a limited number of single rooms in each hall. Preference for single rooms should be indicated early. The many advantages of having a roommate should not be overlooked by the student in making her plans for college life.

The conditions of living in Waldo Hall and Cauthorn Hall are such that the College considers it a distinct advantage to the

women students to live in these halls of residence. A wholesome, busy student atmosphere is maintained. Reasonable freedom is allowed, but week nights are reserved for study. All girls entering the College are expected to live in one of the dormitories, unless their parents reside in the city, or they are given special permission from the Dean of Women to live elsewhere. This permission must be obtained from the Dean of Women previous to registration.

The expenses of living for each student in the dormitories are as follows:

Room deposit	$ 3.00
Room rent for each semester—	
Single room	20.00
Double room	10.00
Board per week, payable monthly in advance	3.50
Incidentals, such as laundry fee, electric iron fee, etc., for each semester	2.00

The room deposit of $3.00 must be sent to the Registrar at the time of application for a room. When the student withdraws from College, this deposit will be refunded, upon presentation of the receipt, if no damage has been done to the room or furnishings.

Women students are not expected to arrive in Corvallis until the day the Halls are opened.

The dormitories will open for students September 17, 1916, one day preceding the first registration day.

Private Board for Men Students. No dormitory accommodations are available for men students. Board and room may be secured in private families in the city of Corvallis for from $4.00 to $5.50 per week. Good accommodations for self-boarding, or for club-boarding, can also be secured in the city. By clubbing, or renting rooms and boarding themselves, students materially reduce the cost of living. Students, however, will not be permitted to live at places not approved by the Faculty.

Lists of private boarding places can be secured from the Secretary of the Y. M. C. A. after the student arrives at the College.

PERSONAL EXPENSES.

The personal expenses of students vary. Many students are able to go through the college year on a comparatively small income.

Questions of personal thrift, discrimination in values, and established habits are determining factors here. Each man, immediately upon registration, is required to supply himself with a military uniform, the cost of which will be approximately as follows: Suit and cap, $11; leggins, 90c; hat band and breast cord, $1.15; collar ornaments, 25c; gloves, 40c a pair; total, $13.70. Tan shoes (the regulation style, costing $3.75) and a drab shirt (costing $2.00) are appropriate elements of the uniform. The uniform is very serviceable and is more economical than civilian clothing; with reasonable care, it should serve for two or more years.

In physical education women are required to provide themselves with a gymnasium suit, consisting of blouse-waist and bloomers of regulation style, and with regulation gymnasium shoes. Good second-hand uniforms of outgoing girls will be on sale for about $4.00, while new uniforms cost $5.00. These suits should be ordered at the gymnasium office at the time of registration.

Men in physical education are expected to supply themselves with a gymnasium suit and the regulation gymnasium shoes. The cost of the gymnasium uniform complete, including shoes, need not exceed $2.75.

COST OF A YEAR IN COLLEGE

One of the most perplexing questions that confronts a prospective student is what the course is going to cost him a year. The necessary cost of a year at the College will vary slightly with the particular course pursued by the student. In general, it may be said that the necessary cost per annum averages about $224. An estimate of this average cost for the main expense items is given below. The cost for room and board is estimated at a safe average price. The board and room items are sometimes slightly reduced, where two students occupy the same room or where boarding clubs are economically managed.

Registration fee	$ 5.00
Incidental (Student) fee	5.00
Laboratory fees and deposits	18.00
Textbooks and supplies	26.00
Board (for eight months)	*120.00
Room rent (nine months)	30.00

*On account of Christmas and other vacations which most students spend at home, the cost of board is estimated for eight months only.

In addition to the above, would be the cost to men of the military uniform and the regulation gymnasium suit, and to women of the gymnasium suit and shoes. Uniforms, however, as already indicated, should serve for more than one year. Personal expenses such as clothing, railroad fare, laundry, etc., vary greatly with the individual.

It is not recommended that any student come to the College without sufficient funds available to purchase his books and college stationery for the entire semester, pay his first month's board and room rent in advance, and pay his first semester entrance fees. For the average student, this initial outlay will be approximately $70.00, the balance of the annual expenses being distributed about evenly throughout the remaining months of the school year.

Persons desiring more detailed information on the question of expenses for students in various departments should write to the Registrar, Corvallis, Oregon, for a bulletin on "Student Expenses."

SELF-SUPPORT

A considerable number of students manage, in one way or another, to earn the whole or a part of their expenses while attending the College. Such opportunities occur in the line of office and laboratory assistance, personal services of numerous kinds, the management of various student enterprises, agencies for laundries, etc.

The Student Employment Bureau, in charge of the Young Men's and Young Women's Christian Associations, registers without charge all students who apply for employment. It is the purpose of the Bureau to try to supply work, regular or occasional, to all who need it. In general, the demand for work on the part of students exceeds the supply that the Bureau has available; therefore the attention of new students who intend to earn the whole or part of their living is called to the following results of past experience.

1. The applications received during summer will be given first attention; it is therefore important to apply early.

2. There is a constant over-supply of those wishing to do teaching and clerical work. None but those having superior qualifications and experience are likely to secure employment the first semester.

3. There is a considerable demand for efficient stenographers; also for men and especially women students who can do domestic labor of any kind; board and room rent may be earned by table service, dish washing, general housework, house cleaning, gardening, etc.

4. Students who can do any kind of domestic or manual labor well, and who have thoroughly good health, can earn their board by three hours' work a day, or board and room by four hours' work a day. But no student should come to the College without resources sufficient for the expenses of one semester. (See "Personal Expenses.") Work of any kind is much more readily secured after the student has had opportunity of becoming familiar with local conditions.

5. No Student should come expecting to earn money, who can do nothing well; skill is essential, as competition is quite as severe in the College community as elsewhere.

6. Opportunities for earning money during the summer vacations can usually be counted on, the demand for forest rangers, for field workers in engineering and mining, for skilled workmen in engineering shops, factories, canneries, and hop-yards, and for horticultural, farm, and forestry laborers, being most constant.

Upon arrival at the College, new students should report for information to the Information Bureau of the Young Men's and Young Women's Christian Associations.

Women students desiring work in the Dormitories should apply early to the Housekeeper of the Women's Dormitories.

The Dean of Women, will be very glad to give any information to parents and prospective students about the work of the women at the College at any time. Office, Room 107 Home Economics Building.

STUDENT LOAN FUND

Through the liberality of friends of the Oregon Agricultural College, and through the accumulation of interest on loans, an irreducible student loan fund aggregating $4,621.05 (August 1, 1915), has been established. The purpose, as expressed by one of the donors, is "not to induce students to attend school by providing money that can be easily obtained, but rather to aid those who have determined to secure an education and are paying the cost wholly or in part from their own earnings."

The fund consists of the following contributions:

1. One thousand dollars ($1,000) from Hon. R. A. Booth of Eugene, restricted to students studying:

(a) Agriculture in its various phases, with a view to becoming producers from the soil.

(b) Such branches of mechanics as properly relate to agriculture.

(c) Home Economics.

2. Five hundred dollars ($500) known as the Ashby Pierce Student Loan Fund.

3. Three thousand one hundred and twenty-one dollars and five cents ($3121.05), without restriction, from accumulated interest and from various College organizations, such as Folk Club, Philadelphian and Feronian Literary societies, the Barometer, the Oregon Countryman, the Cosmopolitan Club, the Faculty, the Christian Associations, the Winter Short Course students of 1914, the Graduating Class of 1915, Chapter A. of P. E. O., Portland, and by various individuals including Mrs. Clara H. Waldo, Portland, and Hon. Thomas Kay, Salem.

PRIZE FUND

The Clara H. Waldo Prize of one hundred dollars is an award annually made in the proportions of forty, thirty, twenty, and ten dollars respectively, to the woman of highest standing registered as a regular student in one of the degree courses in the senior, junior, sophomore, and freshman year. In the distribution of the prizes, the committee having charge of the awards is guided by the following points:

(a) Proficiency in literary and scholastic attainments.

(b) Success in student activities.

(c) Qualities of womanhood.

(d) Qualities of leadership.

ADMISSION TO THE COLLEGE.

A student who wishes to be admitted to the Oregon Agricultural College may do so in one of two ways: (1) by examination, (2) by certificate.

Students who seek admission by examination must present themselves for examination at the College on registration days, September 18 and 19.

Students who seek admission by certificate may do so in one of the following ways:

For Admission to the Vocational Courses. By presenting properly certified evidence of the completion of the equivalent of an eighth-grade course of study in the public schools, and by meeting the other requirements for admission specified in the paragraph on Vocational Courses, under Entrance Requirements.

For Admission to the Degree Courses. By presenting properly certified evidence of the completion of four years of the course of study (15 units) in an accredited or standard high school, and by meeting the other requirements for admission specified in the paragraph on Degree Courses, under Entrance Requirements.

For Admission as a Special Student. By presenting properly certified evidence of suitable preparation for the studies desired, and by meeting the other requirements specified under Special Students.

For Admission as an Optional Student. By presenting properly certified evidence of meeting all the regular entrance requirements, and by meeting the other requirements specified under Optional Students.

For Admission to Advanced Standing. By presenting properly certified evidence of the completion, in other institutions of recognized standing, of such work as is equivalent to corresponding work required in the College courses, and by meeting the other requirements specified under Advanced Standing.

For Admission to Graduate Study. By presenting properly certified evidence of graduation from this or other educational institutions of equal rank, and by meeting the other requirements for admission specified under Graduate Study.

ENTRANCE REQUIREMENTS

Vocational Courses

For admission to the vocational courses in Agriculture, Dairying, Forestry, Home Economics, and Commerce, applicants must be at least 18 years of age, and in addition to having completed the eighth-grade course of study, or its equivalent, must be of good moral character. For admission to the vocational course in Mechanic Arts, applicants must be at least 16 years of age, and in addition to having completed the eighth-grade course of study, or its equivalent, must be of good moral character. Applicants who

have not completed the eighth-grade course of study, but who are 21 years of age or over, and of good moral character, may be admitted to any of these vocational courses at the discretion of the dean of the school in which the work is to be carried on. For admission to the vocational course in Pharmacy, applicants must be at least 18 years of age, and in addition to having completed two years of high-school work, or its equivalent, must be of good moral character. For a statement of the length and character of the vocational courses, see index on Courses of Study.

Degree Courses

Applicants for admission to the degree courses must be 16 years of age or over and of good moral character. The fifteen units required for entrance, distributed in the most advantageous way for admission to the various College courses in Agriculture, Home Economics, Forestry, Engineering, Mining, Industrial Arts, Commerce, and Pharmacy, are indicated in the table entitled "Prescribed Units for Admission." If the distribution of units presented by the matriculate does not correspond to that recommended, as indicated by the table, the student will be required to carry in College the courses lacking in his secondary credits, in order to make up his deficiency.

A unit, as referred to in the table, implies one high-school subject carried for five 45-minute periods a week throughout the school year.

Prescribed Units for Admission	Agriculture	Home Economics	For. & Log. Engineering	Engineering*	Commerce	Pharmacy
English	3	3	3	3	3	3
Mathematics—						
Algebra	1	1	1½	1½	1	1
Plane Geometry	1	1	1	1	1	1
Solid Geometry	0	0	0	½	0	0
Electives	10	10	9½	9**	10	10
Total units	15	15	15	15	15	15

*Includes Mining and Industrial Arts.

**It is suggested that while physics is not prescribed as an entrance requirement in Engineering, students who are preparing to enter any of the Engineering courses take a year's work in high-school physics where this work is available.

The electives listed in the table may be selected from any of the subjects offered in the "Oregon Course of Study" for high schools.

While History and Foreign Languages are not prescribed by the College as entrance requirements, students are urged to pursue these subjects in the high school. For credit involved in this work, see Advanced Standing.

To be admitted as a conditioned freshman, a student must not lack more than two of the total number of entrance units.

In English. Admission to the English courses of the freshman year is by certification from accredited secondary schools. When an applicant cannot furnish such certification, his admission to the freshman courses is conditioned on his passing an examination in essentially the following tests:

1. To test his power of written expression, he will write one or more compositions on a subject, or on subjects, suggested by his personal, school, community, or literary interests.

2. To test his power of oral expression, he will read at sight, in the presence of the Examiner, passages of prose, or of poetry, or both, with accuracy and effectiveness. He will also be expected to talk intelligently in good English, on some assigned subject adapted to his ability.

3. To test the range and character of his reading, and his power of appreciation, he will be expected to answer a number of simple questions on standard classics and contemporary literature not previously prescribed. He will also be expected to explain the meaning of several passages of prose and of poetry of moderate difficulty, selected from books not previously prescribed.

Whether the applicant be admitted by certification or by examination, the English department will, whenever it deems such a course advisable, deal with the student as in a probationary relation.

In case the work of such student should, at the expiration of thirty days after matriculation, fail to conform to the standard set for creditable freshman work, he may be required to make up his deficiencies in English.

Candidates presenting exercise books containing compositions or other written work properly certified to by the instructor, will be given credit for such work.

In Mathematics. The entrance requirements in Mathematics for students entering any of the degree courses in College; namely, one unit in Algebra and one unit in Plane Geometry, will be satisfied by the applicant's ability to pass a satisfactory examination in the following topics:

(a) In Algebra, addition, subtraction, multiplication, and division of positive and negative numbers; use of parentheses, factoring, highest common factor, lowest common multiple, fractions, fractional and literal equations, simultaneous equations, problems involving linear equations with one or more unknown numbers, graphical representation of simultaneous linear and quadratic equations, involution, evolution, theory of exponents, radical expressions.

(b) In Plane Geometry, the five books of Wentworth's Plane Geometry, or any other standard text on the subject. That the student may be trained to think for himself and not be dependent upon the published proofs of the text, much importance is based upon the proving of original exercises. It is distinctly advised that students preparing for entrance examination in Geometry devote considerable time to the study of original exercises.

The entrance requirements in Mathematics for students in the schools of Forestry, Engineering, and Mining demand an additional semester's work in Algebra, including quadratic equations, problems involving quadratic equations with one unknown number, equations in the quadratic form, factoring of quadratic equations, solution of quadratic equations by factoring, simultaneous quadratic equations, problems involving simultaneous quadratic equations with two unknown numbers.

The entrance requirements in the School of Engineering demand also, in addition to the specifications above, one semester's work in Solid Geometry, such as that presented in Wentworth's Solid Geometry, or any other standard text on the subject.

ACCREDITED SCHOOLS

Pending the preparation of a classified list of high schools by the Oregon State Department of Public Instruction, students who have completed four years of high-school work will be admitted to the degree courses on presentation of a signed statement of the principal, showing work completed. It is recommended that the Certificate of Record blank issued by the Oregon Agricultural

College, be used. Copies will be sent by the Registrar on the application of either student or principal. These blanks must be filled out and signed by the principal or other authorized official of the school. The certificate, so authenticated, should be filed with the Registrar of the College on or before September 12, 1916. Certificates will not be rejected at a later date but acknowledgment of the receipt of such certificate will be made by the Registrar up to and including September 12 only. Students sending certificates at a later date will likely be delayed in completing registration.

SPECIAL STUDENTS

Students who have presented satisfactory evidence of suitable preparation for the studies they desire, who are 18 years of age, and of good moral character, may be admitted as special students, provided they have never applied for admission and been rejected.

Special students may be allowed to graduate in any of the courses, on condition that they complete the required work.

Special students are expected to select their studies from courses open to freshmen. If they desire to take studies to which only advanced students are regularly admitted, they must show some special preparation or special necessity for such courses.

Candidates applying for admission on the above basis should file with the Registrar before September 12, 1916, a detailed statement of their preparatory work.

OPTIONAL STUDENTS

Students who have presented satisfactory evidence of meeting all the entrance requirements for the freshman class, who are of mature years and of good moral character, may be admitted as optional students, provided they furnish satisfactory evidence that they are unable, because of poor health, or outside business, or professional duties, to take a full course. They should file with the Registrar, before September 12, 1916, a certified statement of all preparatory work.

ADVANCED STANDING

Students matriculating in the degree courses with more than the number of credits required for entrance to the freshman class, will be given advanced standing for such credits as represent work

beyond the full four years high-school course and are equivalent to the requirements of the course in which the student matriculates.

No credit will be allowed for any Science or Foreign Language carried for less than one full year.

ADMISSION FROM OTHER COLLEGES

Any student who has attended another college or university and desires to enter the Oregon Agricultural College, should file with the Registrar, on or before September 12, 1916, an official certificate from the college from which he wishes to transfer, giving evidence of: (1) his honorable dismissal; (2) a detailed statement of the entrance credits presented at the time of his matriculation at the other college; (3) a detailed statement of the work pursued while in attendance at that college; and (4) a marked copy of the catalogue of the institution, showing by conspicuous markings the courses which he completed.

REGISTRATION

All candidates for admission should file with the Registrar a certificate of their preparatory record on or before September 12, 1916. Certificates of preparatory work will not be rejected at a later date, but applicants cannot expect to receive formal acknowledgement of their receipt by the Registrar. Applicants sending in their certificates late may be delayed at registration time. Blank forms for such records may be secured from the Registrar. Such candidates should present themselves for registration at the College on September 18 or 19, 1916. Registration at a later date will be permitted only on presentation of a satisfactory reason for the delay.

Students who have not before registered at the College are advised to reach Corvallis not later than September 16, 1916, in order that they may secure a boarding and rooming place before the first day of registration.

GRADUATION

The degree of Bachelor of Science in Agriculture, in Forestry, in Logging Engineering, in Home Economics, in Civil Engineering, in Electrical Engineering, in Irrigation Engineering, in Highway

Engineering, in Mechanical Engineering, in Mining Engineering, in Ceramics, in Chemical Engineering, in Commerce, in Pharmacy, and in Industrial Arts, is conferred upon those who have satisfactorily completed the respective four-years courses which in the aggregate comprise 136 credits of College work. A graduate in any of the courses may receive the bachelor's degree in any other course by completing the studies required in that course.

The degree of Graduate in Pharmacy is granted to those students in Pharmacy who complete specified work meeting the requirements of the American Conference of Pharmaceutical Faculties.

A certificate will be granted those students who complete the Vocational Course in Agriculture, Dairying, Home Economics, Mechanical Arts, Commerce, or Pharmacy.

GRADUATE STUDY

The Oregon Agricultural College offers to its graduates and to those of other institutions of equal rank, work in Agriculture, Home Economics, and Pharmacy leading to the degree of Master of Science, and work in Engineering, Mining, and Forestry, leading to the usual professional degrees.

This work is done in the several departments of the College under the general supervision of a standing committee of the Faculty known as the committee on "Graduate Students and Advanced Degrees."

REQUIREMENTS FOR THE HIGHER DEGREES

Candidates for any one of the higher degrees will be required to complete a certain minimum of resident work, to prepare a suitable thesis, and to pass an oral examination.

The resident work is planned so that it may be completed in a single year by a student who devotes full time to his studies; it consists of a minimum of 32 credits, including the preparation of the thesis. Graduate credit from other institutions will not be accepted as reducing this minimum of 32 credits. One credit requires approximately three hours of the student's time each week for one semester. From 16 to 24 of these credits will be devoted to the thesis and to allied subjects in the same department, and will constitute the candidate's major. From 8 to 16 of these 32 credits will be selected from other departments of the College

and will constitute the minor. Undergraduate work may, at the discretion of the committee, be taken as part of the minor, but when so taken, the number of credits allowed for any course will be reduced to two-thirds of the number listed in the catalogue, the assumption being that the candidate can, in work of that grade, accomplish as much in two hours as the average undergraduate in three. No course which is contained in the curriculum of any high school of the State of Oregon, nor any course regularly covered in the Freshman and Sophomore years of this College shall be allowed as credit toward an advanced degree; and no credit shall be allowed toward the major for any regular undergraduate course. All graduate students taking regularly announced courses must attend the examinations given as part of such courses.

The thesis must embody the results of investigative, though not necessarily original, research, and a typewritten copy of the thesis, prepared according to the specifications of the committee, must be deposited with the chairman of the committee not later than two weeks prior to the date set for commencement of the year in which the degree is desired.

After the thesis has been deposited, the chairman will appoint a special examining committee and set a date for the oral examination. This special committee will consist of: (1) the one or more professors in charge of the major; (2) the one or more professors in charge of the minor; and (3) one or more members of the Committee on Graduate Students and Advanced Degrees. The report of this committee will be presented to the College Council by the chairman of the Committee on Graduate Students and Advanced Degrees. The chairman will deposit the thesis of successful students with the Librarian as soon as possible after the oral examination.

Higher degrees will be conferred only at the regular commencement exercises, but the committee many under exceptional circumstances allow the candidate to be absent from such exercises.

ADMISSION TO THE COLLEGE AS A GRADUATE STUDENT

All students who have been graduated from four-years' courses in the Oregon Agricultural College or in other colleges of equal rank, will be considered graduate students and will be registered as such by the Registrar. Graduate students will be required to

present credentials to the Registrar as specified under "Admission from Other Colleges."

FEES

Graduate students will pay the same entrance, incidental, diploma, and binding fees as undergraduates. Laboratory fees will in each case be determined by the head of the department concerned, and must be paid at the beginning of the semester in which the laboratory work is done.

OUTLINE OF COURSES OF STUDY

The Oregon Agricultural College offers the following courses of study, each of which extends over four years and leads to the degree of Bachelor of Science:

(Arranged alphabetically by schools and departments.)

In the **School of Agriculture**, major courses in—

(a) Agriculture (general)
(b) Agriculture for Teachers
(c) Agricultural Chemistry
(d) Animal Husbandry
(e) Bacteriology
(f) Botany and Plant Pathology
(g) Dairy Husbandry
(h) Drainage and Irrigation
(i) Entomology
(j) Farm Crops
(k) Farm Mechanics
(l) Horticulture
(m) Poultry Husbandry
(n) Soils and Farm Management
(o) Veterinary Medicine
(p) Zoology

In the **School of Commerce**, major courses in—

(a) Business Administration
(b) Economics
(c) Political Science
(d) Stenography and Off. Train.

In the **School of Engineering**, major courses in—

(a) Civil Engineering*
(b) Electrical Engineering
(c) Highway Engineering
(d) Industrial Arts
(e) Irrigation Engineering
(f) Mechanical Engineering

In the **School of Forestry**, major courses in—

(a) General Forestry
(b) Logging Engineering

In the **School of Home Economics**, major courses in—

(a) Domestic Art
(b) Domestic Science
(c) Home Administration
(d) Institutional Management

In the **School of Mines**, major courses in—

(a) Ceramic Engineering
(b) Chemical Engineering
(c) Mining Engineering

In the department of **Pharmacy**, a course in—

(a) Pharmacy

In addition to the above baccalaureate courses, provision has been made for the following:

1. A two-years course in Pharmacy leading to the degree of Ph. G., and

2. Vocational courses, varying in length from 6 months to three years, as follows:

A. Agriculture (one year).
B. Business Short Course (two years).
C. Dairying (one year).
D. Forestry (November 6 to April 13).
E. Home Makers' Course (one year).
F. Mechanic Arts (three years).
G. Pharmacy (two years, following two years of high-school training).

*No work below Senior grade will be given in Civil Engineering during the year 1916-17.

SCHOOLS AND DEPARTMENTS

SCHOOL OF AGRICULTURE

ARTHUR BURTON CORDLEY, Dean

The School of Agriculture offers the following courses of study: a one-year course in General Agriculture; a one-year course in Dairying; a four-weeks winter course in Farm Crops, Animal Husbandry, Dairy Husbandry, Horticulture, and Poultry Husbandry (known as the Winter Short Course); and a four-years course, with various options, which leads to the degree of Bachelor of Science.

Vocational Courses. The one-year vocational courses are not preparatory or elementary courses. They are provided especially for those who desire to obtain as quickly as possible a working knowledge of the principles of agricultural practice. They are open to young men with or without high-school preparation, and to men of mature years and practical experience, who may desire to familiarize themselves with the most modern thought on this subject. Those who pursue the one-year course in Agriculture will have the opportunity of specializing in general farm practice, live-stock husbandry, horticulture, or poultry husbandry; and those who pursue the one-year course in Dairying will have the opportunity of specializing in Dairy Production or Dairy Manufacturing.

In this State there are thousands of young men who are to become our future farmers and orchardists. It is to the interest both of the individual and of the State that these young men should keep pace with the rapid development of agriculture. Each and every one should have, if possible, the opportunity of obtaining an agricultural education. Many of these young men are so situated, however, that it is impossible for them to attend any of our regular four-years courses. There are also many mature men well past the usual school age, no doubt, who desire to acquaint themselves more fully with the more recent developments in agricultural science and practice. It is to meet the needs of such men, both young and old, that these one-year courses are offered. They are designed to provide the largest amount of practical information and training that can be given in one year.

The Degree Courses. The various degree courses in Agriculture are open only to those who have completed the equivalent

of four years of the Oregon State high-school course (see Admission to the College). The aim of these courses is to train young men to become successful farmers, stockmen, and fruit growers; to equip them to become efficient managers of orchard and ranch properties and of agricultural cooperative organizations; to prepare them to become specialists in some branch of agricultural college or experiment station work, or to fit them to become teachers of agriculture in the public schools. In short, they offer to those who have faith in the farm and in rural life, opportunities for individual development and technical training equal to those provided for the educated in other professions.

The various subjects of instruction may be conveniently arranged into three groups, as follows:

(a) **Sciences related to Agriculture**; i. e., Botany, Zoology, and Entomology; Chemistry, Physics, and Bacteriology; (b) **Technical Agricultural subjects**: Farm Crops, Soils and Farm Management, Farm Mechanics, Rural Architecture, Irrigation and Drainage, Animal Husbandry, Dairy Husbandry, Horticulture, Poultry Husbandry, Veterinary Medicine; (c) **Non-technical subjects**: i. e., English Language and Literature, Modern Languages, Political Science, Rural Economics, Rural Sociology, and similar subjects.

The subjects of the first group are designed to furnish the student with an insight into the principles of agricultural science. Those of the second group teach him the application of these principles and give him also, both theoretically and practically, various subjects of agricultural technology. The subjects of the third group tend further to develop the student's intellect, broaden his view, and train him in good citizenship.

To indicate briefly the nature of the work, it may be stated that the student studies the origin, structure, fertility, cultivation, and improvement of various soils; the history, growth, culture, improvement, and value of the different field crops; the structures, machinery, drainage, and irrigation of the farm; and the history, economics, methods, and business principles in farm management. Thorough courses in Business Administration, Rural Economics and Sociology, and Political Science for Agricultural students, are given by the School of Commerce. In the course in Animal Husbandry, consideration is given to the history and characteristics of the various breeds of live stock; the principles of breeding; the principles and practice of feeding, with particular reference

to conditions in this State. By constant practice in stock judging, the student is made familiar with the good points of the various breeds. In Horticulture the student studies the problems of the orchard and garden, such as choice of sites, soils, planting, pruning, choice of varieties, sprays and spraying, and thinning; he obtains instruction and practice in the propagation of plants by various methods; in the harvesting, picking, storage, and marketing of fruits; he may study the principles of plant breeding, or the construction and management of greenhouses, or the culture of small fruits and vegetables for market or canning purposes. In Dairy Husbandry he studies the secretion, composition, and separation of milk and cream; and obtains abundant practice in the use of the Babcock and other tests, in butter and cheesemaking, and in creamery practice. A department of Poultry Husbandry offers to students exceptional opportunities to specialize in this line. The instruction will include a study of breeds, the principles of feeding, housing, and incubation, and will be supplemented by practical work on the farm. In Veterinary Medicine the student is taught to prevent disease, diagnose existing pathological conditions, arrest outbreaks of contagious and infectious diseases among domestic animals, give medical attention in emergency cases, and take care of the sick.

In response to the demand for special teachers of Agriculture in the high schools, an opportunity is given students to major in agricultural education. Certain courses are prescribed in the junior and senior years to broaden the general agricultural training of the first two years, so that the teacher may be prepared to meet the conditions in any section of the State. Courses in Pedagogy provide the necessary principles and methods of teaching. Some election is also allowed in order that the student may specialize along the lines of his greatest interest.

Candidates for the degree of Bachelor of Science in Agriculture will pursue one of the two prescribed courses during the first two years.

Group I. (See page 77) describes the more work in technical Agricultural subjects and leads to the more advanced work in the Departments of Animal Husbandry, Dairy Husbandry, Drainage and Irrigation, Farm Crops, Soils, and Farm Management, Farm Mechanics, Horticulture, Poultry Husbandry, and Rural Architecture.

Group II. (See page 79) prescribes the more work in Modern Languages and science and prepares especially for the more advanced work in Agricultural Chemistry, Agricultural Bacteriology, Botany and Plant Pathology, Economic Zoology, and Economic Entomology.

During the two remaining years of his course, each student is given the opportunity to specialize by electing major work in some one department. For graduation sixty-six credits are required in addition to the freshman and sophomore work. Junior and senior courses other than those prescribed must be selected with the approval of the head of the department in which the major is taken.*

Students who prefer not to specialize, may, with the approval of the Dean, pursue a course in General Agriculture with a wide range of electives. Junior and senior courses aggregating not less than twenty-four credits are required in the School of Agriculture. The remaining courses may be taken in any of the schools or departments of the College.

Practical Experience Required For Graduation

Those students majoring in applied Agriculture will be required to have had a certain amount of practical experience, either before entering the institution or during vacation periods, before being granted a degree. The amount of practice work necessary will be determind in each case by the head of the department in which the student is majoring.

*Major work shall consist of not less than sixteen or more than twenty-four credits in any one department.

VOCATIONAL COURSE IN AGRICULTURE

	Semester 1st	2nd
*Elementary Vocational English (Eng. G)	3	
*Advanced Vocational English (Eng. H)		3
Farm Accounting (Com. E)		3
Business and Social Organization (Com. I)	3	
Woodwork (Shop G)	2	
Blacksmithing Shop (Shop L)		2
Farm Soils (Soils A)	3	
Farm Crops (Farm Crops A)		3
Agronomy (Optional)—		
Farm Machines and Engines (Farm Mech. C)	3	
Practical Farm Drainage (Dr. and Irr. A)		2
Irrigation Farming Practice (Dr. and Irr. C)	2	
Animal Husbandry (Optional)—		
Stock Judging (A. H. A)	2	
Feeding and Management (A. H. B)		5
Elements of Stock Feeding (A. H. E)	2	
Diseases of Domestic Animals (V. M. 15)	3	
Horticulture (Optional)—		
Horticultural Practice (Hort. A, B)	5	5
Poultry Husbandry (Optional)—		
Practical Poultry Keeping (P. H. A, B)	5	5
**Drill (Military A, B)	1	1
**Gymnasium (Phys. Ed. 11, 12)	½	½

*Students who have a satisfactory knowledge of English may elect an equivalent amount of other work.

**Mature men may be excused from Military Drill and Gymnasium work.

DEGREE COURSES IN AGRICULTURE

Group I.

Freshman Year	Semester 1st		Semester 2nd
Modern English Prose (Eng. 81, 82)	3		3
General Chemistry (Chem. 100, 101)	3		3
General Physics (Phys. 1)	3	or	3
Agricultural Botany (Bot. 41, 42)	3		3
Crop Production (Farm Crops 1)	3	or	3
Stock Judging (A. H. 1)	2		
*Farm Surveying and Leveling (C. E. 242)	2		
Live Stock Management (A. H. 2)			3
Library Practice (Libr. 1)			½
Hygiene (Phys. Ed. 10)			½
Drill (Military 1, 2)	1		1
Gymnasium (Phys. Ed. 15, 16)	½		½
	17½		17½

Sophomore Year (1917-18)		
*Farm Accounts and Business Methods (Com. 109)	2	
Principles of Economic Zoology (Zool. 108, 109)	3	3
Agricultural Chemistry (Chem. 500, 501)	3	3
Elementary Bacteriology (Bact. 101)	3	
Principles of Fruit Growing (Hort. 101 A)	2	
Fundamentals of Land. Gard. (Hort. 101 B)	1½	
Vegetable Growing (Hort. 201)		1½
**Soils (1, 2)	3	3
Elements of Dairying (D. H. 1)		3
Practical Poultry Keeping (P. H. 6)		2
Drill (Military 3, 4)	1	1
Gymnasium (Phys. Ed. 17, 18)	½	½
	18½	17½

*Students who desire to specialize in the course in Farm Business and Rural Leadership will take Commerce 219 instead of C. E. 242.

**Students who desire to major in Animal Husbandry will take Breeds of Stock instead of Soils, taking Soils courses in the junior year.

Sophomore Year 1916-17	Semester 1st	2nd
Farm Accts. & Business Methods (Com. 109)	2	
Principles of Economic Zoology (Zool. 108, 109)	3	3
Agricultural Chemistry (Chem. 500, 501)	3	3
Elementary Bacteriology (Bact. 101)	3	
Principles of Fruit Growing (Hort. 101 A)	2	
Fundamentals of Land. Gard. (Hort. 101 B)	1½	
Vegetable Growing (Hort. 201)		1½
Elements of Dairying (D. H. 1)		3
Live Stock Management (A. H. 2)		3
*Farm Surveying and Leveling (C. E. 242)	2	
Practical Poultry Keeping (P. H. 6)		2
Blacksmithing (Ind. Arts 153)	1	
Drill (Military 3, 4)	1	1
Gymnasium (Phys. Ed. 17, 18)	½	½
	18½	17½
Junior Year		
Agricultural Economics (Com. 219)	3	
Drill (Military 5, 6)	1	1
Military Science (Theo. Ins. 1, 2)	1	1
Electives	12	15
	17	17
Senior Year		
National Government (Com. 320)	3	
State and Municipal Government (Com. 322)		3
Electives	13	13
	16	16

Students majoring in General Agriculture or Agriculture for Teachers will follow Group I, electing not less than four nor more than six credits each semester in the major department. Other subjects must be elected with the approval of the Dean of the School in the case of students in General Agriculture and the Professor of Industrial Education in the case of students in Agriculture for Teachers.

*Students desiring to specialize in the course in Farm Business and Rural Leadership will take Com. 219 instead of C. E. 242.

DEGREE COURSES IN AGRICULTURE

Group II.

	Semester 1st	2nd
Freshman Year		
Modern English Prose (Eng. 81, 82)	3	3
General Chemistry (Chem. 100, 101)	3	3
General Physics (Phys. 1, 2)	3	3
Principles of Economic Zoology (Zool. 108, 109)	3	3
Modern Language (German, French, first year)	3	3
Library Practice (Libr. 1)		½
Hygiene (Phys. Ed. 10)		½
Drill (Military 1, 2)	1	1
Gymnasium (Phys. Ed. 15, 16)	½	½
	16½	17½
Sophomore Year (1917-18)		
Agricultural Botany (Bot. 41, 42)	3	3
Agricultural Chemistry (Chem. 500, 501)	3	3
Elementary Bacteriology (Bact. 101)	3	
Modern Language (German, French, second year)	3	3
Organic Chemistry (Chem. 201)		3
Drill (Military 3, 4)	1	1
Gymnasium (Phys. Ed. 17, 18)	½	½
Electives	5	5
Sophomore Year (1916-17)		
Farm Accts. & Business Methods (Com. 109)	2	
Principles of Economic Zoology (Zool. 108, 109)	3	3
Agricultural Chemistry (Chem. 500, 501)	3	3
Elementary Bacteriology (Bact. 101)	3	
Principles of Fruit Growing (Hort. 101 A)	2	
Fundamentals of Land. Gard. (Hort. 101 B)	1½	
Vegetable Growing (Hort. 201)		1½
Elements of Dairying (D. H. 1)		3
Live Stock Management (A. H. 2)		3
*Farm Surveying and Leveling (C. E. 242)	2	
Practical Poultry Keeping (P. H. 6)		2
Blacksmithing (Ind. Arts 153)	1	
Drill (Military 3, 4)	1	1
Gymnasium (Phys. Ed. 17, 18)	½	½
	18½	17½

*Students desiring to specialize in the course in Farm Business and Rural Leadership will take Com. 219 instead of C. E. 242.

Junior Year

Agricultural Economics (Com. 219)	3	
Drill (Military 5, 6)	1	1
Military Science (Theo. Ins. 1, 2)	1	1
Electives	12	15
	17	17

Senior Year

National Government (Com. 320)	3	
State and Municipal Government (Com. 322)		3
Electives	13	13
	16	16

In the courses in this group students may major in Agricultural Chemistry, Agricultural Bacteriology, Botany and Plant Pathology, Economic Zoology, and Economic Entomology. The purpose of these courses is to provide students with preliminary training for agricultural college and experiment station positions in these various sciences; for work in the scientific bureaus of the U. S. Department of Agriculture; for positions as fruit inspectors; and for technical positions in State and government fish and game propagation work.

Students majoring in Agricultural Chemistry will follow Group II, electing not less than five credits each semester in the department of Agricultural Chemistry. Other subjects must be elected with the approval of the head of the department of Agricultural Chemistry.

Students who desire a less technical course may, with the approval of the Dean, substitute elective work for any one of the prescribed courses in each semester of the freshman year. These and other elective courses may be taken in any of the schools or departments of the College, provided only that in addition to the prescribed courses not less than twenty-four credits of junior and senior work must be taken in the School of Agriculture.

ANIMAL HUSBANDRY

ERMINE LAWRENCE POTTER, Professor
CARL NELSON KENNEDY, Assistant Professor
RALPH ELMER REYNOLDS, Assistant Professor (Ext.)
GEORGE ROY SAMSON, Instructor
ORAN MILTON NELSON, Instructor

The course in Animal Husbandry is planned to fit the student for the actual raising of live stock on the farm, so that he may produce the highest grade of stock in the most economical and business-like manner. The student is thoroughly grounded in the underlying principles in order that he may successfully continue his study after leaving school, but the practical details are thoroughly treated and a special effort is made to keep the students in close touch with the financial phases of the industry. Students who take this work as their specialty are expected not to devote their entire time to live stock; but, on the contrary, to familiarize themselves with crop production, soil fertility, and other phases of general agriculture. They are expected also to study English, Economics, Commercial Law, and kindred subjects, all of which are so essential in the training of the young man who expects to become not only an up-to-date business stockman, but a good useful citizen.

Students electing to major in Animal Husbandry must have had considerable practical experience in farming and stock raising before they will be allowed to graduate. The nature and extent of the experience required will be left to the judgment of the head of the department.

Students not majoring in Animal Husbandry but desiring to elect some work in the department, will be given careful attention to see that they get just the work fitted to their individual needs.

Equipment. The equipment of the department of Animal Husbandry consists essentially of live stock, barns, and the College stock farms. During the past year the live stock available for illustration and demonstration purposes has been very much improved in numbers and in quality. The College flocks and herds now include typical specimens of Shorthorn and Hereford cattle, Cotswold and Shropshire sheep, Berkshire, Yorkshire, Poland China, and Duroc Jersey swine, Percheron, Belgian, Clydesdale, Shire, American Saddle, and Standard-bred horses, together with the live stock used in experimental work. In addition to the live

stock regularly kept on the College farm, much good stock is loaned from time to time by the leading breeders of the State. During the winter carload lots illustrating the market classes are brought in for demonstration purposes. The department also possesses abundant maps, charts, lantern slides, stud books, a complete animal husbandry library, and other equipment for the conduct of laboratory, lecture, and recitation work.

COURSES IN ANIMAL HUSBANDRY

For the prescribed group courses for the freshman and sophomore years in the School of Agriculture consult pages 77-79.

	Semester	
Junior Year	1st	2nd
Commercial Law (Com. 300, 301)	3	3
Animal Chemistry (Chem. 509)	2	
Comparative Anatomy (Vet. Med. 1)	3	
Comparative Physiology (Vet. Med. 2)		3
Soils	3	3
Forage Crops (Farm Crops 9)	2	
Drill (Military 5, 6)	1	1
Principles of Nutrition (A. H. 7)	2	
Feeds and Feeding (A. H. 21)		4
Military Science (Theo. Inst. 1, 2)	1	1
Elective		2
	18	17
Senior Year		
National Government (Com. 320)	3	
State and Municipal Govt. (Com. 322)		3
Diseases of Live Stock (Vet. Med. 3, 4)	3	3
Principles of Breeding (A. H. 6)		3
Advanced Stock Judging (A. H. 16)	3	
Seminar (A. H. 18, 19)	1	1
Advanced Live Stock Mgt. (A. H. 110, 120)	3	3
English or similar elective	3	3
	16	16

The following courses are offered:

A. Stock Judging. A thorough drill in the judging of beef cattle, sheep, swine, and horses, accompanied by text-book and lecture work on types and breeds of live stock.

Vocational: First semester; 2 credits; 3 laboratory periods.

Fee: $0.25. Text: Vaughan: Type and Market Classes of Live Stock.

B. Feeding and Management. The practical details of the feeding, care, and management of all kinds of live stock, with special reference to practices common in the Northwest.

Vocational: Second semester; 5 credits; 4 recitations; 1 laboratory period.

Fee: $1.50. Text: Potter et al: Live Stock Management.

E. Elements of Stock Feeding. The elementary principles of stock feeding, methods of balancing rations, feeding standards, and nutritive ratios.

Vocational: First semester; 2 credits; 2 recitations.

Fee: $1.50.

1. Stock Judging. The various types of farm animals are studied by score card and comparative methods, and the student made familiar with the desirable and undesirable types of beef and dairy cattle, sheep, swine, and horses.

Agriculture: Freshman year; first semester; 2 credits; 3 laboratory periods.

Fee: $0.25. Text: Vaughan: Type and Market Classes of Live Stock.

2. Live-Stock Management. Practical details of the care and management of live stock, stabling, grooming, sanitation, practical feeding, and kindred details of live-stock farming, all with especial reference to Oregon conditions.

Agriculture: Sophomore year; second semester; 3 credits; 2 recitations; 1 laboratory period.

Fee: $1.50. Text: Live Stock Management.

6. Principles of Breeding. The principles of breeding as related to the development of our domestic animals; variation, transmission of variations and modifications, fecundity, inbreeding, crossing, and like topics.

Prerequisites: Botany 41 and 42; Zoology 108, 109.

Animal Husbandry: Senior year; second semester; 3 credits; 3 recitations.

Text: Walter: Genetics.

7. **Animal Nutrition.** The chemical and physiological principles of animal nutrition; the function of the various classes of nutrients when taken into the animal body; nutritive ratios; feeding standards; compounding rations; and the general significance of the chemical composition and energy value of feeds.

Prerequisites: Chemistry 500 and 501.

Animal Husbandry: Junior year; second semester; and Dairy Husbandry: First semester; 2 credits; 2 recitations.

Text: Henry & Morrison: Feeds and Feeding.

13. **Research Work.** The student is expected to select some line for individual investigation, either by library methods or otherwise. The object is: first, to allow the student to study some particular subject in which he is especially interested; and second, to give him training in working out problems for himself, such as he will have to undertake after leaving school. This course is open only to those who are taking Animal Husbandry as their major, or who have taken practically all of the regular courses in Animal Husbandry.

Animal Husbandry: Elective; senior year; first semester; credits and hours to be arranged.

14. **Research Work.** A continuation of course 13.

Animal Husbandry: Elective; senior year; second semester; credits and hours to be arranged.

16. **Advanced Stock Judging.** Practical judging of all kinds of live stock, with occasional trips to fairs and stock farms. Judging teams for the Pacific International Stock Show will be chosen for the most part from this class.

Prerequisites: At least four credits of stock judging.

Animal Husbandry: Senior year; first semester; 3 credits; four two-hour laboratory periods.

Fee: $0.25.

18. **Seminar.** Weekly meetings in which papers on Animal Husbandry subjects are read and discussed. These papers are prepared under the supervision of the department, although considerable latitude is allowed in the selection of subjects and the manner of presentation.

Animal Husbandry: Junior or senior year; first semester; 1 credit.

19. **Seminar.** A continuation of course 18.

Animal Husbandry: Second semester; 1 credit.

21. **Feeds and Feeding.** An advanced course in the feeding of horses, beef cattle, sheep, and swine, consisting of a thorough training in the most approved methods of stock feeding. Especial study is made of the practices of the best stockmen, and of the investigations carried on by the various experiment stations. Students desiring to take only such parts of the course as relate to certain lines of live stock will be permitted to do so by arrangement with the head of the department.

Prerequisite: Animal Husbandry 7.

Animal Husbandry: Senior year; first semester; 5 credits; 5 recitations.

Text: Henry & Morrison: Feeds and Feeding.

23. **Feeds and Feeding.** A condensed course intended for those students who do not have the time necessary for Courses 7 and 21. While brief, the work is complete in itself and does not depend upon any other course. The feeding of beef cattle, sheep, hogs, and horses is studied with reference to both principles of nutrition and farm practice.

Prerequisite: Animal Husbandry 2.

Elective to juniors and seniors in all agricultural courses except Animal Husbandry; second semester; 3 credits; 3 recitations.

Text: Henry & Morrison: Feeds and Feeding.

24. **Pork Production.** Feeding and Management of hogs with especial reference to dairy farm conditions.

Prerequisite: Animal Husbandry 7.

Dairy Husbandry Elective: Junior or senior year; second semester; 3 credits; 3 recitations.

101. **Live-Stock Practice.** Laboratory studies devoted to such work as dipping, dehorning, hoof trimming, shearing, horse training, and other common operations of the stock farm.

Senior Animal Husbandry students only; first semester; 1 credit; 1 three-hour laboratory period.

Note.—The department reserves the right to limit the number of students in this course.

Fee: $0.50.

102. **Live-Stock Practice.** A continuation of Course 101.

Animal Husbandry: Second semester; 1 credit; 1 three-hour laboratory period.

Fee: $0.50.

110. **Stock-Farm Management.** An advanced course in management dealing particularly with the economic and financial phases of live-stock production.

Animal Husbandry seniors only; second semester; 3 credits; 3 recitations.

210. **Types and Breeds of Horses.** A study of the leading types and breeds of both light and heavy horses, beginning with the market grades and classes, followed by the breeds. Each breed is studied with reference to its early history, the environment under which developed, the foundation stock, the men who were instrumental in establishing the breed, subsequent development, and present status. Careful consideration is given to the leading families, or strains, and the most prominent animals, both in the country at large and in the Northwest. While the work is not entirely local in its application, especial effort is made to make the students familiar with the herds and the breeders with which they will come in contact when they engage in practical work after graduation. The lecture work is accompanied by comparative judging, in which particular attention is given not merely to the general merits of the animal, but to its conformity to the type or breed in question.

Prerequisite: Animal Husbandry 1.

Animal Husbandry: Junior year; first semester; 2 credits; 1 recitation; 1 three-hour laboratory period.

Fee: $0.50. Text: Plumb: Types and Breeds of Farm Animals.

220. **Types and Breeds of Beef Cattle.** A study of the types and breeds of beef cattle as outlined under Course 210.

Prerequisite: Animal Husbandry 1.

Animal Husbandry: Junior year; first semester; 2 credits; 1 recitation; 1 three-hour laboratory period.

Fee: $0.50. Text: Plumb: Types and Breeds of Farm Animals.

230. **Types and Breeds of Sheep.** A study of the types and breeds of sheep as outlined under Course 210.

Prerequisite: Animal Husbandry 1.

Animal Husbandry: Junior year; second semester; 2 credits; 1 recitation; 1 three-hour laboratory period.

Fee: $0.50. Text: Plumb: Types and Breeds of Farm Animals.

240. **Types and Breeds of Hogs.** A study of the types and breeds of hogs as outlined under Course 210.

Prerequisite: Animal Husbandry 1.

Animal Husbandry: Junior year; second semester; 2 credits; 1 recitation; 1 three-hour laboratory period.

Fee: $0.50. Text: Plumb: Types and Breeds of Farm Animals.

300. Pedigree Study. A laboratory study of the blood lines of the various breeds of live stock. Each student is expected to select one or two breeds as the basis for special study rather than to attempt to cover all breeds.

Animal Husbandry: Elective; senior or graduate year; second semester; credits and hours to be arranged.

400. Advanced Hog Feeding. A study of experimental data relating to hog feeding problems.

Animal Husbandry: Elective; graduate year; second semester; 2 credits; hours to be arranged.

411. Graduate Research. Graduate students will be given opportunity to carry on research work along any lines desired. The department is especially well equipped for graduate work along the lines of experimental feeding of hogs, sheep, and beef cattle, live stock management, and all forms of library work with either experiment station or general live-stock literature.

Animal Husbandry: Elective; graduate year; first semester; credits and hours to be arranged.

412. Graduate Research. Continuation of Course 411.

Animal Husbandry: Elective; graduate year; second semester; credits and hours to be arranged.

BACTERIOLOGY

THEODORE DAY BECKWITH, Professor
GODFREY VERNON COPSON, Associate Professor
RALPH McBURNEY, Instructor
———, Instructor
MARKS HUMBERT MIDDLEKAUF, Instructor

Bacteriology, although comparatively a new field of study, has become an every-day interest and has taken a place deservedly prominent among the sciences. It is essential that every student in Agriculture, Pharmacy, or Home Economics acquire at least a general knowledge of the fundamental principles of bacteriology in order to get a thorough understanding of his work.

Since technical bacteriology is usually a totally unfamiliar field to the new student, the first courses are necessarily general in character, although every effort is made towards direct application whenever possible. The work, therefore, is both theo-

retical and practical. Courses are commenced in the Sophomore year to enable the student to continue along definite specialized lines during the junior and senior years. This thorough preparation is given along certain specific lines in bacteriology, such as Soils, Dairying, Domestic Science, Pharmacy, Sanitation, etc. The advanced work undertakes from a bacteriological point of view the problems of the major work of the student, who is trained not only in technique, power of observation, and in the principles of bacteriology, but also in power of resourcefulness, initiative, and individual responsibility.

For the proper understanding of bacteriology, it is necessary to have had at least a course in general chemistry, which is a prerequisite for all students except those in the vocational courses.

Equipment. The department of bacteriology is located on the fourth floor of the Agricultural building. It occupies two large laboratories for general class work, one for special soil bacteriology and a laboratory for combined Experiment Station and Research Work. In addition there are the offices of the members of the department, a small but well-selected library including most of the authoritative works on bacteriology, besides a good list of the leading American and foreign periodicals. A dark-room, well-equipped for work in photomicrography, a store-room and large incubator room with automatically controlled temperature, is furnished for student use. The department is well supplied with the highest grade microscopes, ample glassware, both precision and common, and lead-topped desks.

Individual wall lockers, cylindrical and square copper sterilizers, supplied with steam from the main heating plant, small and large hot-air sterilizers, a large steam-pressure, horizontal sterilizer, the latter arranged for "dry-steam" sterilization, are conveniently arranged in the general laboratory for the larger sections. Small incubators are used by the advanced students. For special work demanding an extraordinary degree of exactness, there is a large electrically controlled and heated incubator. Lead-topped tables with convenient drawers furnish ample working space. Hot water, which is supplied to all laboratories, is fed by the main water system from a large hot-water tank. Sinks are uniformly lead. A high-power centrifuge is used. All the other necessary minor equipment for work in bacteriology is at the disposal of elementary and advanced students.

Major Courses. The purpose of these courses is to train students for Agricultural College and Experiment Station positions; for work in the Scientific Bureaus of the United States Department of Agriculture; for positions as Sanitary and Milk Inspectors with various State and City Boards of Health; as Laboratory Technicians for Health and Sanitary Boards and for Hospital Service; and likewise for testing laboratories for corporations, such as creameries, and producers of various food products.

COURSES IN BACTERIOLOGY

For the prescribed group courses for the freshman and sophomore years in the School of Agriculture consult pages 77-79.

	Semester	
Junior Year	1st	2nd
Agricultural Economics (Com. 219)	3	
Drill (Military 5, 6)	1	1
Military Science (Theo. Inst. 1, 2)	1	1
*Electives	12	15
	17	17
Senior Year		
National Government (Com. 320)	3	
State and Municipal Government (Com. 322)		3
*Electives	13	13
	16	16

The following courses are offered:

A. **Vocational Dairy Bacteriology.** This course includes the bacteriological studies of milk, butter, and cheese; examination of starters, efficiency tests of pasteurization, cooling, straining, centrifuging, etc., and the general sanitation and cleanliness of the dairy.

Vocational Dairying; second semester; 2 credits; 1 lecture; 2 laboratory periods.

Fee: $2.00.

B. **Preventive Medicine.** A consideration of certain common diseases of the human body, their cause, path of entrance, path of exit, method of transmission, and preventive methods to be taken

*Not less than five credits each semester must be taken in the Major department. Other subjects must be elected with the approval of the head of the department in which the Major is taken.

against them; domestic water supply, pure milk, the action of germicides and antiseptics.

Vocational Home Economics; first semester; 1 credit; 2 lectures or recitations.

101. **Elementary Bacteriology.** A series of lectures, recitations, and experiments to familiarize students with the underlying principles of bacteriology as applied to everyday life, especially to agricultural problems; and to serve as an introduction to the more advanced courses in the subject.

Prerequisite: one year's work in chemistry.

Agriculture: sophomore year; first semester; 3 credits; 1 lecture; 1 recitation; 2 laboratory periods.

Fee: $3.00.

102. **Elementary Laboratory Bacteriology.** A course supplementing the lecture and laboratory work of Bacteriology 101.

Prerequisite: Bacteriology 101.

Agriculture; elective; sophomore, junior, and senior year; second semester; 2 credits; 2 laboratory periods.

Fee: $2.00.

112. **Advanced Bacteriology.** Beginning with the first semester of the junior year, a student may elect bacteriology for the two semesters of that year, and continue advanced work through the two semesters of the senior year.

Prerequisite: Bacteriology 101.

Agriculture; elective; junior year; first semester; 4 credits; 1 lecture; 1 recitation; 3 laboratory periods.

Fee: $4.00.

113. **Advanced Bacteriology.** A continuation of course 112, the laboratory work familiarizing the student with special bacteriological apparatus and its use, and then proceeding with advanced work involving questions of pure science, as well as the application of bacteriology to professions and industries.

Prerequisite: Bacteriology 112.

Agriculture; junior year; second semester; 4 credits; 1 lecture; 1 recitation; 3 laboratory periods.

116. **Research in Bacteriology.** A thesis may be selected in this subject, beginning with the first semester, senior year, major bacteriology, and continuing through two semesters. The laboratory is thoroughly well equipped for research in agricultural, veterinary, domestic science, or pharmaceutical bacteriology. Work

for the master's degree, either as a major or minor in the department, may be selected. The investigations are all outlined and conducted by the student in cooperation with the instructional staff of the department.

Prerequisite: Bacteriology 112 and 113.

Agriculture; elective; junior year; credits and hours to be arranged.

Fee: $4.00.

201. **Pharmacy Bacteriology.** A general course in bacteriology built up around the medical aspects of pharmacy. In general structure this course parallels Bacteriology 101.

Pharmacy; senior or junior year; first semester; 3 credits; 1 lecture; 1 recitation; 2 laboratory periods.

Fee: $3.00.

202. **Pharmacy Bacteriology.** Continuation of Pharmacy Bacteriology 201, elementary clinical diagnosis, classification of bacteria, qualitative and quantitative determinations.

Prerequisite: Bacteriology 201.

Pharmacy; senior or junior year; second semester; 3 credits; 1 lecture; 1 recitation; 2 laboratory periods.

Fee: $3.00

203. **Clinical Bacteriology.** This course, intended primarily for students in Pharmacy, deals with practice work in the ordinary methods of clinical diagnosis in use. Typhoid, Widal, diptheria, and tuberculosis routine tests, various pus formations, bacteriological examination of urine and feces, blood counting and its differentiation into its elements, dark-ground illumination.

Prerequisites: Bacteriology 201, 202, or equivalents.

Pharmacy or Agriculture; elective; senior year; first semester; 2 credits; 2 laboratory periods.

Fee: $2.00.

204. **Clinical Bacteriology.** A continuation of Bacteriology 203.

Prerequisites: Bacteriology, 201, 202, 203.

Pharmacy or Agriculture; elective, senior year; second semester; 2 credits; 2 laboratory periods.

Fee: $2.00.

205. **Immunity and Vaccine Therapy.** A study of the standard methods in vogue in the various immunity and therapeutic reactions, antitoxin formation, preparation and standardization of vaccines.

Prerequisites: Bacteriology 201, 202, or equivalents.

Agriculture or Pharmacy; elective, senior or graduate year; time and credits to be arranged.

Fee: $3.00.

300. **Domestic Science Bacteriology.** Deals with bacteriology in relation to home life. An introduction to the subject, therefore, is made along theoretical lines, with application to sanitation and household practices. Water supply, action of septic tanks, house sanitation, control and prevention of specific diseases, fumigation, vinegar making, methods of contamination of milk, canning, treatment of wounds, etc.

Prerequisite: one year of chemistry. In its structure, this course parallels Bacteriology 101, with application to the problems of Home Economics.

Home Economics: sophomore year; second semester; 3 credits; 1 lecture, 1 recitation; 2 laboratory periods.

Fee: $3.00.

301. **Sanitary Bacteriology.** Primarily for Home Economics students in continuation of Bacteriology 300. Standard sanitary bacterial examination of water, milk, butter, cheese, meat, air, etc., certain simple clinical methods. Use and action of antiseptics and germicides.

Prerequisite: Bacteriology 300 or equivalent. Home Economics or students from other departments with equivalent preparation; elective, junior or senior year; first semester; 3 credits; 1 lecture; 1 recitation; 2 laboratory periods.

Fee: $3.00.

302. **Zymology and Ferments.** An elective for students in Home Economics who desire a specialized course dealing with technical fermentations and microscopic structure of the yeast plant and other fermentation organisms; the preparation and manipulation of special media designed for their growth; pure culture methods used in zymology, methods of laboratory testing of commercial yeasts, both for use in breadmaking and alcohol production, the bacteriology of salt-rising bread.

Prerequisite: Bacteriology 300 or equivalent.

Home Economics, or for students of other courses of equivalent preparation; elective, junior or senior year; either semester; 2 credits; 2 laboratory periods.

Fee: $3.00.

401. **Dairy Bacteriology.** History of dairy bacteriology, physiology of bacteria, chemical reactions in dairy products due to bacteriological activities; standard methods of bacterial analysis of dairy products, methods of sanitation, disinfection, diagnosis of diseases and faults of milk, control of milk-borne epidemics, preparation of commercial health drinks such as Bulgarian milk, Yoghurt, etc., discussions of milk problems.

Prerequisite: Bacteriology 101.

Agriculture: senior year; first semester; 3 credits; 1 lecture; 1 recitation; 2 laboratory periods.

Fee: $3.00.

501. **Agricultural Bacteriology.** The history and development of bacteriology as applied to scientific agriculture, micro-organisms in relationship to soil fertility, the destruction of organic matter and humus formation, plant food requirements and bio-chemics, of the decomposition changes supplying such food, soil nitrogen requirements, the nitrogen cycle, nitrogen fixation by legume bacteria, media for the isolation and growth of soil organisms, soil types from the bacteriological point of view, ammonification, nitrification, denitrification, nonsymbiotic nitrogen fixation.

Prerequisite: Bacteriology 101.

Agriculture; senior year; first semester; 3 credits, 1 recitation, or lecture; 2 laboratory periods.

502. **Agricultural Bacteriology.** A continuation of bacteriology 501. A detailed study of soil changes due to micro-organisms. The effect of liming, manuring, and various methods of tillage, irrigation, and drainage, the activities of sulfur and iron bacteria, cellulose digestion, reference work to certain government and station bulletins, followed by abstract writing of the same for class use and discussion.

Prerequisites: Bacteriology 101, 501.

Agriculture; senior year; second semester; 3 credits; 1 recitation or lecture; 2 laboratory periods.

Fee: $3.00.

701. **Poultry Disease Bacteriology.** The bacterial consideration of the most common diseases of poultry, chicken tuberculosis, chicken typhoid, white diarrhoea, roup, and avian diphtheria; soil contamination, and other methods of disease transportation.

Prerequisites: Bacteriology, 101, 102 or equivalent

Agriculture; junior or senior year; second semester; 2 credits; 2 laboratory periods.

Fee: $2.00.

BOTANY AND PLANT PATHOLOGY

HOWARD PHILLIPS BARSS, Professor
WINFRED McKENZIE ATWOOD, Associate Professor
WILLIAM EVANS LAWRENCE, Assistant Professor
MARION BERTICE McKAY, Assistant Professor
CHARLES ELMER OWENS, Instructor
HOWARD SPURR HAMMOND, Instructor
GILBERT BRADLEY POSEY, Instructor
GORDON KELLER VAN GUNDIA, Instructor
HENRY CLARK GILBERT, Instructor
OTTO HERMAN ELMER, Instructor

The courses offered in this department aim not only to give the student a broad knowledge of plants, their structure both external and internal, their vital activities, their relationships to their environment and their natural classification, but also to impart such fundamental and practical information in regard to plants as shall form a strong foundation for the technical work in Agriculture, Forestry, Pharmacy, and Home Economics.

The general courses are so planned as to present the principles of botany from a genuinely scientific point of view, and then to show how the knowledge thus presented applies in a practical way to the problems which the students will meet in the life-work they have chosen. In order that the different needs of students pursuing different lines of work in the institution shall be met in the best possible way, separate sections are provided and the work in each section is planned with the particular interest and needs of that section in mind.

Technical and reference books are used mainly as an aid in correlating the facts brought out by the study of the actual plant specimens in the laboratory. Living plants are used wherever possible. Drawing is made an important feature of the laboratory work, because in order to draw accurately the students must observe closely.

Exceptional opportunities are afforded students who desire to specialize in botany or plant pathology. Well-equipped laboratories and the unusually favorable location for field study and collecting, offer an attractive inducement for those interested in advanced work. Special attention will be given to students wishing preparation for teaching economic biology or botany in the secondary schools, or the teaching of botany or plant pathology in Agricultural Colleges. Training is also provided for those who wish to enter the field of investigational work in Agricultural Experiment Stations, or in the United States Department of Agriculture under

the Civil Service. Agricultural extension workers, horticultural inspectors, district agriculturists, seed analysts, and pure food experts will find special training in Botany and Plant Pathology a most valuable asset.

Equipment. The Department of Botany and Plant Pathology occupies quarters on the second floor of the Agricultural Building at the south end. There is a lecture room provided with projection lantern. There are three general student laboratories well equipped for botanical work, compound and dissecting microscopes being provided for each student. The work in plant physiology is conducted in a laboratory provided with individual lockers and equipment for each student. The laboratory is well supplied with apparatus for general course work and for special investigation, including accurate analytical balances, coarse balances, muffle furnace, electrical ovens, apparatus for the study of the respiration of fruit, meteorological instruments, chemicals, laboratory glassware, reagents, etc. Greenhouse facilities and a dark room for experimentation are also provided. The library room contains a large number of volumes of American and foreign reference works relating to botany and plant pathology, complete sets of important scientific periodicals, increased yearly by the current numbers, and a rapidly growing collection of bulletins and papers of interest to workers and students in the department. A large room is set apart for an herbarium and here accommodation is provided for students in taxonomic botany for the rapid drying and mounting of pressed plants. A number of desks in this room are available for special and graduate students and the equipment for advanced work in plant histology and microscopic technique include a large electric paraffin bath, microtomes of different types, stains, chemicals, and glassware. For advanced students in plant pathology there is available an unusually well-equipped experimental laboratory, provided with thermostatic incubators, refrigerator, inclosed culture room, transfer case, electrical dry-air sterilizer, horizontal autoclave, and steam sterilizers connected with the central steam plant. There is also a photomicrographic apparatus and an excellent equipment for photographing ordinary specimens in the laboratory or in the field. A suitable photographic dark room is provided.

For demonstration and lecture purposes, the department possesses an excellent set of charts and models, a large collection of

lantern slides, photographs, and illustrative material. A museum exhibit of botanical and plant-disease specimens of great value and interest has been got together and is easily accessible to all students.

The surroundings of the Institution are particularly favorable for botanical study. On the campus are planted an interesting variety of trees, shrubs, and ornamental plants from various parts of the world, while a great diversity of economic plants are propagated on the College farm. The country about Corvallis furnishes an interesting variety of topographic features and places within easy distance the flora of the hill and valley, plain and mountain, meadow and forest. Of interest to students in plant pathology is a small corner of the College farm which has been set out with a great variety of fruits for the study of plant diseases.

The permanent equipment of the department includes an herbarium of flowering plants and gymnosperms of many thousand specimens which, in addition to Oregon forms, contains quite extensive collections from New Mexico, California, Washington, and Michigan. The herbarium is being rapidly enlarged, particular attention being paid to the accumulation of economic material, including the forage and shade trees of North America, agricultural plants, pharmaceutical plants, weeds and grasses. The cryptogamic herbarium includes several thousand specimens of fungi from North America and Europe, being particularly rich in parasitic forms.

COURSES IN BOTANY AND PLANT PATHOLOGY

For the prescribed group courses for the freshman and sophomore years in the School of Agriculture consult pages 77-79.

Junior Year	Semester 1st	2nd
Agricultural Economics (Com. 219)	3	
Drill (Military 5, 6)	1	1
Military Science (Theo. Inst. 1, 2)	1	1
*Electives	12	15
	17	17

*Not less than five credits each semester must be taken in the Major department. Other subjects must be elected with the approval of the head of the department in which the Major is taken.

Senior Year	Semester 1st	2nd
National Government (Com. 320)	3	
State and Municipal Government (Com. 322)		3
*Electives	13	13
	16	16

The following courses are offered:

22. **Botany for Home Economics Students.** The fundamental principles of botany. Growth, reproduction, structure and physiological activities in higher plants. A concise survey of the entire plant kingdom. The relations of plants to their environment, their importance in nature and their usefulness to man. Plants and plant products used as foods and food materials or employed in the manufacture of home furnishings and textiles.

The course in Home Economics; freshman year; first semester; 2 credits; 2 lectures; 1 laboratory period of two hours.

Fee: $1.00. Text: Curtis: Nature and Development of Plants.

23. **Botany for Home Economics Students.** Continuation and completion of work outlined under course 22.

Prerequisite: course 22.

The course in Home Economics; freshman year; second semester; 2 credits; 1 lecture; 1 laboratory period of three hours.

Fee: $1.00. Text: Curtis: Nature and Development of Plants.

30. **Forest Botany.** Provides the basis for an adequate understanding of the forest and of the underlying principles of forestry. The structure, reproduction, and physiology of seed plants. The microscopic study of wood. The identification of trees and shrubs in their winter condition. The characteristics and relationships of the four great plant groups. An introduction to the identification of higher plants. Continued throughout the year.

The course in Forestry; freshman year; first semester; 3 credits; 1 lecture; 1 recitation; 2 laboratory periods.

Fee: $1.00. Text: Curtis: Nature and Development of Plants.

31. Forest **Botany.** Continuation and completion of work described under course 30.

Prerequisite: Botany 30.

*Not less than five credits each semester must be taken in the Major department. Other subjects must be elected with the approval of the head of the department in which the Major is taken.

The course in Forestry; freshman year; second semester; 3 credits; 1 lecture; 1 recitation; 2 laboratory periods.

Fee: $1.00. Text: Curtis: Nature and Development of Plants.

35. **Forest Pathology and Taxonomy.** The first part of the semester is devoted to the fungous diseases of forest trees and structural timber. The second part is devoted to the identification of forest trees, plants of the forest floor and native plants of importance on the forest ranges.

Prerequisites: Botany 30 and 31, or 41 and 42.

The course in Forestry; sophomore year; elective for others; second semester; 4 credits; 2 lectures; 3 laboratory periods.

Fee: $2.00. Text: Piper & Beattie: Flora of the Northwest Coast.

41. **Agricultural Botany.** The fundamental principles of botany underlying agricultural practice. The structure, physiology, and development of higher plants from the seed to the flower. The structure and development of fruits, grains, fleshy roots, and tubers. A survey of the plant kingdom from its lowest to its highest forms with special emphasis on the groups of agricultural importance. Particular attention directed to food plants, stock-poisoning plants, and the organisms causing disease in plants. A brief systematic study of agricultural and other economic plants with practice in identification. Continued through the year.

The course in Agriculture; freshman year; first semester; 3 credits; 1 lecture; 1 recitation; 2 laboratory periods.

Fee: $1.50. Text: Curtis: Nature and Development of Plants.

42. **Agricultural Botany.** Continuation and completion of work outlined under course 41.

Prerequisite: course 41.

The course in Agriculture; freshman year; second semester; 3 credits; 1 lecture; 3 laboratory periods.

Fee: $1.50. Text: Curtis: Nature and Development of Plants.

47. **Weeds, Poisonous Plants and Grasses.** The structure and classification of farm weeds, grasses, poisonous plants, and other plants of economic importance. Well-selected types studied in detail. Each student collects and identifies as many specimens as time will permit.

Prerequisites: Botany 20, or 30 and 31, or 41 and 42, or 70.

Elective; second semester; 2 credits; 2 laboratory periods.

Fee: $1.50. Text: Piper and Beattie: Flora of the Northwest Coast.

50. Plant Physiology. An introductory course in experimental Plant Physiology designed to impart a knowledge of the life-processes of the plant as a basis for intelligent agricultural and horticultural practice. Plant nutrition, growth, and response to environment. The functions of the living cell, the intake by the plant of water and raw materials from the soil. The transportation of materials through the plant. The loss of water. The manufacture, digestion, and assimilation of food, and the process of respiration.

Prerequisites: Botany 20, or 30 and 31, or 41 and 42, or 70, and in addition, Chemistry 500 and 501.

The course in Pomology; and the course in Botany or Plant Pathology; junior year; elective for others; second semester; 3 credits; 2 lectures; 2 laboratory periods.

Fee: $2.50. Deposit: $2.00. Duggar: Plant Physiology.

51. Advanced Plant Physiology. A more advanced course than the last. Further studies in the nutritional processes of plants and their relationship to environmental factors.

Prerequisite: Botany 50.

Elective; first semester; 2 or more credits (credits and hours for lecture and laboratory to be arranged with instructor).

66. Range Botany and Plant Ecology. The first part of the semester deals with the factors relating to depletion, renewal, and maintenance of pastures and ranges, with laboratory work in the identification of grasses and poisonous plants. The second part of the semester is devoted to the study of plants and plant societies in relation to the environment including field studies in physiographic ecology. Of special interest and value to students in Forestry.

Prerequisites: Botany 30 and 31, or 41 and 42, or the equivalent.

Elective; first semester; 2 credits; 1 lecture; 1 laboratory period.

Fee: $1.50. Text: Piper and Beattie: Flora of the Northwest Coast, and Hitchcock: Grasses.

68. Classification of Flowering Plants. Native Oregon flowers and common cultivated ornamental plants. Collecting, identifying, pressing, and mounting of specimens by each student.

Prerequisites: Botany 20, or 30 and 31, or 41 and 42, or 70.

Elective; second semester; 2 credits; 2 laboratory periods. (Additional credits may be arranged for with the instructor.)

Fee: $1.50. Texts: Piper and Beattie: The Flora of the Northwest Coast, and Gray: Field, Forest and Garden Botany.

70. **Pharmaceutic Botany.** A fundamental, preparatory course for Pharmacognosy and Materia Medica. A brief survey of the plant kingdom. A careful study of the structure of higher plants. The cell and cell contents. Various types of plant tissues. Work in elementary pharmacognosy with training in the microscopic identification of drugs and drug adulterants. In the spring practice is given in the identification of drug plants. Continued through the year.

The course in Pharmacy; freshman year; first semester; 3 credits; 1 lecture; 1 recitation; 2 laboratory periods.

Fee: $1.50. Texts: Youngken: Pharmaceutical Botany, and Greenish: Food and Drugs.

71. **Pharmaceutic Botany.** Continuation and completion of work outlined under course 70.

Prerequisite: Botany 70.

The course in Pharmacy; freshman year; second semester; 4 credits; 1 lecture; 1 recitation; 3 laboratory periods.

Fee: $1.50. Texts: Greenish: Foods and Drugs. Youngken: Pharmaceutical Botany.

73. **Plant Evolution and Structure.** The evolution of form, structure, and methods of reproduction for all groups of plants. Evolutionary tendencies and homologies of structure and function. An advanced course dealing with fundamental principles. The detailed examination in laboratory of selected types from the lowest to the highest groups of plants.

Prerequisites: Botany 20, 30, and 31, or 41 and 42, or 70.

The course in Botany; junior or senior year; elective for others; first semester; 3 credits; 2 lectures; 2 laboratory periods.

Fee: $2.00. Texts: Coulter et al: A textbook of Botany, Vol. 1, part 1. Coulter: Evolution of Sex in Plants.

75. **Plant Histology.** An advanced course. The structure, inclusions, activities, and methods of division of the plant cell; the development, structure, and adaptation to function of various types of plant tissues. The preparation of temporary and permanent microscopic mounts, including fixation, dehydration, infiltration, sectioning and staining.

Prerequisites: Botany 20, or 30 and 31, or 41 and 42, or 70 and 71.

The course in Botany or Plant Pathology; junior or senior year; elective for others; first semester; 3 credits; 1 lecture; 3 laboratory periods.

Fee: $2.00. Text: Stevens: Plant Anatomy.

80. **Seminar.** Required of all graduate students in Botany and Plant Pathology. Reports on advanced botanical studies. Abstracts of articles of botanical or phytopathological interest appearing in scientific journals, experiment station publications, or the agricultural press.

Elective; senior year; first semester; 1 credit will be given undergraduates regularly attending the meetings and making satisfactory reports; 1 hour session.

81. **Seminar.** The same as course 80 for second semester.

Elective; senior year; second semester; 1 credit as above; 1 hour.

82. **Research and Thesis.** For students specializing in Botany and Plant Pathology. Investigation of special problems or taking up of advanced studies not included in regular courses.

Elective; senior year; first semester; 1 or more credits (to be arranged for with instructor).

Fee: $0.50 per credit.

83. **Research and Thesis.** Work as outlined in course 82; second semester.

Elective; senior year; second semester; 1 or more credits.

Fee: $0.50 per credit.

101. **Principles of Plant Pathology.** Disease in plants: the causes, symptoms, effects, methods of distribution, etc. The principles of plant disease control. Disease resistance in plants. Quarantine and inspection. Detailed examination in the laboratory of representative examples from the different groups of plant parasites. A study of various types of plant diseases, their life-histories and their microscopic appearance.

Prerequisites: Botany 20, or 30 and 31, or 41 and 42, or 70.

The courses in Pomology, Olericulture, and Farm Crops; junior or senior year; elective for others; first semester; 2 credits; 1 lecture; 2 laboratory periods.

Fee: $1.50. Text: Duggar: Fungous Diseases of Plants.

102. Diseases of Orchard and Small Fruits. The causes, symptoms, progress, and control of the important fungous, bacterial, and physiological diseases of orchard trees, and small fruits, with particular emphasis on those of importance in the Pacific Northwest. Laboratory study of specimens showing the effects of the parasite on the tissues of the host, and the microscopic appearance of the causal organism. Frequent field excursions to demonstrate the characteristic results of different diseases under natural conditions.

Prerequisite: Botany 101.

The course in Pomology; senior year; elective for others; second semester; 2 credits; 2 lectures; 1 laboratory period.

Fee: $1.50.

104. Diseases of Vegetable Crops. The causes, symptoms, progress, and methods of control of the important fungous, bacterial, and other diseases of truck and garden vegetables and fruits with particular attention to those which are serious in the Northwest. Careful laboratory study of typically diseased specimens with microscopic examination of the affected tissues and of the parasitic organisms. Field excursions.

Prerequisite: Botany 101.

The course in Olericulture; senior year; elective for others; second semester; 2 credits; 2 lectures; 1 laboratory period.

Fee: $1.50.

105 Diseases of Field Crops. The causes, symptoms, progress and methods of control of the important fungous and bacterial diseases of cereals and other field and forage crops, with particular attention to those of importance in the Northwest. Typical examples of the diseases are studied in the laboratory. Microscopic examination of the affected tissues and of the causal parasites.

Prerequisite or Parallel: Botany 101.

The course in Field Crops, junior year, and Farm Management, senior year; elective for others; first semester; 1 credit; 1 laboratory period.

111. Laboratory Methods in Plant Pathology. A training course in methods of investigation in plant pathology. Record keeping; care of collections; culture work; inoculation methods; photographic work, etc.

Prerequisite: Botany 101.

The course in Plant Pathology; junior or senior year; elective for others; second semester; 2 credits; 1 lecture; 2 laboratory periods.

Fee: $2.00.

113. **Methods of Control of Plant Diseases.** A lecture course on the special methods employed in the practical control of plant diseases, including the use of various fungicides for different types of diseases; the time and methods of application; surgery; sanitation; crop rotation; the development of resistant varieties; soil disinfection; seed treatment, etc.

Prerequisite: Botany 101.

The course in Plant Pathology; junior or senior year; elective for others; second semester; 1 credit; 1 lecture.

116. **Advanced Plant Pathology.** Special studies in the field and in the laboratory of selected plant diseases, or of plant disease problems; designed to provide training and experience in phytopathological investigations, or to extend the student's knowledge of plant diseases beyond the limits attained by the introductory courses.

Prerequisite: Botany 101.

The course in Plant Pathology; senior year; elective for others; second semester; 2 or more credits; 1 lecture; laboratory periods to be arranged with instructor.

Fee: $2.00.

118. **Mycology.** The different groups of fungi; their structure; modes of reproduction; nuclear phenomena; phylogeny and classification, with particular attention to parasite forms. Practice in the identification of fungi. Each student will collect, identify, and properly prepare specimens for an herbarium.

Prerequisite: Botany 101.

The course in Plant Pathology; senior year; elective for others; first semester; 3 or more credits; two lectures; 2 or more laboratory periods.

Fee: $2.00. Text: Stevens: Fungi that Cause Plant Disease.

Graduate Courses. Botany 51, 80, 81, 111, 113, 115, and 116 may be taken by graduate students as major or minor electives with full credit.

Opportunity will be given students to elect work in Economic Botany or Plant Pathology not offered in the above mentioned courses by registering in Botany 82 or 83, either as a major or minor subject. Students who elect Botany as a major must have

completed the work, or equivalent, required in the freshman year of the Agricultural course.

Note.—Any of the courses in Botany except 20, 30, 31, 35, 41, 42, 70, and 71, may be taken as minor electives by junior, senior, or graduate students in any course, upon consultation with the head of the department, provided the course to be elected is not regularly required in the course of study in which the student is registered.

DAIRY HUSBANDRY

ROY RALPH GRAVES, Professor
OTTO GERALD SIMPSON, Assistant Professor
EDWARD BLODGETT FITTS, Assistant Professor (Ext.)
PAUL STANLEY LUCAS, Instructor
D. C. HOWARD, Instructor

Dairy Production and Dairy Manufacturing are the courses which the Dairy department will offer.

Dairying is rapidly becoming the leading animal industry of the United States. The last census report shows that there are more than twenty million dairy cows in the United States and the annual value of their products is aproximately six hundred million dollars.

Since the population of the country is rapidly increasing, as is also the per capita consumption of dairy products, it seems likely that the importance of the Dairy Industry will continue to advance.

The Pacific Northwest, on account of its even temperature and abundant growth of forage crops, is peculiarly adapted to dairying; and the rapid growth of this industry is creating splendid opportunities for young men in the various fields of dairying, such as the breeding of pure-bred dairy cattle, the management of dairy farms, and the management of creameries, cheese factories, and city milk plants. There are many other openings in government work, college work, and county advisory positions for those who do not care to enter the field of practical dairying.

The production and manufacturing courses are so arranged that the student may major in one course, and yet elect enough of the other course to enable him to have a working knowledge of that phase of the industry.

In the production work, it is the intention to give the student a thorough course in the breeding, feeding, judging, care, management, and diseases of dairy cattle.

In order to meet the needs of the industry and the demand for information, the department offers the following courses: A one-year course, designed to fit students for positions as operators of creameries and cheese factories or as managers of dairy farms. A winter short course in both Dairy Manufacturing and Dairy Production. The four-years course, designed to qualify students for agricultural college and experiment station work; for inspectors of dairy products and dairy establishments in city, state, or government service; or as managers of creameries or large dairy farms.

Equipment. The Dairy building, with its three floors and its newly remodeled manufacturing facilities, affords convenient and modern resources for the work of this department. In the manufacturing work, it is the intention to give the student theory and practice in the manufacture of dairy products. Commodious quarters are provided for this department in the Dairy building. The equipment is such as to permit handling milk and cream on a commercial scale, thus giving the student practice under actual factory conditions. On the first floor, are the offices and manufacturing rooms, the latter including a boiler room equipped with a 15 H. P. internal furnace boiler and a 10 H. P. Jewel automatic steam engine; a farm butter-making room, in which are found hand churns, butter workers, and the various types of separators found on the market; a churn room, which is equipped with modern ripeners, combined churns, various forms of butter-molding appliances, refrigerating machine, cooling room, and ice-cream freezer; a cheese room, which is equipped with cheese vats, automatic pressure cheese press, and other equipment used in the cheese factory; a cheese curing room; and a reading room.

On the second floor, are located recitation rooms, and advanced and general laboratories. The latter will accommodate two hundred students in sections of forty each, and are equipped with a full line of appliances for testing milk and milk products. In the advanced laboratory, will be found moisture tests, salt tests, curd tests, and various other forms of apparatus suited to the needs of the advanced student. A circulating hot water system connects the wash sinks in all of the laboratories. Both steam and electricity are used for power purposes.

The College dairy herd consists of sixty-one head of choice dairy cattle of the Guernsey, Jersey, Holstein-Friesian, and Ayrshire breeds. These cattle are housed in a modern dairy barn.

COURSES IN DAIRY HUSBANDRY

For the prescribed group courses for the freshman and sophomore years in the School of Agriculture consult pages 77-79.

One-Year Course in Dairying.

	Semester 1st		2nd
Elementary Vocational English (Eng. G)	3		
Advanced Vocational English (Eng. H)			3
Dairy Accounting (Com. D)			3
Dairy Mechanics (Ind. Arts 228)	1	or	1
Dairy Mechanics (F. M. 7)	1	or	1
Testing Dairy Products (D. H. A.)	2		
Dairy Bacteriology (Bact. 406)			2
Drill (Military A. B.)	1		1
Gymnasium (Phys. Ed. 11, 12)	½		½
Dairy Manufacturing (Optional)—			
Butter Making and Factory Management (D. H. B.)	4		
Cheese Making (D. H. C.)			4
Ice Cream (D. H. D.)	2		
Judging Butter and Cheese (D. H. H. I.)	1		1
Cremeary Practice (D. H. E. F.)	2		2
Special Creamery Tests (D. H. P.)			2
Breeding, Feeding and Management Dairy Cattle (D. H. J. K.*)	2		2*
Judging Dairy Cattle (D. H. L. M.*)	1		1*
Dairy Production (Optional)—			
Diseases of Dairy Cattle (Vet. Med. 17, 18)	2		2
Farm Crops (Farm Crops A)			3
Judging Dairy Cattle (D. H. L. M.)	1		1
Breeding, Feeding and Management Dairy Cattle (D. H. J. K.)	2		2
Dairy Practice (D. H. N. O.)	1		1
Farm Soils (Soils A)	3		
Blacksmithing (Ind. Arts L), and Wood work (Ind. Arts G), and Live Stock Management (A. H. 2) Elective.			

*Second semester of Breeding, Feeding, and Management of Dairy Cattle and Judging Dairy Cattle are optional.

Degree Courses in Dairy Husbandry

(a) Dairy Production

Junior Year	1st		2nd
Agricultural Economics (Com. 219)	3		
Forage Crops (Farm Crops 9)	2		
Animal Nutrition (A. H. 7)	2		
Genetics (Zool. 120)	3		
Comparative Anatomy (Vet. Med. 1)	3		
Animal Chemistry (Chem. 509)	2		
Comparative Physiology (Vet. Med. 2)			3
Herd Management and Milk Production (D. H. 2)			5
Drill (Military 5, 6)	1		1
Military Science (Theo. Inst. 1, 2)	1		1
Electives	1		6
Junior Seminar (D. H. 21)			1
	18		17
Senior Year			
National Government (Com. 320)	3		
State and Municipal Government (Com. 322)			3
Dairy Bacteriology (Bact. 401)	3		
Breeds and Breeding of Dairy Cattle (D. H. 5)	3		
Diseases of Live Stock (Vet. Med. 3, 4)	3		3
Dairy Inspection and Dairy Farm Equipment (D. H. 6)	3		
Dairy Mechanics (Ind. Arts 228)	1	or	1
Dairy Mechanics (F. M. 7)	1	or	1
Buttermaking and Factory Management (D. H. 3)			5
Senior Seminar (D. H. 8)			1
Advanced Judging (D. H. 10) (Elective)	1		
Approved Electives			1
Dairy Research (D. H. 12) (Elective)			
	16		16

(b) Dairy Manufacturing

Junior Year	Semester 1st		Semester 2nd
Agricultural Economics (Com. 219)	3		
Forage Crops (Farm Crops 9)	2		
Animal Nutrition (A. H. 7)	2		
Business Organization and Management (Com. 110)	3		
Genetics (Zool. 120)	3		
Dairy Chemistry (Chem. 502)			3
Buttermaking and Factory Management (D. H. 3)			5
Milk Production and Herd Management (D. H. 2)			5
Drill (Military 5, 6)	1		1
Military Science (Theo. Inst. 1, 2)	1		1
Approved Electives	2		1
Junior Seminar (D. H. 21)			1
	17		17
Senior Year			
National Government (Com. 320)	3		
State and Municipal Government (Com. 322)			3
Cheesemaking (D. H. 4)	4		
Dairy Bacteriology (Bact. 401)	3		
Breeds and Breeding of Dairy Cattle (D. H. 5)	3		
Dairy Inspection and Dairy Farm Equipment (D. H. 6)	3		
Ice Cream and Ices (D. H. 7)			2
Dairy Mechanics (Ind. Arts 28)	1	or	1
Dairy Mechanics (F. M. 7)	1	or	1
Seminar (D. H. 8)			1
Butter and Cheese Judging (D. H. 9)			1
Electives			7
	16		16

The following courses are offered:

A. **Testing Dairy Products.** The testing of dairy products by the Babcock test, with special emphasis on conditions affecting the results of the test under practical conditions.

Required in one-year dairy course in Dairy Production, and in Dairy Manufacturing; first semester; 2 credits; 2 laboratory periods.

Fee: $1.00. Deposit: $2.00

B. Buttermaking and Factory Management. The principles of creamery buttermaking; construction, management, and care of the creamery; a comparison of the various methods commonly used in the manufacture of butter in creameries.

Laboratory. Practice in sampling and grading cream; pasteurization and ripening of cream; churning and packing butter.

Required in one-year course in Dairy Manufacturing; first semester; 4 credits; 2 lectures; 2 laboratory periods.

Fee: $1.00. Deposit: $2.00

C. Cheesemaking. The commercial manufacture of cheddar cheese, covering the process in detail; a comparison of the different methods commonly employed; a study of other varieties of cheese; factory management and construction.

Laboratory. Practice in making cheddar and other varieties of cheeses. Records are kept of the different operations to note their effect on the finished product.

Required in one-year course in Dairy Manufacturing; second semester; 4 credits; 2 lectures; 2 laboratory periods.

Fee: $1.00. Deposit: $2.00

D. Ice Cream. The preparation of mixes for various frozen products by different formulas; the freezing, packing, and sale of frozen products.

Required in one-year course in Dairy Manufacturing; first semester; 2 credits; 1 three-hour laboratory period; 1 lecture.

Fee: $1.00. Deposit: $2.00

E. Creamery Practice. Work in the creamery, care of creamery machinery, repairing and cleaning apparatus, to familiarize the student with practical creamery work.

Required in one-year course in Dairy Manufacturing; first semester; 2 credits; 2 three-hour laboratory periods.

F. Creamery Practice. Continuation of E; second semester; 2 credits; 2 three-hour laboratory periods.

H. Butter and Cheese Judging. Judging butter and cheese with score card; discussion of the defects of body and flavor.

Required in one-year course in Dairy Manufacturing; first semester; 1 credit; 1 three-hour laboratory period.

I. Butter and Cheese Judging. Continuation of H; second semester; 1 credit; 1 three-hour laboratory period.

Fee: $0.50.

J. Breeding, Feeding, and Management of Dairy Cattle. The history and development of the dairy breeds; a study of the breeding of the principal families of the various breeds; the selection and use of the pure-bred dairy sire in grading up the herd; the practice of inbreeding, linebreeding, and crossbreeding in improving dairy cattle. Feeding dairy cattle for economical milk production; feeding for records; developing the dairy calf; developing the dairy heifer; care of the dairy herd; care of the cow at time of parturition; methods of testing and record keeping; care and handling of the bull; the organization and purpose of cow testing, bull and community breeders' associations; the construction of dairy barns, milk houses, manure sheds, and silos; practical problems.

Required in one-year courses in Dairy Production; first semester; 2 credits; 2 lectures.

K. Breeding, Feeding, and Management of Dairy Cattle. C ntinuation of J; second semester; 2 credits; 2 lectures.

L. Judging Dairy Cattle. Scoring animals by breeds and general score cards and placing classes of animals.

Required in one-year course in Dairy Production; first semester; 1 credit; 1 laboratory period.

Fee: $0.25.

M. Judging Dairy Cattle. Continuation of L; second semester; 1 credit; 1 laboratory period.

Fee: $0.25.

N. Dairy Practice. Practice in computing and mixing rations; tracing and compiling extended pedigrees; fitting animals for the show ring.

Required in one-year course in Dairy Production; first semester; 1 credit; 1 three-hour laboratory period.

O. Dairy Practice. Continuation of N; second semester; 1 credit; 1 three-hour laboratory period.

P. Special Creamery Tests. Advanced work in the use of the Babcock test. Short cuts and conveniences for rapid and efficient testing; rapid tests for adulterants and preservatives; curd, acidity, and sediment tests.

Required in one-year course in Dairy Manufacturing; second semester; 2 credits; 2 three-hour laboratory periods.

Fee: $1.00. Deposit: $2.00

1. Elements of Dairying. The secretion and composition of milk, and the causes of variation in composition; brief discussion

of dairy cattle, and the factors in milk production; the Babcock test applied to milk and other products; use of the lactometer; the various methods of creaming; the operation of cream separators; the care of milk and cream; making butter under farm conditions. The general principles of cheesemaking; marketing of milk; dairy by-products; statistics and economics of the dairy industry.

Fee: $1.00. Deposit: $2.00

Laboratory. The use of the Babcock test applied to milk and dairy products, with special attention to conditions that may affect the accuracy of tests; use of the lactometer; churning and working butter; a study of the construction, operation, and efficiency of various makes of cream separators; practice in ascertaining the yield of milk and fat, and the cost of production of cows in the College herd.

Required in all courses in Agriculture; sophomore year; second semester; 3 credits; 2 recitations; 1 laboratory period.

2. **Dairy Herd Management and Milk Production.** Form and its relation to production; difference in the efficiency of dairy cows; improvement of dairy herds; methods of testing and record keeping; the use and importance of the pure bred dairy sire in grading up the herd. **Care of the Dairy Herd**: care of the cow at time of parturition; the dairy calf and its successful development; developing the dairy heifer; care of the bull; feeding for economical milk production and for records. Registered dairy cattle and their management, fitting for the show ring, advertising cattle, and sales. **Dairy Farm Economics**: the preservation and saving of manure; labor; crop systems for the dairy farm, soiling, pasturing, feeds; silage crops and the making of silage; the organization and purpose of cow-testing, bull, and community breeders' association. **Milk Production**: the production of market and certified milk; sources of infection and contamination of milk; the effect of different kinds of feed on flavor and healthfulness of milk; pasteurization of milk; contracts between milk companies and drivers.

Laboratory. Judging dairy cattle; scoring animals by breed and general score cards and judging classes of animals. Animals of the College herd will be used; and trips to local dairies, and an annual trip to prominent dairy farms in the Willamette Valley will be taken by College classes.

Prerequisite: Animal Husbandry 7.

Required in courses in Dairy Production and Dairy Manufac-

turing; junior year; second semester; 5 credits; 3 recitations; 2 laboratory periods.

Fee: $0.25. Text: Eckles: Dairy Cattle and Milk Production.

3. **Buttermaking and Factory Management.** The composition of milk and cream; the effects of condition of milk and cream on the quality and yield of butter; pasteurization; starters; ripening and churning cream; packing and marketing butter. The location, organization, and construction of creameries; creamery refrigeration and management; creamery accounting; and other studies designed to fit the student to manage and operate creameries.

Laboratory. Practice in sampling and grading cream; pasteurization and ripening of cream; the use of starters; churning, with special attention to factors that control the composition of butter; packing and wrapping butter; the use of the acidity, moisture, and salt tests.

Prerequisites: Dairy Husbandry 1, Bacteriology 101.

Required in courses in Dairy Production; senior year; second semester; in course in Dairy Manufacturing; junior year; second semester; 5 credits; 3 recitations; 2 laboratory periods.

Fee: $1.00. Deposit: $2.00.

4. **Cheesemaking.** The importance of quality and composition of milk in the manufacture of cheddar cheese; composition and characteristics of common American and European cheeses; ferments and fermentations and their control; factory management and construction; the making of cheddar cheese and some forms of soft cheeses.

Laboratory. Practice work in receiving and sampling milk; the use of the various tests for acidity, ferments, fats, solids, and casein; the making and curing of cheddar and other varieties of cheeses; the computation of yields, cost of manufacture, and profit; the effect of different methods of manufacture on yield and quality.

Prerequisites: Dairy Husbandry 1, Chemistry 502.

Required in course in Dairy Manufacturing; senior year; first semester; 4 credits; 2 recitations; 2 laboratory periods.

Fee: $1.00. Deposit: $2.00. Text: Van Slyke and Publow: Principles and Practice of Cheesemaking.

5. **Breeds and Breeding of Dairy Cattle.** The origin, history, and development of breeds of dairy cattle, their distribution and their characteristics. A study of the breeding of the principal

families of the various breeds. Application of the principles of Genetics to the breeding of dairy cattle.

Laboratory. Practice in the use of the breed herd books in tracing and making pedigrees. A study of methods of registering animals and advanced registry systems.

Required in courses in Dairy Production and in Dairy Manufacturing; senior year; first semester; 3 credits; 2 recitations; 1 laboratory period.

Fee: $2.50.

6. **Dairy Inspection and Dairy Farm Equipment.** A. Application of Babcock test; use of the lacometer in detecting adulterations; rapid tests for various preservatives and methods of detecting adulterations; moisture, acidity, salt, curd, casein, and sediment tests; the score-card system of dairy inspection; study of federal, state, and city laws governing the production and sale of dairy products; city milk inspection. B. Arrangement, construction, and equipment of dairy barns, milk houses, milk bottling plants, silos, manure sheds, covered exercise sheds, ice houses, and in planning and laying out dairy plants for special purposes.

Prerequisite: Elementary Bacteriology, (Bact. 101).

Required in courses in Dairy Production and Dairy Manufacturing; senior year; first semester; 3 credits; 2 recitations; 1 laboratory period.

Fee: $1.00. Deposit: $2.50. Text: Farrington and Woll: Testing Milk and Its Products.

7. **Ice Cream and Ices.** A study of the preparation, packing, and marketing of ice creams, sherbets, and related frozen products.

Laboratory. Practice in selecting and aging of cream for ice cream; standardizing and preparing the mix for the various frozen products; the freezing, packing, bricking, molding, coloring, and sale of the various frozen products; judging ice cream and related frozen products by the score card.

Required in course in Dairy Manufacturing; senior year; second semester; 2 credits; 1 recitation; 1 three-hour laboratory period.

Fee: $1.00. Deposit: $2.00.

8. **Seminar.** The study and review of new experiment station bulletins, and general dairy periodicals and literature. Papers are presented by the student on dairy subjects. Practice is given in outlining investigational work.

Required of all seniors and advanced students majoring in Dairy Production and Dairy Manufacturing; senior year; second semester; 1 credit.

9. Butter and Cheese Judging. Judging of butter and cheese with score cards; discussion of defects of body and flavor.

Required in course in Dairy Manufacturing; senior year; second semester; 1 credit; 1 three-hour laboratory period.

Fee: $0.50.

10. Advanced Judging. Practice in judging dairy animals. This work, which includes trips to fairs and breeders' farms, is especially for those who desire to try for the Dairy Judging Team.

Elective; senior year; first semester; 1 credit; 2 two-hour laboratory periods.

Fee: $0.25.

21. Seminar. Required of all juniors majoring in Dairy Production or Dairy Manufacturing. Second semester; one credit.

30. Research and Thesis Work. This work is offered for senior and graduate students majoring in Dairy Husbandry. Investigational problems are assigned that will give the student training and experience in experimental work.

Elective for seniors and graduate students; first semester; credits to be arranged.

Fee: $2.00.

Research and Thesis Work. Effective for seniors and graduate students; second semester; credits to be arranged.

40. Dairy Herd Management. A course similar to D. H. 2, except that all laboratory work is eliminated.

Junior or senior year; second semester; 3 credits; 3 lectures.

DRAINAGE AND IRRIGATION

WILBUR LOUIS POWERS, Associate Professor
————————, Instructor

Courses in Irrigation and Drainage hitherto have dealt with these subjects largely from the engineer's standpoint; and the disposal of water from soil or distribution of water within the farm unit has been considered of such small concern as to require nothing but a brief and more or less superficial treatment. Reclamation development has progressed so far, however, that haphazard and loose practices are no longer considered profitable. If the reclamation projects are to pay for costly development, great

care must be given to the location of tile or the distribution of water on the farm. The adoption of scientific methods of handling soils and crops under irrigation and drainage projects, is coming to be regarded as of paramount importance. With the further extension of state and federal aid to reclamation, there will be a greater demand for men who have a knowledge of how most successfully and economically to use water which the engineer's canals and reservoirs provide. These men must know the best time, amount, and method of irrigation, and the effects of irrigation upon soils and crops. They should also know the relations between soils, soil waters, and drainage, and understand how to locate and construct drains and treat the soil so as to secure the highest possible efficiency for each unit of tile employed.

In this course students combine practical and theoretical training received through lectures, laboratory exercises, and field experiments. The course offers opportunity for electing courses in general agriculture, economics, and other electives to give the student a broad training for modern irrigation farming, irrigation investigations, or the work of a drainage specialist.

Equipment. For the class and field work in Irrigation and Drainage, surveying instruments, tile, and ditching tools, weirs, flumes, hook gauges, water-stage register, electric pumping plant, etc., are available. Weather-recording instruments of different kinds supply equipment for the course in Climatology. A new laboratory fitted with desks, ovens, etc., will afford opportunity for studies of the movement and retention of irrigation water in soil, the effects of irrigation upon soils and crops, the effect of tile drainage upon soils of different types, their rate of drainage, etc. The experimental plots and field work in this course offer exceptional opportunity to study drainage and irrigation under practical field conditions. On the College farm the students build weirs, measure water, lay out distribution systems, make cement pipe for laterals, and test pumping machinery. On the drainage plots, the rate of discharge is measured and the effect of drains and soil conditions on water table is studied. Students are required to lay out, level, set grade stakes, and actually lay the tile in some part of a drainage system on the College land.

COURSE IN DRAINAGE AND IRRIGATION*

For the prescribed group courses for the freshman and sophomore years in the School of Agriculture consult pages 77-79.

	Semester	
Junior Year	1st	2nd
Agricultural Economics (Com. 219)	3	
Irrigation Farming (Drain. & Irr. 3)	3	
Climatology (Drain. & Irr. 5)		1
Topographic Surveying (C. E. 243)	2	
Elementary Bacteriology (Bact. 101)	3	
Introduc. Entomology (Ento. 301)	2	
Land Drainage (Drain. & Irr. 1)		3
Elements of Dairying (D. H. 1)		3
Crop Improvement (Field Crops 15)		3
Farm Power Machinery (F. Mech. 3)		3
Military Science (Theo. Inst. 1, 2)	1	1
Drill (Military 5, 6)	1	1
Approved Electives	2	2
	17	17

Senior Year		
National Government (Com. 320)	3	
State and Municipal Government (Com. 322)		3
Hydraulics (I. E. 101)	2	
Hydraulic Lab. (Exp. E. 265)	1	
Irrigation Institutions (Drain. & Irr. 9)	2	
Soil Fertility (Soils 7)	4	
Advanced Irrigation (Drain. & Irr. 15)	2	
Advanced Land Drainage (Drain. & Irr. 7)		3
Seminar (Drain. & Irr. 17)		1
Feeds and Feeding (A. H. 23)		3
Dairy Herd Management (D. H. 40)		3
Approved Electives	2	3
	16	16

*In the sophomore year students specializing in Irrigation Farming are required to take Trigonometry (Math. 11, 3 credits, 1st semester), and Soil Physics (Soils 3, 4 credits, 2d semester), instead of Elementary Bacteriology (3 credits, 1st semester), and Elements of Dairying (3 credits, 2d semester).

The following courses are offered:

A. **Practical Farm Drainage.** The value of drainage, and the methods and cost of installing drainage systems under different soil and land conditions, district drainage, etc.

Elective in vocational course; second semester; 2 credits; 1 recitation; 1 laboratory period.

Fee: $1.00.

C. **Irrigation Farming Practices.** The most effective methods of handling irrigation waters, the different crops under irrigation, and the cost and profits thereof. Organization as affecting water use and control in irrigated districts.

Vocational course; 1st semester; 2 credits; 2 recitations.

Fee: $1.00. Text: Fortier: Use of Water in Irrigation.

1. **Land Drainage.** The history of drainage; road, field, and sanitary drainage on the farm; the different systems of drainage; methods of locating, installing, operating, and maintaining drainage conduits, cost, efficiency, and profits; the effect on crops and soil; laws governing. Lectures, notes, readings, and field work.

Elective; junior year; second semester; 3 credits; 2 recitations; 1 laboratory period.

Fee: $1.00. Deposit: $1.00. Text: Elliott: Practical Farm Drainage.

3. **Irrigation Farming.** Methods of obtaining, distributing, and conserving irrigation waters. Handling of different crops under irrigation. Cost and profits thereof, and duty of water in various districts of Oregon. Water rights and irrigation codes. Field and laboratory studies of irrigable qualities of different soils, laying out of irrigation systems.

Elective; junior year, first semester; 3 credits; 2 recitations; 1 laboratory period.

Fee: $1.00. Deposit: $1.00.

5. **Climatology.** Practical meterology; observing and recording local weather and forecasting; a study of the climate of Oregon and the effect of climate upon agriculture. Class room and laboratory work.

Elective; junior or senior year; second semester; 2 credits: 1 recitation; 1 laboratory period.

Fee: $0.50. Deposit: $1.00. Text: Chandler: Elements of Western Water Law.

7. **Advanced Land Drainage.** A study of drainage problems and conditions in the field. The actual surveying, laying out, draughting of plans, estimation of cost, and installation of drainage systems at different points in the State, is required of students taking this course. A complete report of the organization of a drainage district is prepared by each class.

Prerequisite: Drainage and Irrigation 1.

Elective; senior year, second semester; 3 credits; 1 recitation: 2 laboratory periods (week end).

Fee: $0.50. Deposit: $1.00.

9. **Irrigation Institutions.** A brief history of the development of water laws. Water rights and irrigation codes in the different states, particularly in the Northwest and Oregon. Appropriation, adjudication, and administration of water. Reclamation and other government and state land acts affecting irrigation development. Organization and administration of irrigation districts and projects, water users' associations, etc. Discussion of public questions relating to irrigation.

Elective; senior year; 1st semester; 2 credits; 2 recitations.

11. **Irrigation Farming Elective.** Special course for Irrigation Engineering students or other students who cannot take the regular course in Irrigation Farming the first semester. This course deals with the handling of irrigation water after it reaches the farm, and of the different crops under irrigation. The irrigable quality of different soils, the duty of water in various districts of Oregon, and water rights and irrigation codes from the standpoint of the farmer, are important features of the course.

Elective; junior or senior year; second semester; 2 credits; 2 recitations.

13. **Irrigation Field Practice.** This course is planned to add interest to irrigation farming and develop a practical knowledge of irrigation farming conditions. Careful records are to be kept of water used on different soils and crops and of the yield obtained from definite areas. The work may be done during the summer months in connection with duties as ditch rider or other field agent. A report is required.

Prerequisite: Drainage and Irrigation 3.

Following 2nd or 3rd college year's work; 1 to 3 credits.

15. **Advanced Irrigation.** Irrigation literature and methods of irrigation investigation. Field and laboratory studies of irriga-

tion experiments and calculation of depth of water applied and of the most economical production thereby secured. Costs and profits connected with irrigation are determined. Analysis of data and preparation of a report is required in this course. Field examinations, where possible, will be made of some of the largest projects in the State.

Senior year; first semester; 3 credits.

Fee: $0.50. Deposit: $1.00.

17. **Seminar.** Weekly meetings are held in which papers on Drainage and Irrigation subjects are read and discussed. These papers will be prepared under supervision and will deal with special subjects of interest to students specializing in the course but which are not covered in the other work.

Required of seniors and advanced students specializing in Drainage or Irrigation.

Senior or graduate year; second semester; 1 credit.

19. **Advanced Drainage or Irrigation Work.** Under this head the student who has completed the courses offered may take up further study of special problems in either subject, such as the drainage of alkali lands, drainage against seepage, study of water-table fluctuations, runoff, etc.; or field studies of the duty of water for a certain district, conservation of irrigation waters, effect of irrigation on soil moisture conditions, etc.

Elective; senior or graduate year; either semester; 2 to 5 credits.

Fee: $0.50. Deposit: $1.00.

20. **Advanced Drainage or Irrigation Work.** Continuation of course 19 for students who wish to elect two semesters of the advanced work.

Elective; senior or graduate year; either semester; 2 to 5 credits.

Fee: $0.50. Deposit: $1.00.

ENTOMOLOGY

LESTER LOVETT, Associate Professor
GEORGE FRANKLIN MOZNETTE, Assistant Professor
WILLARD JOSEPH CHAMBERLIN, Instructor

The courses in Entomology are planned to give the student sufficient knowledge of the subject to understand the proper relation of Entomology to the different phases of Agriculture; to meet the needs of the student specializing in Entomology; and to serve

the needs of students from other departments in which certain special courses are required. Students who wish to elect Entomology as a major may, if they desire, specialize in one or more branches by choosing their research problems in definitely grouped subjects. These groups include General Entomology, Agricultural Entomology, Civic Entomology, Entomology for Horticultural Inspectors, and Forest Entomology.

The courses in General and Economic Entomology are intended to provide the student with sufficient training to enable him to identify the common insect pests, understand their habits and life-history, and to apply the most approved methods for their control.

Forest Entomology includes the practical investigation of certain areas of timber to determine the kind and extent of insect infestation, methods of making out correct reports on forest insect infestation, and an investigation of the principles underlying control methods.

Advanced students in Entomology are provided with excellent opportunities for special instruction and research work. The library facilities are unusually good; the insect fauna of the western part of the State is distinctive, offering many new and interesting features for investigation.

Scheduled courses in this department will not be given to a class of less than five students.

Equipment. This department now occupies three rooms on the third floor of Agricultural Hall — one office, one laboratory, and one class room. The entomological class room is equipped for twenty-four advanced students. It also contains the entomological collections and extension materials. The research laboratory is fully equipped with up-to-date apparatus for carrying on research problems. The entomological library is exceedingly rich in old volumes and complete sets of entomological periodicals. Through the kindness of the librarian of the U. S. Department of Agriculture, students in this department have access to entomological publications contained in the library of the Department of Agriculture and the library of Congress.

COURSES IN ENTOMOLOGY

For the prescribed group courses for the freshman and sophomore years in the School of Agriculture consult pages 77-79.

Junior Year	Semester 1st	2nd
Agricultural Economics (Com. 219)	3	
Drill (Military 5, 6)	1	1
Military Science (Theo. Inst. 1, 2)	1	1
*Electives	12	15
	17	17
Senior Year		
National Government (Com. 320)	3	
State and Municipal Government (Com. 322)		3
*Electives	13	13
	16	16

The following courses are offered:

301. **Introductory Entomology.** An introduction to the study of insects by lectures, laboratory, and field exercises. Sufficient field work in collecting, and laboratory work in properly mounting and classifying insects, is provided to make the student familiar with the principal orders of insects.

Prerequisites: Zoology 101, 102, and a collection of insects consisting of at least 250 specimens.

Required in the courses in Horticulture, Plant Pathology, and Entomology; elective in other courses; junior year; first semester; 2 credits; 1 recitation; 1 lecture; 1 laboratory period.

Fee: $1.00. Text: Sanderson & Jackson: Elementary Entomology.

302. **Entomology of Orchard and Small Fruits.** An intensive study of the more important insect enemies of the apple, pear, prune, cherry, plum, currant, gooseberry, bramble fruits, and strawberry, and the critical examination of the methods to be employed in combating them. Each important pest will be studied in the field and laboratory, with a view to becoming thoroughly familiar with the appearance of the insect and its work in all its stages of development. In this and succeeding courses in Entomology the rearing of economic and other forms of insects, is carried on parallel with other work, to gain familiarity with the development

*Not less than five credits each semester must be taken in the Major department. Other subjects must be elected with the approval of the head of the department in which the Major is taken.

and habits of insects. Each student is required to familiarize himself with the life-history, habits, and methods of controlling some insect of economic importance.

Prerequisite: Entomology 301.

Required in the courses in Pomology, Plant Pathology, and Entomology; elective in other courses; junior year; second semester; 2 credits; 1 recitation; 1 lecture; 1 laboratory period.

Fee: $1.00. Text: Sanderson: Insect Pests of Farm, Garden, and Orchard.

303. Entomology of Truck and Field Crops. A course similar to 302, with special emphasis put on the intensive study of the insect enemies of celery, onion, beet, cabbage, kale, clover, vetch, potato, hop, corn, wheat, and oats.

Prerequisite: Entomology 301.

Required in the course in Vegetable Gardening; junior or senior year; elective for students in other courses; second semester; 2 credits; 1 recitation; 1 lecture; 1 laboratory period.

Fee: $1.00. Text: Sanderson: Insect Pests of Farm, Garden, and Orchard.

304. Forest Entomology. A study of insect injuries to forest trees and forest products, factors influencing their occurrence and the general principles of control work.

The course in Forestry; junior year; second semester; 3 credits.

Fee: $1.00.

305. Forest Entomology. A continuation of course 304.

The course in Forestry; senior year; first semester; 2 credits; hours to be arranged.

Prerequisite: Entomology 304.

Fee: $1.00.

306. Advanced Entomology. This course is designed for those who desire to specialize in Entomology. The instruction includes lectures and reference reading on the biology of the principal families of insects, supplemented by laboratory studies of typical life-histories. Considerable time is devoted to studying the habits of insects, particularly injurious species in the field; to collecting, rearing, mounting, and classifying them; and to becoming familiar with Entomological methods and literature.

Required in the course in Entomology, elective in the courses in Agriculture; junior year; first semester; three credits; one lecture; two laboratory periods.

Fee: $1.00.

307. **Advanced Entomology.** A continuation of course 306.

Required in Entomology, elective in the courses in Agriculture; junior year; second semester; 3 credits; 1 lecture; 2 laboratory periods.

308. **Advanced Entomology.** A continuation of courses 306 and 307.

Required in the course in Entomology; elective in the courses in Agriculture; senior year; first semester; 5 credits; 2 lectures; 3 laboratory periods.

Fee: $1.00.

309. **Advanced Entomology.** A continuation of courses 306, 307, and 308.

Required in the course in Entomology; elective in the courses in Agriculture; senior year; second semester; 5 credits; 2 lectures; 3 laboratory periods.

In connection with courses 306, 307, 308, and 309, the student will be required to present a thesis detailing the results of a systematic study of some restricted group of insects, or of the biology of some particular species or group of species.

Fee: $1.00.

310. **Household Entomology.** A study of insects in their relation to pharmacy and to the household. The history and development of insects in medicine, insects in relation to disease, and insect pests of dwellings and stores. Control methods will be taken up in detail. This course is intended to prepare students in Pharmacy and Home Economics intelligently to understand the bearing of insects upon the household and community, and the principles underlying methods of control.

Primarily for Pharmacy students; open to students in Home Economics and to others by special permission; no prerequisite. Two credits; two lecture periods.

Fee: $1.00.

311. **Beekeeping.** A course in the theory and practice of keeping bees for profit and in relation to fertilization of orchard trees. The College has an apiary in which students will be able to become fully acquainted with modern apicultural methods.

Elective in courses in Agriculture and Home Economics; second semester; 1 credit; 1 laboratory period.

Fee: $1.00. Text: Phillips: Beekeeping.

312. **Problems in Forest Entomology.** This course will include the study and application of methods of forest insect investigations. Each student will be assigned a practical problem in Forest Entomology to work out under direction.

Credits to be arranged.

Fee: $1.00.

313. **Problems in Forest Entomology.** A continuation of course 312.

Prerequisite: Entomology 312.

Credits to be arranged.

314. **Seminar.** Senior and graduate students in Entomology. Reading, discussing, and abstracting the leading articles on Entomology as they appear in the scientific journals, horticultural press, current magazines, and experiment station literature.

Senior year; first semester; 1 credit.

Fee: $1.00.

315. **Seminar.** A continuation of course 310.

Senior year; second semester; 1 credit.

Fee: $1.00.

FARM CROPS

GEORGE ROBERT HYSLOP, Associate Professor
HARRY AUGUST SCHOTH, Instructor

This department deals with the various problems of production, improvement, marketing, manufacture, and uses of each of the field crops produced for food, forage, textile, medicinal, and special purposes. The field is a large one and deals principally with well-known and staple crops that are constantly in use and in demand. The work is closely associated with the daily food supply of man and beast, and is of importance to all students of agriculture.

The purpose of the work is primarily to teach students scientific, practical, and economical crop production, and improvement methods that may be put into actual use on the farm. In addition, the courses are so arranged that men may fit themselves for civil service or experiment station work, or for extension or teaching work. The object is to turn out men with a broad training on general lines and well finished in Farm Crops.

Equipment. The department has excellent recitation and well-lighted laboratory rooms. The laboratory is equipped with modern

desks and tables for crop study. Gas, water, and electricity are available for general use. Special equipment consists of compound and binocular microscopes, dissecting and hand lenses, for study of crop structures and crop products; analytical and torsion balances for accurate weights; seed sampler; standard and Semper's type germinators for seed studies; and large collections of cereal, grass, and miscellaneous straw and seed specimens for class use. Grain testers, a Brown-Duvel moisture tester, a drying oven, and extensive collections of standard grain grades and corn-ear samples, provide excellent facilities for grain standardization and judging work.

The Experiment Station plots offer excellent opportunities for field study and make possible extensive collection of valuable material for class work. In addition to the above, a large collection of the best books, periodicals, etc., dealing with the subject, is available.

COURSE IN FARM CROPS

For the prescribed group courses for the freshman and sophomore years in the School of Agriculture consult pages 77-79.

	Semester	
Junior Year	1st	2nd
Agricultural Economics (Com. 219)	3	
Plant Chemistry (Chem. 510)		2
Agricultural Bacteriology (Bact. 501)	3	
Principles of Plant Pathology (Bot. 101)	2	
Diseases of Field Crops (Bot. 105)	1	
Introductory Entomology (Ento. 301)	2	
Cereal Crops (Farm Crops 57)	4	
Land Drainage (Drain. & Irr. 1)		3
Crop Improvement (Farm Crops 15)		3
Soil Physics (Soils 3)		4
Drill (Military 5, 6)	1	1
Military Science (Theo. Inst. 1, 2)	1	1
Elective		3
	17	17

Senior Year	Semester 1st	2nd
National Government (Com. 320)	3	
State and Municipal Government (Com. 322)		3
Agrostology (Farm Crops 11)		3
Forage Crops (Farm Crops 9)	2	
Soil Fertility (Soils 7)	3	
Farm Management (Farm Mgt. 1)		3
Advanced Crop Breeding (Farm Crops 17)	2	
Advanced Crop Work (Farm Crops 23)		2
Feeds and Feeding (A. H. 23)		3
Potato Growing (Farm Crops 13)	1	
Approved Electives	5	2
	16	16

The following courses are offered:

A. **Farm Crops.** A practical course dealing with soil and climatic adaptations; seed selection, care, testing, and judging; seed-bed preparation, planting, culture, and harvest; storage, market, and improvement methods for the important farm crops of various sections of Oregon. Seed treatment, practical methods of weed eradication, and control and prevention of field-crop pests.

Vocational year; second semester; 3 credits; 2 recitations, 1 laboratory period.

1. **Crop Production.** The beginners' course, consisting of lectures and recitations on description, adaptability, seed-bed preparation; selection, storage, treatment, testing, and planting of seed; cultural methods; habits of growth; harvest, preservation, storage, marketing, and uses of the leading cereal, forage, and special field crops. Laboratory work consists of studies of purity and germination of seed, methods of testing, seed cleaning, and seed treatment, corn and seed judging. Practical work consists of studying crop problems in the field on the College farm.

Freshman year; either semester; 3 credits; 2 recitations; 1 laboratory period.

Fee: $0.50.

3. **Semi-Arid Crop Production.** A course dealing with special methods and problems of dry-land and irrigated crop production. Varieties, adaptability, special cultural methods, harvest, yields, etc., for grain and forage crops under semi-arid conditions, are

considered. Recommended as an elective for students from semi-arid sections who cannot take Cereal Crops (Farm Crops 5) and Agrostology (Farm Crops 11).

5. **Cereal Crops.** A study of the production of cereal and allied grains from seed to market. Especial attention is given to varieties, their distribution and adaptability, methods and conditions for production, quality as affected by environment, markets, manufacture, and uses of wheat, oats, corn, rye, and less important cereals, and their enemies and control. Laboratory work consists of studies of varieties, their identification before and after threshing, cereal judging, grain standardization, moisture and gluten and hardness testing, conditions affecting germination, weight per bushel, etc.

Junior year; 1st semester; 4 credits; 2 recitations; 2 laboratory periods.

Fee: $0.50. Texts: Carleton: Small Grains. Montgomery: The Corn Crop.

7. **Cereal Crops, Lectures.** Series of lectures covering same field as the lecture and recitation work of course 5. Especially adapted to the needs of junior students majoring in "Soils."

Junior year; first semester; 2 credits; 2 lectures.

9. **Forage Crops.** A study of legumes, grasses, and succulent crops adapted to the work of students in agriculture. Temporary pasturing systems, seeding, care, and maintenance of permanent pasture; reseeding and care of range. Adaptability, culture, methods of handling, and value of various crops for forage. Silage and hay making. Soiling crop rotations. Storage and marketing.

Elective; junior or senior year; first semester; 2 credits; 2 recitations.

Fee: $0.50. Text: Piper: Forage Crops.

11. **Agrostology.** A study of the grasses, legumes, and other forage and seed crops. Methods of seeding, production, harvesting, and marketing of meadow, pasture, cover, and special crops for seed, fiber, and special purposes other than forage. The comparative structure and identification of the different forage plants, their adaptability to different conditions of soil and climate. Examinations of commercial seed for viability and purity. The identification of weed seed. The production of forage-crop seed.

Senior year; second semester; 3 credits; 2 recitations; 1 laboratory period.

Fee: $0.50. Texts: Piper: Forage Plants. Hitchcock: A Textbook of Grasses.

13. **Potato Growing.** A detailed study of potato soils, culture, harvest, improvement, storage, markets, distribution, uses, and manufacture. Varietal studies and identification. Potato judging and scoring.

Elective; junior or senior year; 1st semester; 1 credit; 1 recitation.

Fee: $0.50.

15. **Crop Improvement.** Studies of practical means of improving farm crops in quality and yield; field selection; mechanical and score-card methods of seed selection; variety testing; head and ear-to-row methods; multiplication; and pure-seed production. Hybridization and plant-breeding laws applicable to practical crop improvement. Laboratory and field work consists of studies of transmission of characters, field selection, planning and planting of plots, hybridization methods, etc.

Junior year; second semester; 3 credits; 2 recitations; 1 laboratory period.

Fee: $0.50. Text: Bailey & Gilbert: Plant Breeding.

17. **Advanced Crop Breeding.** An advanced course dealing with field-crop breeding from a more theoretical view point. Hybridization, variability, and its measurement. Transmission of characters. Behavior of characters of specific crops. A course designed for students desiring to enter plant-breeding work.

Senior year; first semester; 2 credits; 2 recitations.

19. **Seed Testing.** A course for students preparing themselves for private, state, or government seed-testing work. Studies are made of seed identification and germination, seed legislation, and standard methods of seed testing. Students electing this course should take Taxonomy of Weeds and Grasses (Botany 45), and Agrostology (Farm Crops 11).

Senior year; first or second semester; 2 credits; 2 laboratory periods.

Fee: $0.50.

21. **Weed Eradication.** This course deals with weed types and habits of growth, weed laws, and the various practical methods of prevention, control, and eradication. Special attention is paid to noxious, persistent, perennial, and poisonous weeds of ranch and range.

Elective; junior or senior year; first semester; 1 credit; 1 recitation.

23. **Advanced Crop Work.** Lecture or laboratory work or both will be offered to groups of students desiring additional work in various lines of crop production. Suggested topics are sugar beets, hops, flax, seed testing, grain standardization, experimental methods, etc. Individual students desiring special work will be assigned to some practical problem involving experimental or research work and the preparation of a thesis.

Elective; senior year; either semester; 1 to 5 credits.

Fee: 50c.

24. **Advanced Crop Work.** Continuation of course 23 for students who wish to elect two semesters of this advanced work.

Elective; senior or graduate year; either semester; 1 to 5 credits.

Graduate Work. Candidates for advanced degrees majoring in Farm Crops will be assigned some specific problem of a practical nature requiring careful original work. Result of laboratory and field work, together with a review of the literature of the subject, must be embodied in a suitable thesis.

Graduate year; either semester or both; credits to be arranged.

FARM MECHANICS

WILLIAM JAMES GILMORE, Assistant Professor

The purpose and scope of the work in Farm Mechanics is indicated fully in the description of courses given below.

Equipment. The Farm Mechanics building is complete for Farm Mechanics work. It is an attractive, well-lighted, brick building, having a large operating floor, a class room, locker room, shop and tool rooms on the first floor. The operating room is used for displaying the heavier farm machines and for indoor operation of tractors and automobiles. A gallery surrounds this operating floor and provides space for the lighter farm machines, such as tillage, haying, and harvesting machines, and manure spreaders, many of which are operated from a line shaft.

A very large equipment of the most up-to-date farm machinery is loaned the institution by the leading implement dealers of the Northwest, so that the student has constantly before him and is working with and studying the very best farm machines

of all types. Plows, harrows, pulverizers, rollers, cultivators, corn planters, potato planters and diggers, grain and grass seeders, mowers, rakes, hay loaders, corn and grain binders, sprayers and manure spreaders, ensilage cutters, hay balers, and threshing machines, are representative machines found in the laboratory. The large, well-lighted gas-engine laboratory contains many different makes of gas engines and accessories, such as sectional carburetors, magnetos, and lubricators. In addition to this equipment is the large selection of grain-cleaning and crushing machines, farm-lighting plants, pumps, rams, and water-supply equipment.

The laboratory is also equipped with two large brakes for the testing of tractors; dynamometers for determining the draft of the field machines and the draw-bar horse power of tractors, and also a gas and steam indicator for determining the efficiency of farm engines and tractors; and an electric motor and watt meter, so that the student may become familiar with the power requirements of belt-driven farm machines.

COURSES IN FARM MECHANICS

For the prescribed group courses for the freshman and sophomore years in the School of Agriculture consult pages 77-79.

	Semester	
Junior Year	1st	2nd
Agricultural Economics (Com. 219)	3	
Drill (Military 5, 6)	1	1
Military Science (Theo. Inst. 1, 2)	1	1
*Electives	12	15
	17	17
Senior Year		
National Government (Com. 320)	3	
State and Municipal Government (Com. 322)		3
*Electives	13	13
	16	16

The following courses are offered:

A. **Farm Machines and Engines.** A general course in Farm Mechanics. The more important field machines and gasoline engines are studied. Farm buildings, concrete work, rope work, etc., are also given attention.

*Not less than five credits each semester must be taken in the Major department. Other subjects must be elected with the approval of the head of the department in which the Major is taken.

One-year course; first semester; 3 credits; 1 recitation; 2 laboratory periods.

1. **General Farm Mechanics.** Concrete construction on the farm, farm water supply, detailed and comparative study of field machines, assembling and adjusting field machines, crushing and cleaning machinery, threshing machinery, heating farm homes, power requirements of belt-driven machines, field tests showing draft and effects of mis-adjustments in field machines, farm fences, selection and care and adjustments of farm machines, demonstrations of tractor for field operations, farm gas and electric lighting.

Elective; junior year; first semester; 2 credits; 1 recitation; 1 laboratory period.

Fee: $1.50. Deposit: $1.00. Text: Davidson: Farm Machines and Farm Motors.

3. **Farm Power Machinery.** Detail and comparative study of farm gas engine. Construction and operation of engine. Study of carburetors, ignition, governing, and cooling systems, lubricants and lubrication. Testing, adjusting, and trouble hunting. Detail study and power requirements of belt-driven machines, such as crushers, ensilage cutters, etc. Pumping machinery and hydraulic ram. Pipe fitting, babbitting, soldering, belt lacing, and valve grinding.

Elective; junior year; second semester; 3 credits; 1 recitation; 2 laboratory periods.

Fee: $2.00. Deposit: $1.00. Text: Gas Engine on The Farm.

5. **Farm Motors and Tractors.** Detail study of gas and steam tractors; starting and operating, carburetors, lubricators, ignition systems. Valve setting on steam engines; flue repair. Electricity in its adaptation to farm uses. Indicated, brake, and drawbar horse-power tests of tractors.

Prerequisite: Farm Mechanics 3.

Elective; senior year; either semester; 3 credits; 1 recitation; 2 laboratory periods.

Fee: $2.00. Deposit: $1.00.

7. **Dairy Mechanics.** Concrete floors and sidewalks, concrete bases for machines, detailed study of gas engine operation; trouble hunting and tests of gas engine; gas engine accessories; study of steam boilers and steam engines; firing and operating steam engines; lubricators; injectors; magnetos; flue repair.

Elective; junior or senior year; either semester; 1 credit; 1 3-hour laboratory period.

Fee: $1.00. Deposit: $1.00.

9. **Orchard Machinery.** Given to Horticultural students from the mechanical standpoint, and includes study of construction, operation, and efficiency of orchard machinery, such as gas engines, pumps, tillage and seeding implements. Orchard plowing and cultivation. Demonstration of tractor for orchard work. This course is intended only for students who cannot take the regular courses in Farm Mechanics.

Elective; junior or senior year; second semester; 2 credits; 2 laboratory periods.

Fee: $1.50. Deposit: $1.00.

11. **Farm Practice.** A field practice course for students who have had no farm experience. Practically all the time is spent in the field, carrying on ordinary farm operations, such as plowing, seeding, cultivating, haying, and threshing.

13. **Advanced Farm Mechanics.** For students with inclinations toward mechanics and who feel that more work is needed than was obtained in courses 1, 3, and 5. This course includes efficiency tests of gas and steam tractors (indicated, brake, and drawbar), plowing with tractors, power requirement tests of belt-driven machines with electric motor and watt meter, automobile study and operation, magnetos, self-starters, farm lighting, concrete construction, binder adjustments, dynamometer tests of various field machines.

Prerequisites: Farm Mechanics 1, 3, and 5.

Elective; senior or graduate year; either semester; 1 or 2 credits.

Fee: $2.00. Deposit: $1.00.

14. **Advanced Farm Mechanics.** Continuation of course 13 for students who wish to take the second semester of this advanced work.

Elective; senior or graduate year; either semester; 1 or 2 credits.

HORTICULTURE

CLAUDE ISAAC LEWIS, Professor
VICTOR RAY GARDNER, Professor of Pomology
*EZRA JACOB KRAUS, Professor of Research
ARTHUR LEE PECK, Associate Professor
ARTHUR GEORGE BOUQUET, Assistant Professor
WALTER SHELDON BROWN, Assistant Professor (Ext.)
CARL EPHRIAM SCHUSTER, Instructor
ALDEN FORREST BARSS, Instructor
ROY EDGAR MARSHALL, Instructor
JOHN ROBERT MAGNESS, Instructor
SAMUEL KILBOURN WHITE, Teaching Fellow

The scope of the work in Horticulture is very broad, giving instruction in Pomology, Olericulture, Floriculture, Landscape Gardening, School Gardening. In these courses the student is first thoroughly grounded in the fundamentals, and is then allowed to specialize as he may desire. He may thus fit himself for station or government work, or prepare for the many lines in horticultural business, such as fruit growing, truck gardening, floriculture, or landscape gardening; for in all these lines there are splendid opportunities throughout the Pacific Northwest. At the present time there are openings for young men to become managers of orchards or to develop fruit lands for oustide investors; those having a taste for teaching, can find a broad field in college or rural work or as supervisors of horticulture.

The required work for students electing horticulture covers a wide range, giving the student a thorough training, not only in plant propagation and the general principles of orchard management and vegetable growing, but in floriculture and landscape gardening as well, thus broadening his views and interesting him in the aesthetic and all that pertains to more beautiful surroundings.

The courses consist of lectures, reference reading, field exercises, and laboratory work. Much stress is placed upon the practical phases of all the work. In all courses horticultural truths are illustrated by practice, whenever possible. Students are given field and laboratory exercises in all such operations as planting, seeding, budding, grafting, cultivating, thinning, pruning, harvesting, and spraying.

The Horticultural Building contains modern laboratories for spraying, plant propagation, fruit packing, systematic pomology,

*On leave of absence.

and vegetable preparation. There are special class rooms, large draughting rooms, museum, and research laboratories. A new floriculture building and range of greenhouses assist materially in the work. The department is also establishing young orchards and vegetable gardens, and has at its disposal a large campus upon which are planted many species of trees and shrubs. The student is materially assisted in all of his work, and the research work especially, by the large additions that have recently been made to the horticultural library.

Equipment. The Horticultural wing of the Agricultural building contains many spacious rooms, and thoroughly modern equipment for teaching the various subjects. In the basement will be found a large spray laboratory furnished with gas and water and all the equipment, chemicals, and apparatus which are necessary to teach students the proper mixing and testing of the different sprays; accommodations are offered also for the testing of nozzles and spraying apparatus. The department has a large number of hand and power spraying outfits that are placed at the disposal of students.

A large, well-lighted plant-propagation laboratory offers unexcelled opportunities for the study of plant propagation. Specially equipped cabinets, tables, and incubators have been constructed; so that the students can handle to advantage such topics as seedage, layerage, making of cuttings, and budding and grafting.

A laboratory has been especially fitted for the use of students in gardening. It contains large cement-set tubs, where students are taught the proper methods of preparing vegetables for market. This room also contains a demonstration earth bed for use during the winter, to show how the various tools for planting seed and for cultivation are used. The demonstration bed also allows the instructor to demonstrate the proper method of interplanting and transplanting of plants.

In the basement is also located a very large fruit-packing laboratory, equipped with fruit presses, packing and grading tables. The large storage rooms are also located in the basement and include a suite of rooms which are chilled by mechanical refrigeration.

On the first floor a systematic pomology laboratory is especially equipped for the study of nuts, fruits, etc. A special research laboratory, found on this floor, is used for research assistants in

the department, and is also at the disposal of advanced students. This room is completely equipped with ovens, microscopes, and similar apparatus necessary for extensive research work.

On the top floor is the horticultural museum, which is found to be of great value, as in this room are stored all sorts of equipment used in Horticulture, such as pruning shears, budding and grafting utensils, prune-drying apparatus, fruit graders, etc. The department also has on this floor an herbarium which is especially supplied with the plants used in Horticulture. On this floor is also found a large draughting room, extending along the entire south end of the building, supplied with tables, cabinets, etc., for the use of students studying Floriculture, Landscape Gardening, and Greenhouse Construction, Orchard Planting, and Packing House Construction. In addition to these rooms, the department has four large lecture rooms. A balopticon with a good collection of lantern slides, and a large library, add materially to the equipment.

The department is also especially provided with tools and apparatus necessary for conducting field exercises in Truck Gardening, Floriculture, Landscape Gardening, and Pomology.

COURSES IN HORTICULTURE

For the prescribed group courses for the freshman and sophomore years in the School of Agriculture consult pages 77-79.

(a) Pomology

Junior Year	Semester 1st	2nd
Agricultural Economics (Com. 219)	3	
Floriculture (Hort. 401)	2	
Landscape Gardening (Hort. 301)		2
Plant Propagation (Hort. 105)		2
Practical Pomology (Hort. 102)	2	
Orchard Practice (Hort. 103, 104)	2	2
Plant Physiology (Bot. 50)		3
Drill (Military 5, 6)	1	1
Military Science (Theo. Inst. 1, 2)	1	1
Approved Electives	6	6
	17	17

Senior Year	Semester 1st	2nd
National Government (Com. 320)	3	
State and Municipal Government (Com. 322)		3
Systematic Pomology (Hort. 115)	4	
Commercial Pomology (Hort. 117)		2
Introductory Entomology (Ento. 301)	2	
Entomology of Orchard and Small Fruits (Ento. 302)		2
History and Literature of Horticulture (Hort. 125)		2
Seminar (Hort. 123, 124)	1	1
Principles of Plant Pathology (Bot. 101)	2	
Diseases of Orchards and Small Fruits (Bot. 102)		2
Approved Electives	5	5
	17	17

(b) Olericulture

Junior Year		
Agricultural Economics (Com. 219)	3	
Plant Propagation (Hort. 105)		2
Practical Vegetable Gardening (Hort. 203, 204)	3	3
Floriculture (Hort. 401)	2	
Landscape Gardening (Hort. 301)		2
Introductory Entomology (Ento. 301)	2	
Entomology of Truck and Field Crops (Ento. 303)		2
Drill (Military 5, 6)	1	1
Military Science (Theo. Inst. 1, 2)	1	1
Approved Electives	5	5
	17	17

Senior Year		
National Government (Com. 320)	3	
State and Municipal Government (Com. 322)		3
Commercial Truck Gardening (Hort. 209, 210)	3	3
Forcing Vegetables (Hort. 205, 206)	2	2
Systematic Olericulture (Hort. 207)	1	
Seminar (Hort. 123, 124)	1	1
Principles of Plant Pathology (Bot. 101)	2	
Diseases of Vegetable Crops (Bot. 104)		2
Approved Electives	4	5
	16	16

(c) Floriculture

Junior Year	Semester 1st	2nd
Agricultural Economics (Com. 219)	3	
Floriculture (Hort. 401)	2	
Landscape Gardening (Hort. 301)		2
Plant Materials (Hort. 305, 306)	3	3
Greenhouse Construction (Hort. 403)		3
Introductory Entomology (Ento. 301)	2	
Entomology of Truck and Field Crops (Ento. 303)		2
Drill (Military 5, 6)	1	1
Military Science (Theo. Inst. 1, 2)	1	1
Approved Electives	4	4
	17	17
Senior Year		
National Government (Com. 320)	3	
State and Municipal Government (Com. 322)		3
Forcing Flowers (Hort. 405, 406)	3	3
Agricultural Bacteriology (Bact. 501)	3	
Forcing Vegetables (Hort. 205, 206)	2	2
Advanced Plant Breeding (Hort. 127, 128)	3	3
Diseases of Vegetable Crops (Bot. 104)		2
Approved Electives	2	3
	16	16

(d) Landscape Gardening

Freshman Year		
Modern English Prose (Eng. 81, 82)	3	3
Plane Surveying (C. E. 222)		5
Modern Language (French, German, or Spanish, first Yr.)	3	3
Agricultural Botany (Bot. 41, 42)	3	3
Trigonometry (Math. 11)	3	
Architectural Drawing (Arch. 601)	3	
Drill (Military 1, 2)	1	1
Library Practice (Libr. 1)		½
Hygiene (Phys. Ed. 10)		½
Gymnasium (Phys. Ed. 15, 16)	½	½
Approved Elective	1	1
	17½	17½

Sophomore Year	Semester 1st	2nd
American Literature (Eng. 71, 72)	3	3
Modern Language (French, German, or Spanish, second Yr.)	3	3
Topographic Surveying (C. E. 223)	5	
Railroad and Canal Surveying (C. E. 272)		5
Principles of Fruit Growing (Hort. 101 a)	2	
Fundamentals of Land. Gard. (Hort. 101 b)	1½	
Landscape Gardening (Hort. 301)		2
Drill (Military 3, 4)	1	1
Gymnasium (Phys. Ed. 17, 18)	½	½
*Approved Electives	3	4*
	18½	18½

Junior Year		
Agricultural Economics (Com. 219)	3	
Composition of Addresses (Eng. 103, 104)	2	2
Water Color Rendering (Arch. 505, 506)	2	2
Floriculture (Hort. 401)	2	
Plant Materials (Hort. 305, 306)	3	3
Hist. and Lit. of Landscape Architecture (Hort. 311)		2
Drill (Military 5, 6)	1	1
Military Science (Theo. Inst. 1, 2)	1	1
Approved Electives	3	6
	17	17

Senior Year		
National Government (Com. 320)	3	
Constitutional Law and Politics (Com. 322)		3
Theory and Design (Hort. 307, 308)	2	3
Town Planning (Hort. 313)	3	
Field Practice (Hort. 309, 310)	3	3
Approved Electives	5	7
	16	16

*It is suggested that four of these elective credits be taken in Architectural drawing and Perspective, such as Arch. 602, Arch. 518.

The following courses are offered:

A. **Horticultural Practice.** Practical fruit growing, dealing with such subjects as the choice of locations, sites, soils, and varieties; the establishment of orchards, including staking, setting trees; the maintenance of the orchard, including such topics as tillage, maintaining orchard fertility, thinning, pruning, spraying; the propagation of the principal fruits, and the study of the most common methods of budding and grafting; handling the fruit crop, including picking and packing.

One-year course in Agriculture; first semester; 5 credits; 3 recitations; 2 laboratory periods.

B. **Horticultural Practice.** Continuation of Course A. The greater part of the work, however, will be devoted to vegetable gardening and landscape gardening. The first part of the semester will be devoted to a fundamental study of vegetable gardening, and will deal with such problems as the choice of soils and locations; production of plants, including problems connected with the use of manures and fertilizers, irrigation, tillage, etc.; the harvesting and market preparation and disposal of vegetable products. The latter part of the semester will be devoted to a fundamental study of landscape gardening; and will deal with the fundamental principles and their application in beautifying the farm home.

One-year course in Agriculture; second semester; 5 credits; 3 recitations; 2 laboratory periods.

The sophomore's required work in Horticulture allows 3 credits in the first semester, and 2 in the second semester. The work is divided into three parts: namely, Pomology, Landscape Gardening, and Vegetable Gardening.

The work in Pomology, designated as 101 a, is given the first semester, extending only to the Christmas holidays, for which 2 credits will be allowed.

The work in Landscape Gardening, designated as 101 b, begins after the Christmas holidays, and extends to the end of the second week in March, for which 1½ credits will be allowed. Registration for this course should be arranged with the first semester registration in September.

The work in Vegetable Gardening, designated as 201, begins with the third week in March and extends to the end of the second semester, for which 1½ credits will be allowed. Registration for

this course should be arranged with the second semester's registration in February.

Any student completing a single third of the course will be allowed separate credits.

101-a. **Principles of Fruit Growing.** This includes the problems incident to the establishing of an orchard. It embraces a consideration of such questions as locations, site, soils, windbreaks, variety selection, selection of nursery stock, and planting. Some attention is also given to problems incident to maintenance, especially the maintenance of the home orchard. It is designed especially for general agricultural students, who are interested mainly in the orchard as an accessory of the general farm. At the same time, it is a fundamental course for students desiring to pursue other horticultural studies.

Required of all Agricultural students; sophomore year; 2 credits; 3 recitations; 1 laboratory period.

Fee: $1.50. Text: Sears: Productive Orcharding.

101-b. **Fundamentals of Landscape Gardening.** This course consists of a series of lectures and practicums dealing with the beautifying of the farm home and rural public buildings. It begins after the Christmas holidays and extends to the end of the second week in March. Registration for the course should be arranged in September.

Required of all Agricultural students; sophomore year; 1½ credits; for the remainder of the first semester, 3 recitation and 1 laboratory period; for the first part of the second semester, 1 lecture and 1 laboratory period.

Fee: $1.50. Text: Sears: Productive Orcharding.

Pomology

102. **Practical Pomology.** A continuation of course 101. It deals especially with the problems incident to the maintenance of the commercial orchard, including a study of such questions as cover crops, fertilization, irrigation, frost occurrence and prevention, pollination, pruning, thinning, spraying, and spray injury.

Required of students majoring in Pomology; junior year; first semester; 2 credits; 3 recitations.

Text: Bailey: The Pruning Book.

103. **Orchard Practice.** A laboratory course in which the student obtains actual practice in regular orchard and packing-house

operations. The work includes tree planting, pruning, the preparation of spray solutions, a study of spray machinery, orchard spraying, orchard heating, and the picking, grading, packing, and judging of fruits.

This course is open only to those who have taken or are taking course 102.

Required of juniors majoring in Pomology; junior year; first semester; 2 credits; 1 laboratory period of four hours scheduled for Saturday forenoons.

Fee: $1.00.

104. Orchard Practice. A continuation of course 103.

Required of juniors majoring in Pomology; junior year; second semester; 2 credits; 1 laboratory period of four hours, scheduled for Saturday forenoons.

Fee: $1.00.

105. Plant Propagation. A study of the propagation of plants by means of seeds, separation, and division, layerage, cuttage, and graftage. Sufficient attention is given the subject of nursery management to acquaint the student with its more important features.

Required of juniors majoring in Pomology; junior year; second semester; 2 credits; 1 recitation; 2 laboratory periods.

Fee: $1.00.

109. Viticulture. A study of the problems pertaining to the growing, harvesting, and marketing of both the American and European types of grapes. Soils, locations, pruning, training, harvesting, grading, packing, storage, etc., are some of the questions receiving attention.

Elective; open to juniors and seniors; second semester; alternate years; (not given in 1916); 2 credits; 2 recitations.

111. Small Fruit Culture. A study is made of the problems connected with the growing, harvesting, and marketing of such fruits as the strawberry, currant, gooseberry, raspberry, blackberry, loganberry, and cranberry.

Elective; open to juniors and seniors; second semester; 2 credits; 2 recitations.

113. Nut Culture. A study of the methods of growing, harvesting, curing, and marketing of such nut crops as the walnut, filbert, almond, and pecan. In the laboratory a detailed study is made of the leading varieties of these different nuts.

Elective; open to juniors and seniors; second semester; alternate years (to be given in 1916); 2 credits; 1 recitation; 1 laboratory period.

115. **Systematic Pomology.** A study of the principles underlying pomological nomenclature and variety description, classification, and adaptation. A critical study is made of many varieties of fruits, of the influence of environment upon behavior of fruit trees and the development of their products. The student becomes acquainted with the more important fruit groups and their interrelationships.

Required of seniors majoring in Pomology; senior year; first semester; 4 credits; 2 recitations; 3 laboratory periods.

117. **Commercial Pomology.** The problems of handling fruit, including the picking and grading and packing of fruits; a study of the problems of transportation, storage, distribution, and marketing. Considerable attention will also be given to the planning of buildings for the packing and storing of fruit.

Required of seniors electing Pomology as a major; senior year; second semester; 2 credits; 2 recitations.

119. **Sub-Tropical Pomology.** This course takes up in detail the problems concerned with the growing and marketing of such sub-tropical fruits as oranges, figs, olives, pineapples, etc.

Elective; senior year; first semester; 2 credits; 2 recitations.

121. **Advanced Pomology.** A finishing course in pomology. The students will first be given a general review to determine their knowledge of pomology. The course is designed especially to fit students for Civil Service examinations. The latter part of the course will be devoted to the study of some advanced problems in pomology, and will also include a study of orchard costs and economics, the cost of production, and marketing.

Elective; senior year; second semester; 3 credits; 3 recitations.

123. **Seminar.** A course especially arranged for senior and graduate students in Horticulture. A study is made of some of the advanced problems. Articles from the leading magazines on horticultural subjects, as well as station and Government publications, are reviewed.

Required of Agricultural seniors and advanced students having their major in Horticulture; senior year; first semester; 1 credit; 1 two-hour recitation.

124. **Seminar.** Continuation of course 123.

Prerequisite: Course 123.

Required of seniors electing Pomology as a major; senior year; second semester; 1 credit; 1 two-hour recitation.

125. **History and Literature of Horticulture.** A study is made of the literature and history of Horticulture from the time of the Egyptians to modern times.

Required of seniors electing Pomology as a major; senior year; second semester; 2 credits; 2 recitations.

Fee: $3.00.

126. **Advanced Orchard Practice.** This course will deal with problems of pruning, spraying, budding, and grafting. It will consist entirely of field work or laboratory exercises. Work will be conducted not only at Corvallis, but in various other sections of the State. The course is especially offered for those students who have had regular orchard-practice work, and who have the qualifications to enable them to secure benefit from the course.

Students can only be registered by appointment with the head of the department. Schedule by arrangement in four-hour periods on Saturdays. Work will commence January 1 and extend to May 1.

2 credits; 1 laboratory period.

127. **Plant Breeding. The principles of breeding.** A study of some of the facts pertaining to variation, classification of variations, causes of variation, and the theories that have been advanced to explain the inheritance of characters. The class room work will consist of lectures, reference readings, and recitations; the laboratory work will acquaint the student with statistical methods of studying variation; and through greenhouse experiments he will become acquainted with some of the ways in which environment influences plant growth.

Elective; open to seniors and graduate students (and to juniors by special permission); first semester; 3 credits; 3 recitations; 1 laboratory period.

Text: Davenport: Principles of Breeding.

128. **Plant Breeding.** A continuation of course 127. A study of breeding systems and recent breeding work. For the laboratory work, each student will be assigned to some problem that will give him a knowledge of the technique involved in plant breeding

studies, and of the methods that are employed in plant breeding investigations.

Elective; open to seniors and graduate students (or to juniors by special permission); second semester; 3 credits; 2 recitations; 2 laboratory periods.

Text: Davenport: Principles of Breeding.

Vegetable Gardening

Students taking their major in this course are required to take Horticulture 301 and 401.

201. Vegetable Growing. This course is offered for the purpose of teaching the student the value of a well-conducted farm or home vegetable garden, serving especially those students who cannot further pursue a horticultural course. At the same time, the work will be fundamental in the instruction of higher courses in commercial vegetable growing and marketing, for those students who desire to pursue work in this branch of Horticulture.

Required: sophomore year; second semester; 1½ credits; 1 lecture; 1 laboratory period. Work begins the third week in March. Registration should be arranged at opening of second semester.

Fee: $1.00. Text: Lloyd: Productive Vegetable Gardening.

203. Practical Vegetable Gardening. This course is offered to those students wishing to learn the fundamentals of the business of vegetable gardening. The practices of the leading commercial growers in all phases of field management will be studied, including such problems as vegetable soils, locations, production of plants, distribution of crops, successions, rotatinos, manures and fertilizers, irrigation, implements, capital, labor, and other vital factors in the management of a commercial vegetable farm.

Required of juniors electing Vegetable Gardening as a major; junior year; first semester; 3 credits; 2 lectures; 1 laboratory period.

204. Practical Vegetable Gardening. A continuation of the above course, designed especially for those who are specializing in vegetable growing. Course 204 offers work dealing with the methods used in the commercial production of vegetables for market, consisting largely of practicums in field and greenhouse so as thoroughly to acquaint the student with proper methods and management. The commercial testing grounds, trips to vegetable farms,

and the College greenhouses give ample opportunities for the student to fit himself for later commercial work.

Required of juniors electing Vegetable Gardening as a major; junior year; second semester; 3 credits; 2 lectures; 1 laboratory period.

Text: Corbett: Garden Farming.

205. **Forcing Vegetables.** The problems connected with the forcing of such vegetables as lettuce, cucumbers, tomatoes, rhubarb, and melons, in cold frames, hotbeds, and greenhouses. Lectures and exercises in the greenhouses.

Required of seniors electing Vegetable Gardening as a major; senior year; first semester; 2 credits; 1 lecture; 1 laboratory period.

206. **Forcing Vegetables.** Continuation of course 205.

Prerequisite: Horticulture 205.

Required of seniors electing Vegetable Gardening as a major; senior year; second semester; 2 credits; 1 lecture; 1 laboratory period.

207. **Systematic Olericulture.** Description, nomenclature, and classification of vegetables. Exercises are given in displaying and judging vegetables.

Required of seniors electing Vegetable Gardening as a major; senior year; first semester; 1 credit; 1 laboratory period.

209. **Commercial Truck Gardening.** Only the purely commercial aspects of market gardening and trucking are offered in this course. Problems of growers in the production of vegetables on an extensive scale for market and cannery will be considered. Students will be fitted by this course for extensive or intensive operations, and for managerial positions. Particular attention will be paid to modern methods of marketing vegetables; and the economics of producing vegetable crops will be treated in lectures and discussions.

Required of seniors electing Vegetable Gardening as a major; senior year; first semester; 3 credits; 2 recitations; 1 laboratory period.

210. **Commercial Truck Gardening.** A continuation of course 209.

Prerequisite: Horticulture 209.

Required of seniors electing Vegetable Gardening as a major; senior year; second semester; 3 credits; 2 recitations; 1 laboratory period.

Landscape Gardening

(For the first course in Landscape Gardening, see Pomology 101-b.)

301. Landscape Gardening. All students should be interested in everything that pertains to the decoration of the home, the improvement of school grounds, the beautifying of streets, and the establishment of recreation grounds and parks. In the course in Landscape Gardening the general principles of this are so treated as to apply to the up-building of the aesthetic in everyday life.

Required of Agricultural juniors electing Horticulture as a major; junior year; second semester; 2 credits; 1 recitation; 1 laboratory period.

303. Tree Surgery. The principles of tree surgery are presented and put into execution in the laboratory. All the varying cuts, cavities, fillings, bracing, and cultivating will be worked out in a practical manner.

Elective; junior year; first semester; 1 credit; 1 laboratory period.

304. Tree Surgery. A continuation of course 303.

Elective; junior year; second semester; 1 credit; 1 laboratory period.

305. Plant Materials. To create satisfactory landscape effects, one must have a broad knowledge of the materials with which landscape architects must work. A thorough study is given to trees, both everygreen and deciduous, shrubs, vines, perennial herbaceous plants, biennials and annuals, with a view to bringing out their characteristics, such as foliage, color, form, adaptation, hardiness, and artistic effect.

Prerequisite: Horticulture 301.

Elective; junior year; first semester; 3 credits; 1 recitation; 2 laboratory periods.

306. Plant Materials. A continuation of course 305.

Elective; junior year; second semester; 3 credits; 1 recitation; 2 laboratory periods.

307. Theory and Design. A study of the best works of prominent landscape architects, together with a wide range of collateral reading bearing upon the various problems. Private estates, public parks and play grounds, boulevards, and cemeteries will be carefully studied. Reports, such as those of park boards and landscape architects, will also be studied.

Prerequisites: Horticulture 301, 305, 306.

Elective; senior year; first semester; 2 credits; 2 laboratory periods.

308. **Theory and Design.** A continuation of course 307, in which a large portion of the time will be devoted to the preparation of planting plans. Outside time will be required for collateral reading.

Prerequisites: Horticulture 301, 305, 306, 307.

Elective; senior year; second semester; 3 credits; 3 laboratory periods.

309. **Field Practice.** A course in practical problems brought in from the field of practice. The student is required to make the surveys, do the engineering work incidental to the solving of the problem, make general plans, planting plans, grading plans, details, and, in short, perform all the duties ordinarily met with in the landscape architect's office.

Prerequisites: Horticulture 301, 305, 306. Civil Engineering required in freshman and sophomore year.

Elective; senior year; first semester; 3 credits; 3 laboratory periods.

310. **Field Practice.** A continuation of course 309.

Prerequisites: Horticulture 301, 305, 306, 309. Civil Engineering required in freshman and sophomore year.

Elective; senior year; second semester; 3 credits; 3 laboratory periods.

311. **History and Literature of Landscape Architecture.** Designed to give the student a good idea of the development of the art, and to bring him into close touch with the literature, past and current, that is related to the subject.

Elective; senior year; second semester; 2 credits; 2 recitations.

313. **Town Planning.** This course is offered in order that the student may understand, in a general way, the underlying ideas of municipal, town, and village improvement. Literature and reports are studied, town problems discussed, and methods of procedure in town improvement worked out.

Elective; senior year; first semester; 3 credits; 2 recitations; 1 laboratory period.

Floriculture

Students taking their major in Floriculture are required to take Horticulture 301 and 401.

401. **Floriculture.** An elementary course in the cultivation of greenhouse and home plants and of the common annuals and perennials used in outdoor work. The course is designed to broaden the views of those students who are unable to take advanced courses in Floriculture, and to make them more useful citizens.

Required of Agricultural juniors electing Horticulture as a major; first semester; 2 credits; 1 recitation; 1 laboratory period. Fee: $1.00.

403. **Greenhouse Construction.** A course particularly adapted for students specializing in Floriculture and Truck Gardening. The problems connected with the building of greenhouses, hotbeds, and cold frames are dealt with; also the selection of materials; the various systems of heating and ventilating, and the value of the various types of buildings. Lectures and laboratory exercises in greenhouse and draughting room are conducted.

Elective, junior year; second semester; 3 credits; 1 recitation; 2 laboratory periods.

405. **Forcing Flowers.** The propagation and problems of culture; such as soils, ventilation, and heat, connected with the forcing of plants used in the florist's trade.

Prerequisite: Horticulture 401.

Elective; senior year; first semester; 3 credits; 1 recitation; 2 laboratory periods.

406. **Forcing Flowers.** A continuation of Horticulture 405.

Elective; senior year; second semester; 3 credits; 1 recitation; 2 laboratory periods.

501. **Floriculture.** As related to the cultivation of the common household and dooryard flowers, instruction is given in various subjects; namely, proper soils, planting of seed, transplanting, making of cuttings, cultivation, principles of heating and ventilating and control of insect pests and diseases. In addition, such problems as the grouping and arranging of flowers, so as to obtain the best color harmonies and most pleasing effects while growing, as well as for decoration purposes, are included. The lectures are supplemented by reference reading and laboratory periods in the greenhouse and garden.

Course in Home Economics; junior year; first semester; 2 credits; 1 recitation; 1 laboratory period.

503. Landscape Gardening. The general principles of Landscape Gardening are taught, the aim being to give the student sufficient foundation to understand landscape gardening as applied to home decoration; to interest the student in the home beautiful; and the improvement of our public school grounds and city and village streets. A study is made of photographs, and of famous landscape paintings, showing good taste and design in various phases of Landscape Gardening. Lectures and reference readings are supplemented by field exercises.

Course in Home Economics; second semester; 2 credits; 1 recitation; 1 laboratory period.

505. Vegetable Gardening and Small Fruit Culture. Care of soil, seeding, rotation, fertilizing, and the selection of the best varieties of vegetables and small fruits for use in the home garden. Lectures, laboratory, and field exercises.

Course in Home Economics; second semester; 3 credits; 2 recitations; 1 laboratory period.

By-Products

601. Horticultural By-Products. A general study of horticultural by-products, including a study of the growth and development of this important industry in this country and abroad, but more especially in the Pacific Northwest. In addition, the course will deal with the establishment of plants, their operation, and the fundamental principles connected with canning, evaporating, drying, and the manufacture of fruit juices.

Elective; junior or senior year; first semester; 1 credit; 1 recitation.

603. Dried Products. A detailed study of the evaporation and drying of fruits and vegetables. It will include a study of the types of buildings now used, and of the machinery and apparatus needed in the successful operation of the various types of driers. This course will also deal with the technique connected with the evaporation and drying and processing of such products as apples, pears, peaches, apricots, berries, and vegetables.

Elective; junior or senior year; first semester; 3 credits; 1 recitation; 2 laboratory periods. Not offered in 1916-17.

605. Canning. A study of the establishment, management and operation of canneries, including a study of necessary buildings, machinery, and the successful operation of canneries. It will

also include a detailed study of the various methods used in canning, and in the manufacture of syrups, jellies, etc.

Elective; junior or senior year; second semester; three credits; one recitation; two laboratory periods. Not offered in 1916-17.

607. **Fruit Juices.** A study of the manufacture of cider, vinegars, and juices of such fruits as the apple, grape, and loganberry. A study will be made of the various types of buildings and machinery suitable for the manufacture of such juices, together with the study of the best methods embraced in the manufacture of fruit syrup and juices.

Elective; junior or senior year; first semester; 3 credits; 1 recitation; 2 laboratory periods. Not offered in 1916-17.

Research

The department of Horticulture is unusually well equipped for offering research work. In addition to the laboratory facilities, there are the greenhouses, experimental plots, and a splendid research library, well supplied with scientific books and periodicals, all combining to give the student unsurpassed facilities.

701. **Research Work for Seniors.** This course is offered for those seniors who are contemplating following college, experiment station, or Government work as a life career, or for those students who desire to have some special training in research technique. Problems will be assigned to the students which will give them experience in the laboratory, greenhouse, field, and library.

Elective; senior year; first semester; 3 credits.

702. **Research Work for Seniors.** A continuation of course 701.

Elective; senior year; second semester; 3 credits.

703. **Advanced Thesis and Research Work.** A course offered only for graduate students. Such students will be allowed to select problems in pomology, vegetable gardening, landscape gardening, floriculture, plant breeding, and the like.

Elective; for graduate students only; first semester; from 10 to 20 credits.

704. **Advanced Thesis and Research Work.** A continuation of course 703.

Elective; for graduate students only; second semester; from 10 to 20 credits.

705. Methods of Research. This course is offered to graduate or senior students interested in research work. It will be conducted as a research round table. Special drill will be given in the making of briefs and outlines of research problems, in methods of procedure in conducting investigative work, and in the preparation of bulletins and reports. The study of research problems conducted by the department of Horticulture will be taken up, and a close study made of the research work which is presented in bulletins from other institutions.

Elective; senior or graduate students; first semester; 1 credit.

706. Methods of Research. Continuation of course 705.

Elective; senior or graduate students; second semester; 1 credit.

POULTRY HUSBANDRY

JAMES DRYDEN, Professor
ARTHUR CLIFFORD McCULLOCH, Instructor

In recognition of the importance of the poultry industry, and to meet the demands of students who aim to give special attention to this industry after leaving college, the department of Poultry Husbandry was established. Poultry keeping is a part of every well-regulated system of diversified farming, and at the same time offers opportunity for profit-making as a special business under special conditions. The two poultry plants at the College give exceptional opportunities for study of the practical as well as the theoretical side of the poultry industry.

Equipment. The equipment of this department consists of a number of poultry houses of different types; about 1,000 fowls of several breeds and varieties; twenty incubators of several different makes; brooders of different types; hatching, brooding, and colony coops; bone and clover cutters; feed grinders and mixers; cramming machine and fattening batteries; trap-nests; and various other appliances necessary for practical poultry keeping. There are also sets of charts, lantern slides, motion pictures, and photographs, illustrating breeds of fowls, poultry farms, and houses.

COURSE IN POULTRY HUSBANDRY

For the prescribed group courses for the freshman and sophomore years in the School of Agriculture consult pages 77-79.

Junior Year	Semester 1st	2nd
Agricultural Economics (Com. 219)	3	
Poultry Husbandry (P. H. 1, 2)	4	4
Embryology and Histology (Zool. 104, 105)	3	3
Anatomy of the Fowl (Vet. Med. 11)	2	
Poultry Diseases (Vet. Med. 12)		2
Drill (Military 5, 6)	1	1
Military Science (Theo. Ins. 1, 2)	1	1
Approved Electives	3	6
	17	17
Senior Year		
National Government (Com. 320)	3	
State and Municipal Government (Com. 322)		3
Advanced Poultry Husbandry (P. H. 3, 4)	5	5
Genetics (Zool. 120)	3	
Farm Management (Agron. 505)		3
Approved Electives	6	4
	16	16

The following courses are offered:

A. **Poultry Husbandry Optional Course.** Arranged to meet demands of students unable to take the degree course. Students will be given practice in judging poultry, feeding laying and fattening birds, operating incubators, feeding and rearing chicks, etc., as well as assisting in general work about the department. Practical work supplemented with lectures and recitations in class room.

Vocational course in Agriculture; first semester; 5 credits.

Fee: $1.00. Dep.: $1.00. Text: Lippincott: Poultry Production.

B. A **continuation** of course A, but may be taken separately; second semester; 5 credits.

Fee: $1.00. Dep.: $1.00. Text: Lippincott: Poultry Production.

1. **Poultry Husbandry.** Includes a study of breeds of domestic poultry, their history, and classification. Laying and market qualities of different breeds are emphasized. Breeding fowls for different purposes will be considered, as will the location and construction of the poultry plant and its equipment. Laboratory work consists of practice in judging; preparing poultry products for

market; construction of houses, coops, poultry plant equipment; and drawing plans.

Required of all juniors in Poultry Husbandry; junior year; first semester; 4 credits; 2 recitations; 2 laboratory periods.

Fee: $1.00. Dep.: $1.00. Text: Lippincott: Poultry Production.

2. **Poultry Husbandry.** A continuation of course 1. Includes a study of poultry feeds and feeding with reference to egg and meat production. Reproduction by natural and artificial methods, poultry breeding, markets and marketing. Laboratory work consists of a study of poultry food stuffs and rations. Students will be given practice in preparing different rations. Practice will also be given in hatching and brooding. Each student will have charge of a pen of fowls, and during his period of management will do all the feeding and keeping of records.

Required of all juniors in Poultry Husbandry; junior year; second semester; 4 credits; 2 recitations; 2 laboratory periods.

Fee: $1.00. Dep.: $1.00. Text: Lippincott: Poultry Production.

3. **Advanced Poultry Husbandry.** For students specializing in poultry husbandry who wish to prepare for future college, experiment Station, or Government work. Current poultry literature, especially reports of experimental work at other institutions, will be studied. Each student will be required to conduct some original investigation work and prepare a thesis. To complete advanced work, each student must give evidence of ability successfully to carry on practical instruction, and investigation work in Poultry Husbandry.

Prerequisites: Poultry Husbandry 1, 2.

Required of all seniors in Poultry Husbandry; senior year; first semester; 5 credits.

4. **Advanced Poultry Husbandry.** A continuation of course 3.

Prerequisites: Poultry Husbandry 1, 2, 3.

Required of all seniors in Poultry Husbandry; senior year; second semester; 5 credits.

6. **Practical Poultry Keeping.** A course arranged to meet the demands of students who desire a knowledge of practical poultry keeping, but who are unable to elect a full year's course. The course includes the selection of stock; breeding farm poultry; poultry house construction and equipment; methods of reproducing the flock; poultry breeding; feeds and feeding; as well as markets and preparation of poultry products for market.

Required of sophomores in Agriculture; second semester; 2 credits; 2 lectures or recitations.

Deposit: $1.00.

8. **Poultry Breeding.** Study of origin and history of breeds and varieties of poultry. Principles of poultry breeding with special reference to the inheritance of egg production will be emphasized. Lectures supplemented with laboratory work largely in judging birds for constitutional vigor and general utility qualities, as well as a study of type among laying birds.

Elective; first semester; 2 credits; 1 lecture or recitation; 1 laboratory period.

9. **Marketing Poultry Products.** Study of the different classes of market poultry and eggs and how they may be improved in quality before marketing. Quality of products as affected by feeding, etc., will be considered. Selling and purchasing to best advantage. Study of markets and marketing conditions. Laboratory work will consist of judging, candling, grading, and packing of eggs, finishing, dressing, judging, grading, and packing of poultry for market, and other allied work.

Elective; junior and senior years in Home Economics; first semester; 1 credit; 1 lecture; 1 laboratory period.

***Poultry Diseases.** (Vet. Med. 12.) Elective; required of all seniors in Poultry Husbandry; 2 credits; 1 lecture or recitation; 2 laboratory periods; second semester.

***Anatomy of the Fowl.** (Vet. Med. 11.) Elective; required of all juniors in Poultry Husbandry; 2 credits; 1 lecture or recitation; 1 laboratory period; first semester.

*The two last courses named above are given as Vet. Med. 11 and 12.

SOILS AND FARM MANAGEMENT

HENRY DESBOROUGH SCUDDER, Professor
CHARLES VLADIS RUSEK, Assistant Professor
JOHN EDWARD COOTER, Instructor

Soils

The soil is the foundation of all agriculture and no student in agriculture is well prepared for his work who is not fully versed in his knowledge of it.

The purpose of the work of the courses in Soils is to give the student a thorough training in this important phase of agriculture, making him competent for his work on the farm or preparing him for positions in state or federal service.

Equipment. A large soil laboratory is equipped with the necessary apparatus for the complete study of the physical properties of soil and problems of soil management. Ample desk room, supplied with running water, gas, compressed air, and elcetricity, is available. Electric centrifuges and shakers, electric bridge for alkali testing, electric air baths, analytic and torsion balances, microscopes, blast lamps, aspirators, percolators, capillary tubes, mulch cylinders, soil sieves, scales, solution balance, compression filters, soil-sampling tubes, etc., form part of the equipment for the work in Soils. Soil surveying and mapping outfits, soil survey charts of the United States, and a collection of samples of the chief soil types of Oregon and the United States, are available.

A Soil Preparation room equipped with benches, soil-grinding and sifting machinery, and ample space for the drying, preparation, and storage of large quantities of the different soil types used in the laboratories, is available.

An Exhibit Room and Museum has been provided and is being equipped with exhibit cases and racks for the collection of soil and crop specimens and other exhibits of interest and use in the different courses in Agronomy.

A well-stocked reference library is available. The Experiment Station farms at Corvallis and in other parts of the State, together with the cooperative trials in different sections, offer opportunity for field study of soil problems.

COURSE IN SOILS

For the prescribed group courses for the freshman and sophomore years in the School of Agriculture consult pages 77-79.

Junior Year	Semester 1st	2nd
Agricultural Economics (Com. 219)	3	
Forage Crops (Farm Crops 9)	2	
Cereal Crop Lectures (Farm Crops 7)	2	
Agricultural Bacteriology (Bact. 501, 502)	3	3
Land Drainage (Drain. & Irr. 1)		3
Soil Chemistry (Chem. 503)	3	
Soil Physics (Soils 3)		4
Drill (Military 5, 6)	1	1
Military Science (Theo. Inst. 1, 2)	1	1
Approved Electives	2	5
	17	17

Senior Year	Semester 1st	2nd
National Government (Com. 320)	3	
State and Municipal Government (Com. 322)		3
Agricultural Geology (Min. 171)	3	
Soil Fertility (Soils 7)	4	
Crop Improvement (Farm Crops 15)		3
Farm Management (Farm Mgt. 1)		3
Soil Surveying (Soils 13)		2
Approved Electives	6	5
	16	16

The following courses are offered:

A. **Farm Soils.** A brief history of the origin of soils; the fertility of soils; the most valuable chemical constituents; their exhaustion and replenishment; the most important physical factors; their deterioration or improvement. The physical components; their relative value and amounts in soil mixtures. Practice in judging the chief soil types of Oregon. The effects upon soils of tillage, manuring, crop rotation, drainage, and irrigation.

Vocational course, first semester; 3 credits; 2 recitations; 1 laboratory period.

Fee: $1.00. Deposit: $1.00.

1. **Soils.** The origin, formation, and classification of soils; a study of the physical properties of soil moisture, heat, and air; the effects of tillage, drainage, and irrigation. The plant foods and soil fertility, fertilizers, crop rotations, and manures. Acid and alkaline soils.

Prerequisites: Chemistry 100 and 101.

Course in Agriculture; sophomore year; first semester; 3 credits; 2 recitations; 2 laboratory periods.

Fee: $1.00. Deposit: $2.00. Text: Lyon, Fippin & Buckman: Soils.

2. **Soils.** Continuation of the course outlined under "Soils 1."

Course in Agriculture; sophomore year; second semester; 3 credits; 2 recitations; 2 laboratory periods.

Fee: $1.00. Deposit: $2.00. Text: Lyon, Fippin & Buckman: Soils.

3. **Soil Physics.** Advanced study of the geology of soils, with their origin, formation, physical composition, and classification.

Soil moisture and moisture movements and conservation. The various physical processes of the soil—surface, tension, osmosis, capillarity, diffusion, etc. The effects of the various crops and the different methods of culture upon the texture, aeration, temperature, and moisture of the soil, and the resulting alteration in crop-producing power. The influence of washing, drainage, and irrigation upon soils. Work in the laboratory will consist of the determination and comparison of such physical properties in the various soil types as, specific gravity, water retention, capillarity, organic content, etc,; the physical effect of mulches, rotations, and cropping; soil sampling and judging; the mechanical analysis of soils.

Elective; junior year; second semester; 4 credits; 2 recitations; 2 laboratory periods.

Fee: $1.00. Deposit: $2.00. Text: Mosier & Gustafson: Laboratory Manual.

5. **Soil Physics, Elective.** Similar to course No. 3, but shorter, dealing with the more important phases of the subject. Designed as an elective for agricultural students unable to take the regular course in Soil Physics, and for students in Irrigation Engineering.

Elective; junior year; second semester; 3 credits; 2 recitations; 1 laboratory period.

Fee: $1.00. Deposit: $1.00. Text: Mosier & Gustafson: Laboratory Manual.

7. **Soil Fertility.** Advanced work in the composition and values of fertilizers and barnyard and green manures, and the maintenance and improvement of fertility by the use of the same. The effect of the various crops and different systems of farming upon the fertility of the soil. Crop rotations and fertility in different sections of the state and the United States. The productivity and best use of the different types of Oregon soils, their plant food requirements and comparative values, and methods of improvement of each. Field plot and pot culture investigations. Where necessary, the laboratory work may be omitted and the lecture work only taken (see Soils 9).

Elective; senior year; first semester; 4 credits; 3 recitations; 1 laboratory period.

Fee: $1.00. Deposit: $2.00.

9. **Soil Fertility Lectures.** Same as Soils 7 except no laboratory work.

Elective; senior year; first semester; 3 credits; 3 recitations.

Fee: $0.50.

11. **Dry-Farming Tillage.** One of the special courses given in Dry Farming, others of which are described under Field Crops as Semi-Arid Crop Production, and under Farm Management as Semi-Arid Farm Management. This course takes up the advanced study of the subject of moisture conservation, special tillage methods and machinery, soil and climatic conditions, etc., in dry-farming regions, with particular reference to Oregon and the Northwestern states.

Prerequisite: Soils 3 or 5.

Elective; junior or senior year; second semester; 1 credit; 1 recitation.

13. **Soil Surveying.** For the advanced student who wishes to specialize in Soils for service in the state experiment stations or the Government Bureau of Soils. The course includes some advanced study of the classification of soils and soil areas of the United States, of Oregon, and of the Northwest, but most of the time is devoted to work in the field, making regular and completed soil surveys of assigned areas, with a report thereon.

Prerequisite: Soils 3 or 5.

Elective; senior year; second semester; 2 credits; 2 laboratory periods.

Fee: $0.50.

15. **Advanced Soil Work.** The advanced student specializing in Soils may study the various soil types of Oregon through mechanical analysis, and other physical tests; may undertake field work in soil surveying and mapping; or, through wire-basket, pot-culture, and field-plot tests, may determine the effects of various systems of cropping, or fertilizing, or of soil bacteria, upon soil fertility.

Prerequisites: Soils 3 and 7.

Elective; senior or graduate year; either semester; 2 to 5 credits.

Fee: $1.00. Deposit: $2.00.

16. **Advanced Soil Work.** Continuation of course 15.

Elective; senior or graduate year; either semester; 2 to 5 credits.

Fee: $1.00. Deposit: $2.00.

Farm Management

No matter how expert the student may become in the various lines of agricultural production, his success as a farmer is not assured unless the organization and management of his farm as a whole, as a profitable business enterprise, is capably done.

The course in Farm Management is designed especially: First, to give the student a broad, well-rounded training in all the phases of agriculture that will prepare him for successful production, but with emphasis laid upon those studies which will fit him best for successful management of the home farm; second, to prepare students for positions as farm managers or for state or federal service in farm management investigational and extension work.

COURSE IN FARM MANAGEMENT

For the prescribed group courses for the freshman and sophomore years in the School of Agriculture consult pages 77-79.

Junior Year	Semester 1st	2nd
Forage Crops (Farm Crops 9)	2	
Cereal Crops, Lectures (Farm Crops 7)	2	
Agricultural Economics (Com. 219)	3	
Typewriting (Com. 410a)	1	
Practical Pomology (Hort. 102)	2	
Gen. Farm Mechanics (F. Mech. 1)	2	
Land Drainage or Irrigation Farming (Drain. & Irr. 1 or 3)	3	
Farm Management (Farm Mgt. 1)		3
Soil Physics (Soils 3)		4
Farm Power Machinery (F. Mech. 3)		3
Diseases of Live Stock (Vet. Med. 14)		3
Technical English (Eng. 141)		2
Drill (Military 5, 6)	1	1
Military Science (Theo. Inst. 1, 2)	1	1
Summer Field Course—5 credits (See Farm Mgt. 5)		
	17	17

Senior Year	Semester 1st	2nd
Soil Fertility, Lectures (Soils 9)	3	
Introductory Entomology (Ento. 301)	2	
Principles of Plant Pathology (Bot. 101)	2	
Diseases of Field Crops (Bot. 105)	1	
Economics Organization of Agriculture (Com. 264)	3	
Accounting and Management of Cooperative Enterprises (Com. 130)	3	
Advanced Farm Management (Farm Mgt. 7)		3
Soil Surveying (Soils 13)		2
Dairy Herd Management (D. H. 40)		3
Feeds and Feeding (A. H. 23)		3
Extempore Speaking (Eng. 104)		2
Approved Electives	2	3
	16	16

The following courses are offered:

A. **Practical Farm Management.** The chief factors bearing on successful farming, such as the type of farming, size of business, use of capital, handling of labor, proper equipment, cropping systems, marketing, etc., are given consideration from the practical standpoint. The laboratory work deals with the solution of the home-farm problems.

Vocational course; second semester; 3 credits; 2 recitations; 1 laboratory period.

Fee: $0.50.

1. **Farm Management.** Farm Management deals with the organization and management of the farm as a business enterprise. It concerns itself especially with those factors which affect the labor income. The chief subjects covered in this course are: types of farming, selection and purchase of the farm, requirements as to capital investment and distribution, size and diversity of business, farm rental and leasing methods, management of man and horse labor, farm-equipment costs and duty, cropping systems on different types, maintenance of soil-fertility as a farm management problem, relation of live stock to crop production and to different systems of farming, farm and farmstead layout and building arrangements, production costs, marketing in relation to farm management, the study of successful and unsuccessful farms. When-

ever possible, short field trips are taken. Students desiring to strengthen their work in this course may do so by taking laboratory work to accompany it, registering in Advanced Farm Management (Farm Management 13), 1 credit, for this purpose.

Elective; junior or senior year; second semester; 3 credits; 3 lectures.

Fee: $1.00.

3. **Semi-Arid Farm Management.** A study of the farm management problems of the dry farmer and irrigation farmer, and the preparation of management plans dealing with fertility, rotations, equipment, labor distribution, forms of production, marketing, etc., as adapted to semi-arid conditions. When circumstances permit, a field excursion into the dry farming and irrigated sections of Oregon for farm survey work, will be made.

Prerequisite: Farm Management 1.

Elective; senior year; first semester; 1 credit; 1 lecture.

Fee: $0.50.

5. **Farm Management Field Course.** A course for students specializing in Farm Management. The object of the course is two-fold: First, to increase the student's knowledge of the practical application of the principles of Farm Management, through direct study and analysis, in the field, of some of the most successful farms in the state; Second, to give the student training in regular farm-management survey work.

In the summer of the junior year, following the close of the College in June, the group of students registered in this course, accompanied by the instructor, spends four or five weeks in the field in various representative sections of the state, devoting about one week to each section. All of the time during the day is spent in the company of the farm owner in the study of his individual farm and its methods, a complete record being taken, and in the evenings this record is analyzed.

In order to reduce expense and increase the efficiency of the work, camp equipment is provided and field camp maintained throughout the period, the student paying only his living and traveling expenses.

Prerequisite: Farm Management 1.

Elective; junior year; 5 credits; field work.

7. **Advanced Farm Management.** In this course students in Agriculture who have taken or are taking the lecture work in

Farm Management 1 are offered opportunity to do laboratory or field work, applying the principles of the subject in working out problems in which they are especially interested, such as those connected with the home farm or home region or a future farm under certain known conditions.

Students specializing in Farm Management will register in this course for laboratory and field work as indicated above but on a more extensive scale and with wider range, including advanced reading in the literature of the subject.

Elective; junior year, second semester; or senior year, either semester; 1 to 5 credits.

Fee: $0.50.

9. **Seminar.** A course for advanced and graduate students only. Discussion of investigational methods, analysis of data, new literature, special problems, etc.

Elective; senior or graduate year; second semester; 1 credit; fortnightly meetings.

11. **Accredited Farm Work.** The object of this course is to offer opportunity for the furtherance of the student's training in Farm Management through a period of actual experience obtained on a highly developed farm where the practical application of the principles of good management are in successful operation. Advanced or graduate students who have taken the regular four-years course in Farm Management or its equivalent and who have previous good records of practical experience in farming and the necessary personal qualifications as to character, industry, etc., may register in this course. Such students will be assisted to secure places as workmen on "accredited" farms—farms operated by progressive and successful farmers—known to the College as following the best practices in production and management. In addition to gaining actual experience, the student will be required to study the organization, management, methods, costs of production, methods of solution of special problems, etc., on this farm, and make written report upon the same. He will be visited, his work being inspected by the instructor and reported upon by the farm owner. The College credit given the student for a year on such a farm will depend upon the quality of his practical work and the extent and quality of his study of the organization and management as evidenced in his written reports.

Senior or graduate year; 8 to 16 credits.

Fee: $1.00.

13. **Graduate Work.** Under this head all graduate work in Farm Management is registered. Graduate work in this field divides itself into the two phases indicated below. Selection should be made according to the work the student desires to prepare himself for.

A. Research. For the student who wishes to prepare himself for investigational and instructional or extension work in Farm Management with the development of Farm Management throughout the country as a distinct science or branch of agriculture, opportunities are opening up for men in either instructional or investigational or extension work in both state and federal service. A wide diversity of problems are available for thesis subjects, ranging from the reorganization and preparation of management plans for unsuccessful farms to the study of efficiency factors in special regions, such as on dry-land or irrigated areas, on marsh or diked lands, on drainage reclamation areas, on distinct soil types, etc. The minor courses required in connection with research problems are taken in residence one or both semesters and the major work in residence or in the field.

Elective; graduate year; either semester; credits to be arranged.

14. **Graduate Work.** Continuation of course 15 through the second semester's work.

Elective; graduate year; either semester; credits to be arranged.

B. Practical Management. For the student who wishes to prepare himself more thoroughly as a farm manager, one year registered in the course Accredited Farm Work (Farm Management 11) combined with one semester's work in residence graduate work, is suggested.

Elective; graduate year; either semester; credits to be arranged.

VETERINARY MEDICINE

BENNETT THOMAS SIMMS, Professor

The object of the courses in Veterinary Medicine is to prepare the students to recognize disease, treat emergency cases, diagnose and control outbreaks of infectious diseases, and take care of sick animals.

Equipment. This department has its office, laboratory, and lecture room on the second floor of the Dairy building. Laboratory equipment includes mounted skeletons of the horse and cow, complete sets of loose bones, dissected specimens preserved in museum jars, rotary microtome with accessories, microscope, electric oven, electric thermostat, steam and hot air sterilizers, the necessary glassware for physiological laboratory work, and the necessary instruments and drugs for clinical work.

COURSE IN VETERINARY MEDICINE

For the prescribed group courses for the freshman and sophomore years in the School of Agriculture consult pages 77-79.

	Semester	
Junior Year	1st	2nd
Agricultural Economics (Com. 219)	3	
Drill (Military 5, 6)	1	1
Military Science (Theo. Inst. 1, 2)	1	1
*Electives	12	15
	17	17
Senior Year		
National Government (Com. 320)	3	
State and Municipal Government (Com. 322)		3
*Electives	13	13
	16	16

The following courses are offered:

A. Diseases of Dairy Cattle. A practical course given to the Dairy Husbandry students who are taking the vocational course.

Vocational students; first semester; 2 credits; 2 recitations.

B. Diseases of Dairy Cattle. A continuation of course A. The laboratory work consists of a free clinic. The students observe methods of diagnosis and treatment of both medical and surgical cases.

Vocational students; second semester; 2 credits; 1 lecture; 1 laboratory period.

Fee: $0.50.

*Not less than five credits each semester must be taken in the Major department. Other subjects must be elected with the approval of the head of the department in which the Major is taken.

C. **Diseases of Domestic Animals.** A practical course given to Animal Husbandry students who are taking the vocational course. The laboratory work consists of a free clinic, which provides an abundance of animals for treatment.

Vocational students; second-semester; 2 credits; 1 lecture; 1 laboratory period.

Fee: $0.50. Text: P. B. Hadley: The Horse in Health and Disease.

1. **Comparative Anatomy.** Anatomy is taught in the most practical manner possible. Special attention is paid to the digestive systems of the horse and cow; to the foot, the muscles of locomotion, and the teeth of the horse. The laboratory work includes complete dissection of the digestive, urinary, genital, and respiratory systems, and partial dissection of the circulatory, muscular, and nervous systems.

Prerequisites: Zoology 108, 109. Chemistry 500, 501.

Junior year; first semester; 3 credits; 1 recitation; 2 laboratory periods.

2. **Comparative Physiology.** The study of the functions of the body. Special attention is paid to the digestive system. The physiological processes of all the domestic animals are studied, with special emphasis on the horse and cow. The laboratory work consists of practical experiments which are correlated with the lectures.

Prerequisite: Veterinary Medicine 1.

Junior year; second semester; 3 credits; 2 lectures; 1 laboratory period.

Fee: $1.00.

3. **Diseases of Live Stock.** The parasitic, infectious, and noninfectious diseases of domestic animals are considered in this course. Special attention is given to the prevention and control of parasitic and infectious diseases. The laboratory work consists of a free clinic, which provides an abundance of both medical and surgical work. The students assist in handling and diagnosing the medical cases, and in operating on the surgical cases. They also observe the results of treatment of all animals in the hospital.

Prerequisites: Veterinary Medicine 1 and 2.

Senior year; first semester; 3 credits; 2 lectures; 1 laboratory period.

Fee: $0.50.

4. **Diseases of Live Stock.** A continuation of course 3.

Senior year; second semester; 3 credits; 2 lectures; 1 laboratory period.

Fee: $0.50.

5. **Veterinary Histology.** The histology of the domestic animals.

Elective; junior or senior year; first semester; credits to be arranged.

6. **Veterinary Histology.** A continuation of course 5.

Elective; junior or senior year; second semester; credits to be arranged.

Fee: $1.00.

11. **Anatomy of the Fowl.** A study of the structure of the body of the fowl. The laboratory work consists principally of dissection.

Fee: $0.50.

12. **Poultry Diseases.** The parasitic, infectious, and non-infectious diseases are considered. Special emphasis is placed upon methods of prevention and control of parasitic and infectious diseases. Students observe autopsies, methods of diagnosis, and treatment of fowls.

Junior or senior year; second semester; 2 credits; 1 lecture; 1 laboratory period.

14. **Diseases of Live Stock.** A one-semester course for Agronomy students. The more common diseases, with the methods of prevention and control, are considered. The laboratory work consists of a free clinic, which provides an abundance of animals for both surgical and medical treatment.

Prerequisites: Zoology 108, 109. Chemistry 500, 501.

Junior or senior year; second semester; 3 credits; 2 lectures; 1 laboratory period.

Fee: $0.50. Text: R. A. Craig: Common Diseases of Farm Animals.

ZOOLOGY

GEORGE FRANCIS SYKES, Professor
ALICE LEORA EDWARDS, Instructor
IRVINE HILL BLAKE, Instructor
ASA CHANDLER, Instructor
HOWARD MARSHALL WIGHT, Instructor

The interests of human life are so intimately bound up in the facts of animal life that today, at least, a general knowledge of

the science of Zoology is considered a personal asset few students can afford to omit from their college course. The instruction in this department, therefore, is designed not only to awaken interest in the study of native birds, insects, and other animals in order to afford a basic knowledge of the structure and functions of the animal body, but particularly to develop the faculty for determining the dynamic value of an animal, or a group of animals, in the solution of the problems of everyday life.

By means of lectures, laboratory work, and field observations, the student becomes familiar with the form and habits of various representatives of the animal kingdom, learning something of the mechanism of living things, of their importance as active forces in nature, and of the biological laws according to which their development is regulated. The work is adapted, so far as possible, to the particular needs of students in Agriculture, Forestry, Pharmacy, and Home Economics.

Opportunity is offered, moreover, to those who desire it, to receive training for teaching zoology, physiology, or nature study in the public schools; for development of the game and food resources of the State; or for the pursuance of studies in the field of research. In connection with the course in Pharmacy, the required work forms a valuable pre-medical course.

Equipment. The laboratories of the department occupy the following rooms on the third floor of Agricultural Hall; offices, physiological laboratory, laboratory for embryology and histology, general laboratory for zoology, lecture room, vault and photographic dark room. The general laboratory is equipped with desks with individual drawers to accommodate 280 students; each desk is provided with compound microscopes, dissecting microscopes, and various minor pieces of apparatus. The physiological laboratory is similarly equipped for 225 students and in addition is provided with an articulated skeleton, a dissectible human skull, a complete Azoux model of the human body, greatly enlarged Azoux models of the brain, eye, ear, and other organs, a set of the celebrated Leukart zoological charts, and a good supply of specimens and dissections for illustrating the work in physiology. The laboratories are provided with high-grade compound and dissecting microscopes, a Minot rotating microtome, paraffin bath, eye piece and stage micrometers, and an abundant supply of minor instruments.

The museum contains, in addition to a beautiful collection of native birds, a small collection of mounted mammals, the Ladd collection of bird skins, a large collection of eggs of native birds, a small collection of fishes and reptiles, a considerable number of marine invertebrates, including a small but beautiful collection of Philippine shells, and numerous specimens of a miscellaneous nature.

COURSE IN ZOOLOGY

For the prescribed group courses for the freshman and sophomore years in the School of Agriculture consult pages 77-79.

	Semester	
Junior Year	1st	2nd
Agricultural Economics (Com. 219)	3	
Drill (Military 5, 6)	1	1
Military Science (Theo. Inst. 1, 2)	1	1
*Electives	12	15
	17	17
Senior Year		
National Government (Com. 320)	3	
State and Municipal Government (Com. 322)		3
*Electives	13	13
	16	16

The following courses are offered:

101. General **Zoology**. A general introduction to advanced courses in the department; designed also for students who, without intending to pursue the subject further, desire a general view of zoological work and its problems; lectures and laboratory work supplemented by collateral reading and field investigation, gives general knowledge of different animal forms; distribution; habits; mechanism and functions of body; introduction to laboratory methods of dissection and experiment; outline of biological theories of selection, adaptation, and evolution. Runs throughout the year.

The courses in Pharmacy, Physical Education, and for Premedical students; freshman year; first semester, 3 credits; 2 lectures; 1 laboratory period of three hours.

Fee: $1.50. Deposit: $1.00.

*Not less than five credits each semester must be taken in the Major department. Other subjects must be elected with the approval of the head of the department in which the Major is taken.

102. General **Zoology**. A continuation of 101.

Prerequisite: Zoology 101.

The courses in Pharmacy, Physical Education, and Pre-medical students; freshman year; second semester; 3 credits; 2 lectures; 1 laboratory period of three hours.

Fee: $1.50. Deposit: $1.00.

103. **Functional Zoology**. A brief course designed to give students in Home Economics some conception of the structure and physiological activities of animals, as a basis for the work in Physiology. The work consists of a general survey of the forms and activities of living organisms, with general reference to the human organism.

The course in Home Economics; freshman year; first or second semester; 3 credits; 2 lectures; 1 laboratory period of three hours. (Not given 1916-17.)

Fee: $1.50. Deposit: $1.00.

104. **Embryology and Histology**. The origin and development of the animal body; the elementary structure of the adult organs and tissues; a study of the chick and pig with reference to other animals and man; practice in micro-technique, killing, fixing, imbedding, sectioning; adapted to the requirements of the general student as well as to those intending to study Veterinary medicine.

Prerequisites: Zoology 101, 102; or 108, 109; or the equivalent.

For students in Agriculture, Pharmacy, Physical Education, and other courses; junior or senior year; first semester; 3 credits; 1 lecture; 2 laboratory periods of three hours each.

Fee: $2.00. Deposit: $3.00.

105. **Embryology and Histology**. A continuation of course 104.

Prerequisite: 104.

For students in Agriculture, Pharmacy, Physical Education, and other courses; junior or senior year; second semester; 3 credits; 1 lecture; 2 laboratory periods of three hours each.

Fee: $2.00. Deposit: $3.00.

106. **Game Propagation**. A laboratory and reading course, supplemented by field work in the propagation of food animals of the field and forest; the breeding and protection of game birds and mammals; methods of conducting game reservations; and a comparative study of game laws.

Elective for students in Agriculture and Forestry; first semester; 1 credit; 1 lecture; 1 laboratory period; hours to be arranged. Offered in 1916.

Fee: $0.25.

107. **Ornithology.** A lecture course and field study of the common birds of Oregon; the course aims to develop an interest in the native birds, their habits, and haunts, with particular reference to their usefulness.

Elective; second semester; 1 credit; 1 lecture; 1 laboratory period; hours to be arranged.

Fee: $0.25.

108. **Principles of Economic Zoology.** Designed for both students in Agriculture and in Forestry; the facts and conditions that render animal life an important factor in the economic problems of life; prefaced by a study of animal forms, distribution, and habits. The physiological functions of the body. Lectures, laboratory work, and collateral reading.

Required of Agricultural and Forestry sophomores; first semester; 3 credits; 2 lectures; 1 laboratory period of three hours.

Fee: $1.50. Deposit: $1.00.

109. **Principles of Economic Zoology.** Continuation of course 108. A dynamic interpretation of life; contact in the field with vital economic problems, agricultural or sylvan. An outline of the different biological theories, natural-selection, adaptation, cultivation; acquaintance with their fundamental principles leading to an insight into the more far-reaching significance of everyday problems.

Prerequisite: 108.

Required of Agricultural and Forestry sophomores; second semester; 3 credits; 2 lectures; 1 laboratory period of three hours.

Fee: $1.50. Deposit: $1.00.

110. **Animal Parasites.** An advanced course for the study of such parasitic forms as flukes, tapeworms, nematodes, fish "lice," cattle ticks, etc., that affect the health of man, and of domestic and food animals; the study will be primarily ecological, the object being to obtain a more exact knowledge of the conditions which produce parasitism, to the end that by intelligent control, diseases and economic losses may be rendered less liable, and preventive measures made productive of more permanent results.

Prerequisites: Zoology 101, 102; or 108, 109; and 104, 105, or the equivalent.

Elective to students in Agriculture, Forestry and Pharmacy, Vet. Bacteriology; junior or senior year; first semester; 2 credits; hours to be arranged.

Fee: $1.00. Deposit: $1.00.

111. **Protozoology.** An advanced course for the study of microscopic animals with a view to their relation, beneficially or injuriously, to man, particular attention being paid to such pathogenic forms as blood spores and enteric parasites, with some reference to soil protozoans and water animalcules.

Prerequisites: Zoology 101, 102; or 108, 109; and 201, 202, or the equivalent.

Elective for students in Agriculture, Pharmacy, Aqiculture, and Bacteriology; second semester; 2 credits; hours to be arranged.

Fee: $1.00. Deposit: $1.00.

112. **Research and Thesis.** Opportunity will be given students who desire to specialize in Zoology and Physiology to take up work not given in the regular courses, or to undertake the investigation of special problems. Work for the master's degree, either as a major or as a minor in this department, may be selected. It is the policy of the department to allow the student to develop his own initiative in the selection of a problem, and in outlining and conducting his investigations, but with the cooperation of the head, or other member, of the department.

Elective for seniors and graduates; first semester; credits to be arranged.

113. **Research and Thesis.** A continuation of course 112.

Elective for seniors and graduates; credits to be arranged.

Deposit: $3.00.

114. **Aquiculture.** Lecture, laboratory, and field course dealing with the problems and methods of sea-farming and fish culture; the hatching and rearing of fish and other aquatic food animals, the planting and care of oyster and clam beds, and a study of the various methods of production and preparation for market.

Elective for Agriculture and Forestry students; first semester; 3 credits; hours to be arranged.

Fee: $1.50. Deposit: $1.00.

115. **Aquiculture.** A continuation of 114.

Elective for Agricultural and Forestry students; second semester; 3 credits; hours to be arranged.

Fee: $1.50. Deposit: $1.00.

116. **Taxidermy and Zoological Collecting.** Lecture, laboratory, and field course in the methods involved in the preparation of skins, the preservation of museum specimens, and a study and practice of the methods involved in field survey work.

Elective for Agriculture and Forestry students; second semester; credits to be determined; hours to be arranged.

Fee: $1.50. Deposit: $1.00.

120. **Genetics.** A lecture course dealing with the general principles of heredity, and the factors involved in variation and inheritance; the fundamental principles of breeding. The course will be prefaced by lectures on the phenomena of reproduction; and will be followed by an explanation of the mechanism of heredity, involving a discussion of problems of inheritance of acquired characters, segregation, dominance, and sex determination, with respect to their application both to the human and to the domestic forms. Experimental problems may be outlined for practical investigation for those who may desire to carry on such work.

Elective for juniors in Agriculture and others; first semester; 3 credits; 3 lectures; 1 laboratory period of 1 hour.

Fee: $0.25.

201. **Physiology and Anatomy.** Intended not only for the general student, but also for students particularly interested in this branch of Zoology, and for those who expect to study medicine; a study of the structure, significance, and function of the human body, with reference to the animal body in general; the laboratory course includes some work upon the gross anatomy and the histology of the various tissues and organs of a typical mammal; also includes experiments and demonstrations with foods, the study of blood, nerve, muscle, reactions, etc.

Prerequisites: Zoology 101, 102, or the equivalent.

Physical Education freshmen, Pharmacy sophomores; elective for other students; first semester; 3 credits; 2 lectures; 1 laboratory period of three hours.

Fee: $1.50. Deposit: $1.00.

202. **Physiology and Anatomy.** A continuation of course 201.

Prerequisites: Zoology 101, 102, 201.

Pharmacy sophomores; elective for other students; second semester; 3 credits; 2 lectures; 1 laboratory period of three hours.

204. **Physiology and Hygiene.** A general course designed primarily to give Commerce students a practical knowledge of the functions and care of the human body in every-day life. The laboratory will be of such nature as to furnish demonstrations of the physiological principles.

Elective to Commerce in conjunction with Bacteriology 101; second semester; 3 credits; 2 lectures; 1 laboratory period of three hours.

Fee: $1.50. Deposit: $1.00.

205. **Nutritional Physiology.** An advanced course dealing particularly with the process of digestion, absorption, nutrition, secretion and excretion.

Prerequisites: 207, 208; or the equivalent.

Elective for students in Home Economics; senior year; second semester; 3 credits; 2 lectures; 1 laboratory period of three hours.

Deposit: $3.00.

207. **General Physiology.** The object of this course is to give to the Home Economics student the knowledge of life processes and anatomical relationships which will be most useful in maintaing the highest efficiency of the human mechanism; the chief functions of the human body and the laws of health falling naturally within the province of the physiologist, including such experimental, histological, and anatomical work as will best serve the object of the course.

Home Economics; junior year; first semester; 3 credits; 2 lectures; 1 laboratory period of three hours.

Fee: $1.50. Deposit: $1.00.

208. **General Physiology.** A continuation of 207.

Home Economics; junior year; second semester; 3 credits; 2 lectures; 1 laboratory period of three hours.

Fee: $1.50. Deposit: $1.00.

209. **Neuro-Physiology.** An advanced course dealing with the special processes and anatomical relationships of the nervous system; an examination of the physiological bases of mental states; experimentation in neuro-muscular reactions; studies in animal behavior.

Prerequisites: 100, 102, 201, 202, or the equivalent.

Elective; Pharmacy and other students; first semester; 2 credits; 1 lecture; 1 laboratory period of three hours.

Deposit: $3.00.

211. **Elementary Physiology.** For the women of the Home-makers' course; an elementary study of the process and organs of digestion, circulation, excretion, reproduction, etc. The physiological basis of the laws of hygiene.

Required of women in the Home-makers' course; first semester; 3 credits; 2 lectures; 1 laboratory period of three hours.

Fee: $1.50. Deposit: $1.00.

THE SCHOOL OF COMMERCE

JOHN ANDREW BEXELL, Dean

The School of Commerce offers two distinct courses of study; namely, (1) a four-years course leading to the degree of Bachelor of Science in Commerce; (2) a two-years vocational course leading to a Certificate of Business Proficiency. The practical side of every subject is especially emphasized, the constant aim being to train the student for service and efficiency.

The Vocational Course. This course has been arranged primarily for the benefit of persons who have been unable to finish a high-school course. The only entrance requirements are that the applicant must have had an eighth-grade education, or its equivalent, and must be at least eighteen years of age. The student may emphasize bookkeeping and business methods, or stenography and typewriting; or he may have an opportunity to take both courses.

The Degree Course. In the degree course all freshmen follow the same schedule; in the sophomore year, however, the student may choose as a major either accounting or secretarial studies, the latter including stenography and office practice. In the junior year, the student may further select a major course from one of the following: (1) Business Administration, (2) Economics, (3) Political Science and History, (4) Secretarial Studies. Instead of the above options, a liberal range of general electives is offered, so that in the junior or senior year the men may elect courses in Agriculture, Forestry, or Industrial Arts, while the women may elect courses in Home Economics.

Departments. For administrative purposes, the School of Commerce is organized into four distinct departments: (1) Business Administration, (2) Economics, (3) Political Science, and (4) Stenography and Office Training.

REQUIREMENTS FOR GRADUATION IN SCHOOL OF COMMERCE

For graduation in the school of Commerce a total of 136 college credits must be completed. It is expected that the suggested schedule as listed elsewhere for this school will be closely followed. Before graduation a student must complete credits as indicated in the following groups:

General group at least 22 credits.
Natural Science group at least 6 credits.
Commerce group at least 66 credits.
Mathematics group at least 3 credits.
Gymnasium 2 credits.
Military Science 2 credits.
Military Drill 6 credits.
Free Electives 29 credits.

VOCATIONAL COURSE IN COMMERCE

	Semester 1st	2nd
First Year.		
Vocational English (Eng. G, H)	3	3
U. S. History (Hist. D)	3	
Civics (Com. N)		3
Stenography (Com. 400, 401) or	4	4
Office Training and Typewriting (Com. 410, 411, S)	(2)	(2)
Penmanship (Com. U, V)	(2)	(2)
Commercial Arithmetic (Math. M. N)	3	3
Bookkeeping (Com. B. C)	3	3
Gymnasium (Phys. Ed. 11, 12)	½	½
Drill (Military A, B)	1	1
	17½	17½
Second Year.		
Advanced Vocational English (Eng. I, J) or	3	3
Stenography (Com. 402, 403)	(4)	(4)
Business English (Eng. M, N)	3	3
Accounting (Com. 100, 101)	3	4
Elementary Commercial Geography (Com. H)	2	
Elementary Industrial History (Com. K)		2
Commercial Law (Com. L)	3	
Elementary Industrial Problems (Com. J)		3
Penmanship (Com. W. X)	1	1
Gymnasium (Phys. Ed. 13, 14)	½	½
Drill (Military C, D)	1	1
	16½	17½

First Year, Second Semester Registration.	Semester 1st	2nd
Vocational English (Eng. H)		3
Bookkeeping (Com. B)		3
History of Commerce (Com. 205)		3
Civics (Com. N)		3
Penmanship (Com. V)		2
Typewriting (Com. 411) or		(4)
Stenography (Com. 400)		(4)
Gymnasium (Phys. Ed. 12)		½
Drill (Military B)		1
		17½

DEGREE COURSE IN COMMERCE

Freshman Year.

Accounting (Com. 100, 101)	3	4
Stenography (Com. 400, 401)*	4	4
Business English (Eng. 143) or Modern Language	3	
Technical Business English (Eng. 144)		3
Commercial Geography (Com. 200)	3	
History of Commerce (Com. 205)		3
Advanced Commercial Arthmetic (Math. 10)	3	
Contemporary American History (Hist. 62)		3
Library Practice (Lib. 1)	½	
Hygiene (Ph. Ed. 10)	½	
Gymnasium (Phys. Ed. 15, 16)	½	½
Drill (Military 3, 4)	1	1
	18½	18½

Sophomore Year.

Modern English Prose (Eng. 81, 82) or French, German or Spanish	3	3
Economic History of The United States (Com. 206)	3	
Principles of Economics (Com. 210)		3
Advanced Commercial Law (Com. 300, 301)	3	3
Accounting (Com. 102, 103) or Stenography (Com. 402, 403)	4	4
Modern European History (Hist. 40)		3
History of Oregon (Hist. 70)	3	
Gymnasium (Phys. Ed. 17, 18)	½	½
Drill (Military 3, 4)	1	1
	17½	17½

*Or Science, See requirements for Graduation.

Junior Year.*	Semester 1st	2nd
Money and Banking (Com. 230)	3	
National Government (Com. 320)	3	
State and Municipal Government (Com. 322)		3
Business Organization and Management (Com. 110)	3	
Advertising and Selling (Com. 112)		3
Drill (Military 5, 6)	1	1
Military Science (Theo. Inst. 1, 2)	1	1
Practical Sociology (Com. 250)		3
Free Electives (6-3) (See groups)	6	6
	17	17

Senior Year*		
Public Finance (Com. 233)	3	
Transportation (Com. 240)		3
Comparative Study of Governments (Com. 325)		3
International Relations (Com. 302)	3	
Free Electives (10-10) (See groups)	10	10
	16	16

Freshman Year, Second Semester Registration.		
Accounting (Com. 100)		3
Modern English Prose (Eng. 82)		3
Advanced Business English (Eng. 143)		3
Principles of Economics (Com. 210)		3
History of Commerce (Com. 205)		3
Typewriting (Com. 411) or		2
Stenography (Com. 400)		(4)
Gymnasium (Phys. Ed. 16)		½
Drill (Military 4)		1
		18½

Note: Six credits in sciences are required for graduation. The following are recommended: Chemistry 100, 101, Physics 1, 2, Bact. 101, Zoology 204, or Botany 20.

*On recommendation of the professor in charge of the major course, the junior and senior schedules may be modified to suit the individual student, provided, that the entire course shall contain not less than 66 nor more than 75 credits in professional subjects, and not less than 39, nor more than 61 credits in non-professional subjects.

SUGGESTED ELECTIVE GROUPS

While the student may choose other subjects than those enumerated below, he is strongly urged to adopt one of the suggested groups.

Group 1. Business Administration.	Semester	
Junior Year.	1st	2nd
Commercial Pharmacy (Phar. 160)	3	
Labor Problems (Com. 213)		3
Practical Public Speaking (Eng. 105, 106)	3	3
	6	6
Senior Year.		
Accountancy Problems (Com. 105)	3	
Public Accounting and Auditing (Com. 106)		3
General Psychology (Ind. Ed. 101)	3	
History of Education (Ind. Ed. 120)		3
Economic Organization of Agriculture (Com. 264)	3	
Insurance (Com. 235)		3
Business Lecture and Reading Course (Com. 140, 141)	1	1
	10	10

Group 2. Economics and Sociology.		
Junior Year.		
American Literature (Eng. 71, 72) or Modern Language	3	3
Cooperation (Com. 260)		3
Science	3	
	6	6
Senior Year.		
Accountancy Problems (Com. 105)	3	
Public Accounting and Auditing (Com. 106)		3
Insurance (Com. 235)		3
Practical Public Speaking (Eng. 105)	3	
General Psychology (Ind. Educ. 101)	3	
History of Education (Ind. Educ. 120)		3
Lecture and Reading Course (Com. 140, 141)	1	1
	10	10

Group 3. Political Science.	Semester	
Junior Year.	1st	2nd
History of English Literature (Eng. 61, 62)	3	3
Economic Organization of Agriculture (Com. 264)	3	
Insurance (Com. 235)		3
	6	6
Senior Year.		
Advanced American Government (Com. 304)	3	
Practical Legislation (Com. 328)		3
History of the British Empire (Hist. 52)	3	
American Diplomatic History (Hist. 80)		3
Accountancy Problems (Com. 105)	3	
Public Accounting and Auditing (Com. 106)		3
Lecture and Reading Course (Com. 140, 141)	1	1
	10	10

Group 4. Teachers' Course.		
Junior Year.		
General Psychology (Ind. Ed. 101)	3	
Educational Psychology (Ind. Ed. 102)		2
Principles of Education (Ind. Ed. 131)	3	
History of Education (Ind. Ed. 120)		3
Lecture and Reading Course (Com. 141)		1
	6	6
Senior Year.		
Special Methods (Ind. Ed. 180, 181)	2	2
Business Organization and Management (Com. 110	3	
Labor Problems (Com. 213)		3
Approved Electives	5	5
	10	10

Group 5. Agriculture.	Semester	
Junior Year.	1st	2nd
Soils (Agron. 101)	3	
Crops (Agron. 201)		3
Approved Electives	3	3
	6	6
Senior Year.		
Stock Judging (An. Hus. 1)	2	
Live Stock Management (An. Hus. 2)		3
Plant Propagation (Hort. 105)		2
Orchard and Garden Practice (Hort. 103)	2	
Approved Electives	6	5
	10	10

Group 6. Home Economics.		
Junior Year.		
Food Preparation (D. S. 101)	3	
Food Preparation (D. S. 102)		3
Approved Electives	3	3
	6	6
Senior Year.		
Dressmaking (D. A. 201)	3	
Dressmaking (D. A. 202)		3
Approved Electives	7	7
	10	10

Note.—If the student has not already six college credits in Science he should register according to Note concerning requirement for graduation page 178, in the Junior or Senior year.

COURSE IN FARM BUSINESS AND RURAL LEADERSHIP.

	Semester 1st	2nd
Junior Year.		
Economic History of the U. S. (Com. 206)	3	
Rural Finance (Com. 265)		3
National Government (Com. 320)	3	
State and Municipal Government (Com. 322)		3
Genetics (Zool. 120)	3	
Practical Sociology (Com. 250)		3
Cooperative Accounting and Management (Com. 130)	3	
Dairy Herd Management (D. H. 40)		3
Soil Fertility (Agron. 107)	3	
Feeds and Feeding (A. H. 23)		3
Drill (Military 5, 6)	1	1
Military Science (Theo. Inst. 1, 2)	1	1
	17	17
Senior Year.		
Public Finance (Com. 233)	3	
Comparative Governments (Com. 325)		3
Economic Organization of Agriculture (Com. 264)	3	
Rural Sociology (Com. 252)		3
Literature and Exposition of the Rural Life (Com. 255)	3	
Farm Management (Agron. 505)		3
Forage Crops (Agron. 203)	2	
Elementary Laboratory Bacteriology (Bact. 102)		2
Practical Pomology (Hort. 102)	2	
Approved Electives	3	5
	16	16

BUSINESS ADMINISTRATION

JOHN ANDREW BEXELL, Professor
JOHN B. HORNER, Professor of History
ERWIN BERTRAM LEMON, Instructor
RUSSEL MARION HOWARD, Instructor

The distinctive work of the department of Business Administration in the School of Commerce is to train men and women for efficient business management. This includes thorough courses in

the various phases of Accounting, Auditing, Business Organization, Scientific Management, Advertising, and Salesmanship.

While the courses in Business Administration are primarily designed to fit students for the countinghouse and business office, including banking, it is found that such positions are generally only stepping stones to more advanced positions of trust and responsibility. A large percentage of the commercial students eventually engage in business of their own.

The School of Commerce has taken a leading part in developing courses in business methods especially adapted to the farm, the home, and cooperative enterprises. Such courses are given not only in residence but also by correspondence.

When it is remembered that every vocation has its business side, and that this phase of all pursuits is receiving increasing attention, it is apparent that the avenues of employment and the chances for promotion by the really competent business expert are almost unlimited. As a preparation for law or public accounting, this course, combined with economics and political science, is especially attractive. A large proportion of the graduates in commerce find employment as teachers of commercial subjects in state and private schools; to them the courses in business administration are very important.

Equipment. The Department of Business Administration occupies the top floor of the east wing of Agricultural Hall. It is completely equipped for thorough and efficient work in modern business courses. Each room is specially designed and furnished for the work to be conducted in it. The furniture of the department consists of individual desks and counters, a complete set of modern banking fixtures, a wholesale house, a retail house, a commission house, freight, real estate, and insurance offices. Permanent blank books, letter files, rubber stamps, copying presses, college currency, blanks and similar material are provided by the College. A Burroughs Adding Machine is in constant use in the department. The room for typewriting contains twenty standard machines, each provided with approved conveniences for the operator. The room for stenography is furnished with tables designed for conveniences in practical work, as well as in equipment for illustrating various systems of filing.

COURSES IN BUSINESS ADMINISTRATION

For outline of courses in Business Admini tration consult pages 177-179.

The following courses are offered:

B. Bookkeeping. The aim of this course is to give the student a thorough foundation in the fundamental principles of bookkeeping. The theory of debit and credit, modern books of original entry, closing a set of books, statements, promissory notes, interest and discount, drafts, bills of lading, and other legal forms receive much attention. The subjects of partnership, shipments, and consignments are also introduced. Every phase of the work is illustrated by means of a large number of practical problems secured from various sources.

Vocational Course; first year; either semester; 1 recitation; 4 Laboratory periods.

Fee: $1.00. Text: MacFarland & Rossheim: A first year in Bookkeeping and Accounting.

Prerequisite: Course B.

C. Bookkeeping. Continuation of Course B. Elementary problems of how to handle depreciation, reserves, and accruals; the preparation, analyzing, and checking of balance sheets and financial statements; the distinction between capital and revenue; the use of controlling accounts and columnar books is carefully treated. Throughout the entire course, the work is supplemented by a large number of practical problems illustrating the various subjects treated.

Vocational Course; first year; second semester; 3 credits; 1 recitation; 4 laboratory periods.

Fee, $100; text: same as course B.

D. Dairy Accounting. The same general course as E, except that in the last third of the course special attention will be given to the development of a system of accounts suited to the dairy business.

Dairy Vocational Course; second semester; 3 credits; 2 recitations; 1 laboratory period.

Texts: Bexell & Nichols: Principles of Bookkeeping and Farm Accounts. I. C. S.: Cost Accounting. Robinson: Organizing a Business.

E. Farm Accounting and Business Methods. (a) Bookkeeping: Students who are not acquainted with the elements of double-entry

bookkeeping will be required to work out several practice sets and master the theory of accounts before taking up farm accounting. (b) **Business Methods**: A thorough course in the essentials of business methods required on a well-managed farm. Financial accounts and statements, cost accounts and special records, business methods, business organization, business correspondence and forms; household and personal accounts.

This course may also be taken by correspondence.

Agriculture; Vocational Course; second semester; 3 credits; 4 recitations.

Texts: Bexell & Nichols: Principles of Bookkeeping and Farm Accounts. Robinson: Organizing a Business.

F. Shop Accounting. A course in the theory and practice of accounting especially adapted to the shop and factory. Sufficient time is devoted to the fundamental principles of bookkeeping to familiarize the student with the use of special columns and various labor-saving devices. A special set of books adapted to the shop is then studied and prepared, making the course exceptionally practical. Besides the course in the technique of bookkeeping, considerable time is devoted to the phases of business management, such as advertising, selling and buying.

Mechanic Arts; third year; second semester; 2 credits; 2 recitations.

Text:

U. Penmanship. Students entering the first year are expected to have acquired a good hand in the grades, but considerable time is devoted during the first year to mastering the best form of business writing and lettering.

Vocational Course; first year; either semester; 2 credits; 2 recitations.

V. Penmanship. A continuation of Course U.

Vocational Course; first year; second semester; 2 credits; 2 recitations.

W. Advanced Penmanship. Special emphasis is laid on rapid business writing, correct forms of business papers, lettering, and designing.

Vocational Course; second year; first semester; 1 credit; 1 recitation.

X. Advanced Penmanship. A continuation of Course W.

Second semester; 1 credit; 1 recitation.

100. **Principles of Accounting.** Modern accounting as practiced in the best business establishments of the country, forms the basis of the course. The use of special columns, controlling accounts, and their adaptations, is carefully studied. Labor saving devices of all kinds are studied with a constant view to secure greater accuracy and to diminish work. A great deal of practice in retail, wholesale, and commission accounting, and the preparation and interpretation of financial statements is required. In connection with partnership accounts, a careful study is made of opening closing entries; adjustment of profits and losses; consolidation of firms; changing from partnership to single proprietorship and vice versa. The practical side of every phase of the course is emphasized by various sets of books which the student prepares under the supervision of the instructor.

Prerequisite: Course C or equivalent.

Commerce; *Freshman year; Vocational Course, second year; either semester; 3 credits; 1 recitation; 4 laboratory periods.

Fee: $1.00; Text: Miner: Complete Bookkeeping.

101. **Practical Accounting.** (a) **Corporation Accounts:** A presentation of the theory of manufacturing bookkeeping and the preparation of a set of books illustrating corporation bookkeeping as applied to manufacturing business. (b) **Principles of Cost Accounting:** A careful study of the element of cost entering into the finished product, the various methods of finding cost and its proper distribution. (c) **Short Accounting Systems:** A further study of the use of special column books and filing devices, with reference to the saving of time and labor in bookkeeping, as applied to modern business houses. The practical work also consists of the preparation of sets of books illustrating the principles involved.

Commerce; Freshman year; Vocational Course; second year; either semester; 4 credits; 1 recitation; 5 laboratory periods.

Prerequisite Course 100 or equivalent.

Fee: $1.00. Text: A large number of practical problems and exercises selected from various sources.

102. **Accounting and Business Practice.** (a) **Bank Accounting.** A thorough course in modern bank accounting and business

*Freshmen who have not had Course C or equivalent, desiring to enter this course, may do so by registering for Course 107 and carrying both courses simultaneously.

practice. The organization of private, state, and national banks, trust companies, and other financial institutions. (b) **Business Practice.** The business practice course is designed to supplement all the theoretical courses and to develop initiative and originality. The offices are thoroughly equipped with modern labor-saving appliances, such as filing devices, loose-leaf books, adding machines, duplicating devices, etc.

Prerequisite: Course 101.

Commerce; sophomore year; first semester; 4 credits; 2 recitations; 2 laboratory periods.

Fee: $1.00. Texts: Miner: Banking Set. Klein: Elements of Accounting.

103. **Accounting and Business Practice.** This course covers the broader economic phases of accounting. Emphasis is laid on accounts as a means of administrative control and economy of production. (a) **Factory Costs**: A system of accounts and records especially adapted to a manufacturing business with a considerable pay-roll. (b) **Farm Costs Accounts**: A system of cost accounts adapted to the farm or any productive enterprise. (c) **Business Practice**: A continuation of Course 102.

Prerequisite: Course 102.

Commerce; sophomore year; second semester; 4 credits; 2 recitations; 2 laboratory periods.

Fee: $1.00. Text: Heitman: Higher Accounting; Guide to the Study of Auditing. Cole: Accounts: Their Construction and Interpretation.

105. **Accounting Problems.** In the efficient administration of a business of some magnitude, the accounting department is of first importance. In it, difficult problems arise, which require not only accounting skill, but judgment and executive ability. This course covers a large variety of practical problems viewed from the standpoint of the manager rather than the accountant. The matrial is drawn from certified public accountancy examinations and other sources. The student does not follow any prescribed form of treatment or solution, but is expected to develop analytical initiative, resourcefulness, and originality.

Prerequisite: Course 103.

Elective; senior year; first semester; 3 credits; 2 recitations; 2 laboratory periods.

Text: Greendlinger: Accounting Problems; select C. P. A. Problems.

106. Public Accounting and Auditing. (a) **Public Accounting.** This course embraces a study of accountancy as a vocation; the C. P. A. laws of the various states are studied and compared; an analysis and interpretation of accounts and financial statements; terminology and precedure in public systems form an important part of this course. (b) **Auditing:** The duties and responsibili y of the auditor; his function in the executive staff; his relation to the accounting department; different classes of audits; investigation in the conduct of utility corporations, municipalities, and public institutions. Typical audits will be studied and compared.

Prerequisite: Course 105.

Elective; senior year; second semester; 3 credits; 3 recitations; 1 laboratory period.

Text: Montgomery: Auditing in Principle and Practice.

107. **Bookkeeping.** A thorough but rapid study of the general principles of bookkeeping. The aid of this course is twofold; first, to prepare the student for the study of an advanced set of books adapted to his particular vocation; second, to afford those students entering the Degree Course in Commerce who have not had a year of bookkeeping an opportunity to secure additional instruction which will enable them to carry Course 100. In the latter case, the student should register for both Course 107 and Course 100.

Commerce and Elective; freshman year; first semester; 3 credits; 5 recitations.

Fee: $1.00. Text: Miner: Complete Bookkeeping.

108. **Special Accounting.** In this course the student is given an opportunity to apply the principles of accounting to his special needs, the course being designed primarily for engineering students. Cost accounting, and corporation accounts and statements receive special attention.

Prerequisite: Course 107 or equivalent.

Electrical Engineering Course (elective to others); freshman year; second semester; 1 recitation; 2 laboratory periods.

109. Farm Accounting and Business Methods. (a) **Farm Accounting.** This part of the course consists of a thorough discussion of a system of accounts suited to the farm. Cost accounting is especially emphasized, with a view to determining the results of different enterprises. A knowledge of the principles of bookkeeping is required before entering upon cost accounting. Students who are not thus prepared will be required to devote extra

time to make up the deficiency. (b) **Business Methods**: The economics of business receive special attention in this part of the course. The farmer is becoming a factor in commerce and finance to be reckoned with. He often engages in business adventures outside of farming; if he aspires to success, he must observe the same rules of business as a manufacturer, merchant, or banker. Business organization, principles of business management; labor efficiency; buying and selling; advertising and correct office methods receive special attention.

Agriculture; sophomore year; first semester; 2 credits; 2 recitations.

Texts: Bexell & Nichols: Principles of Bookkeeping and Farm Accounts. Robinson: Organizing a Business.

110. **Business Organization and Management.** (a) **Business Organization**: General nature of business organization; evolution and forms; structure and life-history of typical corporations; the corporation and trust problem; public utility corporations; reorganization and receivership; blue sky laws and state c\ntr.l. (b) **Parliamentary Practice**: A brief discussion of parliamentary practice and procedure as applied to corporate business. (c) **Business Management**: This part of the course emphasizes internal organization for the purpose of securing efficiency; d partmental organization and coordination; various systems of scientific management are studied and compared.

Commerce; junior year; first semester; 3 credits; 3 recitations.

Text: Haney: Business Organization. Gowin: The Executive and His Control of Men.

111. **Thesis.** A research course and treatise on the organization and management of a business in which the student is especially interested. The subject of the thesis must be chosen at the time of registration, and a complete outline approved by the professor in charge not later than November 1. When the thesis is approved, a bound (either printed or typewritten) copy must be deposited in the College library.

Prerequisite: All College courses in Business Administration.

Open only to seniors; both semesters; 1 credit each semester.

112. **Purchasing and Selling.** (a) **Purchasing**: principles of purchasing; relations of buying to successful merchandising and

manufacturing; ethics of buying; the purchasing organization; records of purchasing; stores, their function and operation; markets; agents; brokers; jobbers; wholesalers; transportation; reports and statistics. **(b) Advertising**: A study of the fundamental principles of modern advertising. Special emphasis is given to the peculiarities of composition in newspaper and circular advertising, proofreading, effectiveness of design, illustration and display, follow-up systems, etc. **(c) General Principles of Salesmanship**: Business ethics; wholesaling and retailing; brokerage and commission; specialty selling; the sale of service; planning a selling campaign; special sales; prices; correct buying.

Commerce; junior year; second semester; 3 credits; 3 recitations.

Texts: Twyford: Purchasing. Neystrom: Retail Selling.

120. **Household Accounts.** A course dealing with the business side of the household. The family income and its distribution; the planning of the annual budget; a simple but complete system of household accounts based on the budget; private accounts as a basis for encouraging thrift among members of the family; bank accounts and their relation to household finance; savings and how they grow.

Home Economics; sophomore year; first semester; 1 credit; 1 recitation.

122. **Business Management for Women.** The aim of this course is to treat in a practical way the ordinary rules and methods of conducting business affairs. Two distinct phases are emphasized as follows: **(a) Finance**: Value of money, how savings grow, banking and credit, general principles of investment, loan associations, bonds, stocks, and insurance. **(b) Fundamentals of Business Law**: The principles of the law of contracts, of negotiable paper, mortgages, real property, and wills.

Home Economics; elective to juniors and seniors; second semester; 2 recitations.

Text: Cromwell: American Business Woman.

(Will not be given in 1916-17.)

124. **Pharmacy Accounting.** A course in the theory and practice of accounting, especially adapted to the drug business. Sufficient time is devoted to the fundamental principles of bookkeeping to familiarize the student with the use of special columns and various labor-saving devices. A special set of books adapted

to the average drug establishment is then prepared, making the course exceptionally practical. Besides the course in the technique of bookkeeping, considerable time is devoted to other phases of business management, such as advertising, selling, and buying.

Pharmacy; elective; second semester; 2 credits; 2 recitations.

130. Accounting and Management of Cooperative Enterprises. This course covers the business management of cooperative societies. It includes such subjects as the organization of the employees; structure of buildings; office arrangement and equipment; correspondence and filing; bookkeeping and cost accounting especially adapted to different types of cooperative associations in the United States, such as creamery associations, cow-testing associations; auditing, banking, and finance; purchasing, advertising, selling; depreciation of assets; conduct of membership meetings; annual reports and audits; statistical analysis of operations. The course is based on the system published by the Cooperative Union Ltd. of England, adapted to American conditions.

Farm Management; senior year; first semester; 3 credits; 2 recitations; 1 laboratory period.

Text: Wood: The Cooperative Secretary. U. S. Bureau of Markets Bulletins.

140. Business Men's Lectures and Reading. (a) **Lectures.** A series of lectures on practical business subjects will be given during the year by prominent business men of the State. Following is a tentative list of subjects during the present year: Present Problems in Finance; Organization of a Bank; Organization of a Railroad; Organization of a Department Store; Advertising and Selling; Buying Merchandise; The Fishing Industry of Oregon; The Lumber Industry of Oregon; The Business Side of Farming; Commercial Expansion of the United States; Duties and Responsibilities of the Bank Cashier; Education for Business; Business Opportunities in Oregon. Various topics in Business Law and Insurance will be discussed by specialists. (b) **Reading.** An assignment of reading will be made at the beginning of the semester covering such phases of the lectures as are best suited to the needs of individual students.

This course is open to all students of the College. To obtain credit complete notes must be submitted on the lectures and assigned readings, and an examination taken on the course. One

lecture a week. First semester, one credit. Assistant Professor Maxey in charge.

141. Business Men's Lectures and Reading. A continuation of course 140. Second semester, one credit. One lecture a week. Assistant Professor Maxey in charge.

150. Forestry Accounting. (a) A brief, intensive study of the fundamental principles of double-entry accounting. The theory of debit and credit, labor-saving features, controlling accounts and their adaptations. The purpose of this course is to give the student the necessary foundation for the second part of the course, which deals with the lumber industry.

(b) This part of the course will consider especially those systems of accounts, forms, and records, which are adapted to the lumber industries. Cost accounting and statements receive especial attention. It is not intended to make of the student a professional accountant, but rather to teach him accounting as a means of control and the proper methods of analyzing the different operations connected with the business.

Logging Engineering; freshman year; elective second semester; three credits; 2 recitations; one laboratory period.

ECONOMICS AND SOCIOLOGY

HECTOR MACPHERSON, Professor
ELMER JAY BROWN, Associate Professor
NEWELL ROWLAND COMISH, Instructor
RUSSELL MARION HOWARD, Instructor
GUILFORD LANSING HURD, Instructor

The work of this department of the School of Commerce s rves a three-fold purpose:

(1) The training of men and women for citizenship. Every citizen has business relations requiring a knowledge of the fundamental principles of political economy. Then, too, the necessity of such knowledge is especially felt in a democracy where every man and woman has the right to vote, and is called upon to mold legislation directly. The basis for intelligently exercising this paramount duty of citizenship can only be supplied by a training in economics and sociology, the problems of which form the subject matter of all legislation.

(2) To provide courses supplementary to the various branches of applied science. To the agricultural college belongs the special

task of developing the field of Agricultural Economics and Rural Sociology. It is the aim of this department to provide the necessary training for teachers in these subjects, to prepare specialists for research work in economic and social surveys of rural communities, and to equip those who will make a life work of organizing farmers' associations for the more economical conduct of the business side of farming.

(3) Field Work. The Bureau of Organization and Markets. At its meeting October 9, 1914, the Board of Regents established the Bureau of Organization and Markets for the purpose of assisting farmers in the marketing of their products.

The work of the bureau is, in the first place, investigational. It aims to find out the conditions fundamental to successful marketing, and to place the results of its investigation at the disposal of all who are interested.

In the second place, it is at the service of any group of farmers contemplating the establishment of any sort of business organization. It has worked out model constitutions and by-laws and standardized systems of accounting; it has lists of equipment and can guide the farmers to where such equipment can be most cheaply obtained. It will also assist organizations in planning the kind of plants necessary to carry on their business.

Equipment. The department has for some years been developing a commercial museum for use in the various courses in economic and social science. The museum has now grown to such an extent that it is a very important factor in making the work of the department practical and successful. The Bureau of Organization and Markets also has a collection of bulletins, pamphlets, lantern slides, and documents illustrating the farmers' marketing and organization movement in all parts of the world.

GRADUATE COURSES IN AGRICULTURAL ECONOMICS AND RURAL SOCIOLOGY

Courses will be outlined leading to the degree of Master of Science in Agricultural Economics and Rural Sociology. It is strongly recommended that students wishing to pursue this work, take the Agricultural course during their first two years in College, and that they follow the work outlined in the course in Farm Business and Rural Leadership on page 182, during their junior and senior years.

Students taking the regular Commercial course, who contemplate studying for a Master's degree in Agricultural Economics and Rural Sociology, should commence with their sophomore year to take certain courses in Agriculture which will be chosen in consultation with the deans of the schools of Agriculture and Commerce.

Our aim is to make the graduate work in this course fit students for County Agriculturists, positions in the U. S. Department of Agriculture, especially in the office of Markets and Rural Organization, teachers in rural High Schools, and for Rural Leadership in general. Students will also be prepared for Civil Service examinations in this general field.

For outline of courses in Economics and Sociology in the School of Commerce consult pages 177 - 179.

The following courses are offered:

ECONOMICS

H. Elementary Commercial Geography. Especially adapted for Vocational students. A general survey will be made of the fundamental conditions affecting industrial and commercial development. This will be followed by a study of the natural resources, industries, products, and commerce of the United States, and each of the principal countries of the world. Emphasis will be laid upon the reasons for the organization of industry. Materials from the Commercial Museum will be used in connection with the course.

Vocational Mechanic Arts, second year; vocational Commerce, second year; first semester; 2 credits; 2 recitations.

I. Business and Social Organizations. A discussion of the principles of better business and better living that should accompany the general improvement in farm methods, which it is the purpose of this school to promote. The general application of the economic laws of consumption, distribution, and production to the business side of farming, and the social and economic results of agricultural organization will be studied by the aid of textbook, lectures, and assigned readings.

Vocational Agriculture; first semester; 3 credits; 3 recitations.

J. Elementary Industrial Problems. Especially designed for Vocational students in Industrial Arts and Commerce. It aims to give them some insight into the economic problems with which they have to deal. A very condensed outline of the principal economic concepts will be followed by the discussion of industrial organization, labor problems, transportation, marketing, taxation, etc.

Vocational Mechanic Arts, third year; vocational Commerce, second year; first semester; 3 credits; 3 recitations.

K. Elementary Industrial History. A general but comprehensive review of the most important phases of the economic development of the United States. It will include a historical study of such topics as tariff, internal improvements, slavery, banking, industrial development, commerce and shipping, immigration and other similar topics, together with a study of present-day problems, as outlined in the press.

Vocational Mechanic Arts, second year; vocational Commerce, second year; first semester; 2 credits; 2 recitations.

200. Commercial Geography. The fundamental conditions underlying all industry and all commerce are taken up in detail. First of all basic elements as climate and topography are investigated, as they mold transportation and commerce and the production of animal and vegetable products. Then the natural resources of the different countries of the world are treated with especial emphasis upon those of the United States.

Specimens from the Commercial Museum will be used by the students in making reports on the production and manufacture of the principal raw materials and their relation to the development of the countries from which they come. The course presupposes a fair knowledge of physical and political geography and of general history.

Freshman Commerce, freshman Industrial Engineers, sophomore Mechanical Engineers; first semester; 3 credits; 3 recitations.

Text: Smith: Industrial and Commercial Geography.

205. History of Commerce and Industry. The development of commerce from the time of the Phoenicians. The commercial achievements of some of the early nations. The industrial development of Great Britain, as a basis for the study of the United States, in course 206, including the rise and breaking down of

feudalism, important changes in agriculture, Gill system, rise of the factory system, and its results, the market system, and England's present industrial position.

Freshman year; second semester; 3 credits; 3 recitations.

Texts: DeGibbins: Industry in England. Bland, Brown & Tawney: Select Documents in English Economic History.

206. **Economic History of the United States.** This course follows and develops out of the previous work in Commercial Geography and the History of Commerce. On the basis of a knolwedge of our natural resources and of the previous commercial and economic development of the world, we attempt to outline and interpret the economic progress along many lines which has been made by the United States. The development of agriculture, the growth of manufacturing, the improvement of transportation, the history of labor organization and legislation, the evolution of our monetary and credit systems, changes in the protective tariff, etc., are traced from Colonial times onward.

Prerequisites: Commerce 200, 205.

Sophomore year; first semester; 3 credits; 3 recitations.

Text: Bogart: Economic History of United States. Callender: Economic History of United States.

210. **Principles of Economics.** A general course covering the elementary problems of our industrial and commercial organization, including the nature of wealth, its production and consumption, and the different forms in which it is found; the conditions underlying its success in agriculture and manufacturing; the localization of industry and the relation of raw material to manufacturing; the law of diminishing returns; division of labor and efficiency in production; exchange and distribution and their dependence upon the price-making process, the factors determining prices, wages, interest, and rent; the problems of taxation; public expenditures; protection and free trade; money and banking; labor problems and transportation.

Textbook, lectures, and reports on assigned readings.

Prerequisites: 200 and 206.

Forestry, junior year; first semester; Commerce and Engineers, sophomore year; second semester; 3 credits; 3 recitations.

Text: Ely: Outline of Economics. Brown: Questionnaire and Syllabus.

211. Principles of Economics. A course especially adapted for students in Home Economics. Not open to Commerce students.

Home Economics; junior year; first semester; 2 credits; 3 recitations.

Texts: Ely: Outline of Economics. Brown: Questionnaire and Syllabus.

213. Labor Problems. Begins with a brief historical review of the rise of a labor class. The influence of occupation upon the laborer; and the different types of labor and the problems involved in the occupations represented by the several technical departments of the College, will be studied. Then follows the beginnings of organization; the structure, aims, methods of offence and defence, and achievements of associations of labor. The trade agreement, the strike, the boycott, the lockout, methods of conciliation and arbitration, the application of the injunction in labor disputes, the political activity of labor organizations, employers' liability, legislation, workingmen's insurance, profit sharing and cooperation in relation to labor problems, will be taken up with the aid of a textbook, lecture, and assigned readings. Studies will be made of typical historical and current labor disputes and embodied in term papers and class discussion.

Prerequisite: Commerce 210.

Commerce and Forestry; junior year; second semester; 3 credits; 3 recitations.

Text: Hobson: Work and Wealth. Carleton: History and Problems of Organized Labor.

219. Agricultural Economics. The fundamental principles of production, distribution, and consumption are taken up with especial reference to agriculture. The aim of the course is to acquaint the student with the laws of supply and demand and the influences determining them. A brief history of agricultural production is taken up, showing the growing complexity of the economic problems of taxation, transportation, marketing, etc., as the transition is made from self-sufficing, general farming to localized, commercial agriculture.

Agriculture; junior year; first semester; 3 credits; 2 recitations and one lecture (of sections combined).

230. Money and Banking. (a) **Money**: The nature and functions of money, legal tender, Gresham's law, coinage; the factors affecting prices, and their relation to business conditions; a brief

history of the various forms of paper currency; silver legislation; present problems and conditions.

(b) **Banking**: Procedure in organizing state and national banks; history of banking, including our National Banking System as modified by the Federal Reserve Bank Act of 1913; the functions of banks; the preparation and analysis of bank statements; loans and the granting of credit, securities required; rediscount; duties of the various bank officers; legal principles of banking; the principles underlying foreign exchange; a comparison of our banking system with that of foreign countries.

Prerequisite: Commerce 210.

Commerce; junior year; first semester; 3 credits; 3 recitations.

Text: Holdsworth: Money and Banking.

233. **Public Finance.** An examination will be made of public expenditures, local, state, and national. For this purpose, typical financial budgets and reports will be analyzed. A history of reforms calculated to secure efficiency in these expenditures will be sketched. The various forms of taxes, customs, and fees whereby revenues are raised, will be taken up in detail and their apportionment studied in relation to the budgets previously analyzed. Present systems of land taxation will be studied in the light of proposed reforms. An attempt will be made to give the student some laboratory practice through the study of local systems of assessment and the resulting apportionment of taxes.

Commerce; senior year; first semester; 3 credits; 3 recitations.

Texts: Plehn: Introduction to Public Finance. Bullock: Selected Readings in Public Finance.

235. **Insurance.** A course designed to cover, in a general way, the whole field of insurance. The nature and statistical basis of different kinds of insurance will be first treated. Then the application of the principles discovered to different forms of insurance, such as straight life, endowment, accident, industrial, old age, fire, live stock, hail, etc., will be taken up in detail.

Elective; junior and senior years; second semester; 3 credits; 3 recitations.

240. **Transportation.** The relation of transportation systems to industrial and commercial progress; a brief historical review of the development of systems of transportation; the organization and financing of different systems; the effects of competition in the

railroad business; freight classification, and the making of rates and fares; the necessity of government control, and attempts at regulation by state and federal governments; government ownership in the light of European experience.

Senior year; second semester; 3 credits; 3 recitations.

Texts: Ripley: Railroads; Rates and Regulations. Johnson & Huebner: Railroads; Rates and Traffic.

250. Practical Sociology. In this course, social theory will be subordinated to the study of practical social problems. The different social and political units, such as the family, school, church, club, city, state, and nation will be discussed in their relation to the general welfare. This will necessitate an examination of the organization, purpose, and methods of each of these functional groups, involving a discussion of the training of children, employment of women and children, marriage and divorce; the labor movement as a factor in the struggle for existence; overcrowding in city slums, and its amelioration; the causes of pauperism, immorality, and crime, with modern methods of their treatment, etc. A good general textbook will be studied and the whole field covered in class discussion and assigned readings.

Junior year; second semester; 3 credits; 3 recitations.

Texts: Hayes: Introduction to the Study of Sociology. Carver: Sociology and Social Progress.

251. Practical Sociology. Course 250 especially adapted for students in Home Economics. Not open to students of Commerce. Textbook and lectures.

Home Economics; junior year; second semester; 2 credits; 3 recitations.

Text: Hayes: Introduction to the Study of Sociology. The Survey.

252. Rural Sociology. This course will deal with the special problems of the rural family, the rural school, the rural church, rural societies and associations, and the relation of the State to the general rural welfare. This will involve an inquiry into the prevailing ideals of the rural community regarding labor and leisure; art, literature, and music; and the necessity for recreation. Recent progress in adapting education to rural needs will be discussed. City over-crowding will be examined from the rural point of view, and the lessons which the rural community can learn from the progress made by cities in solving their problems, will

be emphasized. The social and educational effects of the telephone, free mail delivery, rural press, and improved methods of agricultural production and exchange, will be discussed in detail. The best textbooks in the field will be carefully studied, and the whole ground covered in class discussion and assigned readings.

Elective; junior and senior year; second semester; 3 credits; 3 recitations.

254. **National Vitality.** A one-credit course, covering the general field of national vitality, its importance, the conditions underlying it and the means of maintaining such conditions. The economic and social waste due to disease, alcohol, and vice will be treated in a series of lectures by experts from different departments of the College. Outside specialists will also be secured to lecture upon particular phases of the subject. Besides taking notes on the lectures, each student will be required to make an abstract of not less than three hundred pages of assigned readings.

Elective for all students; first semester; 1 credit; 1 recitation.

Note: This course will not be given unless at least fifteen students register for it.

255. **The Literature and Exposition of Rural Life.** A critical study will be made of the general field of literature bearing upon rural life. Typical interpretations of rural life will be taken from the best poetry and prose. The rural press will be studied with a view to estimating its sociological and economic influence. Themes will be prepared upon current economic and sociological topics and the subject matter discussed in the class room to familiarize the student with the problems involved in the Rural Life movement.

Elective; junior and senior year; first semester; 3 credits; 3 recitations.

260. **Cooperation.** This course takes up the origin and development of the cooperative movement in Europe, and its introduction into the United States. It sets forth the general principles underlying the economic and social activities of cooperative associations. Then, following this, the different types of organization, the methods by which they are formed, their working plans in different enterprises, and the factors which determine their success or failure, will be studied in detail. The store, the factory, the dairy and cow-testing association, the credit organization, etc., will be taken up systematically, and the advantages and difficulties of cooperation will in each case receive careful analysis.

Elective to juniors and seniors who cannot take Commerce 264 and 265, and who have had considerable training in Economics. First semester; 3 credits; 3 recitations.

264. The Economic Organization of Agriculture. This course, together with 265, is designed to give a more specialized training in the economic problems of agriculture than is possible in the general course outlined under 219.

In both courses, 264 and 265, economic problems are discussed from the standpoint of the efficiency to be attained through closer organization. Existing associations of farmers both in this country and in Europe will be carefully studied by means of sample constitutions and by-laws, and also by lantern-slide illustrations of the work actually being accomplished through cooperation in Europe and America. The aim is to turn out men trained to play their part in the revolution in agricultural business methods which is now sweeping over this country.

(a) **Economic Problems of Production and Marketing:** Old methods and their weakness are examined, and the possible savings through organized business are investigated.

(b) **The Purchase of Farm Supplies:** The purchasing end of the farm business is about as important as the selling of farm products. Present methods will be taken up in detail, and the possibility of eliminating waste and duplication thoroughly discussed and illustrated.

(c) **The Problems of Transportation as Affecting the Farmer:** The economic significance of the good roads movement will be dealth with; systems of rail and water transportation will be taken up, government control discussed, and the possibility of eliminating waste through precautions on the part of the shippers pointed out.

Open to all who have had 219 or its equivalent; elective for juniors and seniors; first semester; 3 credits; 3 recitations.

265. Rural Finance. (a) **Rural Credit.** The principles of money, credit, and banking will be sufficiently studied to lay the foundation for the examination of the credit needs of the rural communities, and the most economical means of satisfying them. The reasons why farmers have been so poorly served by existing credit institutions will be investigated. The credit institutions of Europe will be compared with those of the United States; the development of cooperative credit in European countries will be

carefully studied, and the present widespread movement to adapt cooperative credit institutions to American rural conditions will be closely followed.

(b) **Rural Insurance.** The basis of insurance of different kinds will be taken up, and applied to agricultural needs; old line, mutual, and fraternal organizations will be examined from the standpoints of efficiency and safety.

(c) **Rural Taxation.** The general principles of public finance will be taken up in so far as may be necessary to lay the foundation for an intelligent discussion of rural taxation; existing systems, as well as proposed reforms, will be examined.

Open to all who have had 219 or its equivalent; elective; junior and senior year; second semester; 3 credits; 3 recitations.

270. **Problem Course.** Students especially interested in Applied Economics may select some problem within the scope of the work characteristic of the College, and under the direction of the instructor in charge prepare a thesis embodying the results of an investigation made during the senior year.

Elective; senior year; both semesters; 1 credit (each semester); consultation by appointment.

280. **The Economics of Distribution.** A seminar covering the whole subject of the distribution of wealth, preparatory to graduate and thesis work in Agricultural Economics and Rural Sociology.

Open to graduate students who have had 219, 264, and 265 or an equivalent training.

281. **Continuation of Course 280.** This course is required in order to receive credit for first semester's work.

Open to graduates who have had 219, 264, and 265 or equivalent training; both semesters; 3 credits; 3 recitations.

Note: This course will be given as a seminar by special arrangement.

283. **Markets and Marketing.** The development of marketing systems; the study of local, state, and national commercial programs and policies; commercial clubs, boards of trade, chambers of commerce, speculation organized and unorganized; foreign trade relations, the consular service, commercial treaties, tariffs, bounties, and foreign exchange.

Open to graduate students who have had Com. 280. First semester; 3 credits; credit not given for one semester's work.

284. Continuation of Course 283. This course is required in order to receive credit for first semester's work.

Open to graduate students who have had Commerce 280, or equivalent work; both semesters; 3 credits; 3 recitations.

Note: This course will not be given in 1916-17 unless demand warrants it.

POLITICAL SCIENCE

ULYSSES GRANT DUBACH, Professor
CHESTER COLLINS MAXEY, Assistant Professor
RUSSELL MARION HOWARD, Instructor

The work of this department of the School of Commerce includes two divisions: business law, and government. In the business law courses, arranged to accommodate students of different preparation and needs, the department endeavors to train the students for practical business affairs, particularly to give the legal information necessary to prevent the common business errors. Special attention is given to industrial and rural problems.

In order to acquaint the student with the rudiments of court procedure, a practical case is tried by the class, the students performing all the parts.

In the courses in political science proper, the department seeks to instruct in the basic general principles of all government, the construction and operation of modern governments, with particular attention to that of the United States, the rules and principles which regulate the relations of governments with each other. The courses are planned with the purpose of equipping students for an intelligent participation in governmental affairs. The work culminates in the courses of Advanced American Government and Practical Legislation, designed to instruct in the fundamentals of law making. The work implies that as citizens, our students will take a dynamic part in the various activities of government, including law making.

For outline of courses in Political Science in the School of Commerce consult pages 177-180.

The following courses are offered:

L. Commercial Law. Adapted to students of limited training. A course covering the general principles of contracts, and particular contracts including sales of goods, bailment, insurance, credits, loans, negotiable instruments, agency, partnership, corporations, and property.

Vocational course; second year; and Mechanical Arts; third year; first semester; 3 credits; 3 recitations.

Text: Huffcut: Elements of Business Law.

N. **Civil Government and Administration.** (a) **Civil Government**: Our European ancestors; origin of states and state institutions. English and American governments compared; federal and state constitutions; state and foreign service; the executive departments; federal and state power; political parties and issues.

(b) **Federal and State Administration**: A survey of the administrative activities of federal, state, and municipal governments; governments from the sociological point of view. The financial operations, preparation of budgets and reports, will be considered.

Vocational course; first year; second semester; 3 credits; 3 recitations.

Text: Ashley: American Federal State.

300. **Advanced Commercial Law.** (a) **Contracts in General:** Formation of contracts, offer, acceptance, form, and consideration; competence of parties, consent, and legality of subject matter; operation of contracts, including limit of obligations and assignments; interpretation, rules of evidence, and construction; discharge of contracts; the agreement, performance, breach of contract, etc.

(b) **Negotiable Instruments**: Maker's, acceptor's, drawer's and indorser's contracts; proceedings before, upon, and after dishonor; proceedings in protesting; accommodation paper; grantor and surety; holder's position, defense, equities, agency, insurance, etc.

Sophomore year; first semester; 3 credits; 3 recitations.

Text: Spencer: Manual of Commercial Law. Bay: Cases on Commercial Law.

301. **Advanced Commercial Law.** (c) **Partnership Law**: Formation of partnerships, essentials, liabilities of members, capital, profits, good will, individual and firm property; agency for partners; dissolution winding up; priority of distribution, etc.

(d) **Corporation Law**: Kinds, formation, powers, liabilities, ownership, shares, subscription, calls, notice, transfers, management, officers, directors, contractional powers, dividends, dissolution, are discussed fully from the legal point of view.

(e) **Property**: Classes, method of acquiring and transferring titles, mortgages, lease, landlord and tenant, etc. The case method

is used throughout the entire course. Lectures, reports, and discussions.

Sophomore year; second semester; 3 credits; 3 recitations.

Text: Spencer: Manual of Commercial Law. Bay: Cases on Commercial Law.

Note: Credit will not be given for Com. 300 without Com. 301 except on special permission of the department.

302. **International Relations.** Persons concerned, rights and duties of states; territorial jurisdiction; jurisdiction on the high seas; agents of the state treaties; settlements of disputes; war and its effects; military occupation; neutrality, contraband, blockades, etc. Lectures, reports, and discussions.

Senior year; first semester; 3 credits; 3 recitations.

Text: Hershey: Essentials of Public International Law.

304. **Advanced American Government.** This course will supplement courses 320 and 322 giving chief attention to the interpretation of our federal and state constitutions, and the relation of legislation to these constitutions. Court reports will be used liberally with a view to showing the interpretation of the rights of the people guaranteed in our constitutions and of the powers granted to the government by these instruments. Course 320 is prerequisite.

Elective; junior or senior year; first semester; 3 credits; 3 recitations.

Text: Hall's Constitutional Law is used as a basis for the course. Case briefing is required as a large part of the work.

306. **Commercial Law.** A short course in the laws of business. Recitations and discussions.

Pharmacy and Farm Management students.

Second semester; 3 credits; 3 recitations.

Text: Huffcut: Elements of Business Law.

307. **Rural Law.** A special course supplementary to Commercial Law 300 and 301, elaborating on such questions as fixtures, fences and inclosures, roads, easements, location of land, titles, abstracts, mortgages, legal status of crops in case of termination of lease or sale of land, insurance, irrigation, drainag., and water rights in general.

Elective; junior or senior year; 1 credit; 1 recitation.

320. **National Government.** (a) **National Government**: The Constitution; rise of the American Union; distribution and powers

of the Government; powers of Congress; powers of the executive; the judicial departments; checks and balances of governments; governments of territories and colonies; admission of new states; amendments to the Constitution; civil rights and their guarantees; protection of persons accused of crimes; protection of contracts and property, etc. Lectures, readings, reports, and discussions.

(b) **American Politics**: Origin of political parties in the United States; changes, growth, and development; party platforms.

Junior or senior year; first semester; 3 credits; 3 recitations.

Text: Beard: American Government and Politics. Young: New American Government.

322. State and Municipal Government. A study of the functions of state government; the machinery of state government; political parties in state government; special study of the government of the State of Oregon; municipal government, including county, town, and city government.

Lectures, readings, reports, and discussions.

Junior or senior year; second semester; 3 credits; 3 recitations.

Text: Beard: American Government and Politics. Young: New American Government.

325. Comparative Governments. A critical study of the governments of the principal countries of the world, with special emphasis on modern movements and features of government, that are problems in the United States at present.

Lectures, reports, and discussions.

Senior year; second semester; 3 credits; 3 recitations.

Text: Ogg: European Governments.

326. Practical Legislation. The work in Advanced American Government would serve as a preparation for this course which will instruct in practical bill drafting. Attention will be given to the correct form, and the correct expression of the desired content of bills. Emphasis will be placed on the necessity of preparing laws with reference to prior legislation and court decisions. In addition, an attempt will be made to show the necessity of studying conditions, and the possibility of guiding legislation to meet the demands of the times. Special emphasis will be placed on rural and industrial legislation. Course 304 is prerequisite.

Elective; junior or senior year; second semester; 3 credits; 3 recitations.

Text: Jones: Statute Law Making in the United States.

STENOGRAPHY AND OFFICE TRAINING

_____, Assistant Professor
BERT WALTER HARRIS, Assistant Professor.*
ETHA MABEL MAGINNIS, Instructor

The courses offered by this department of the School of Commerce are for four classes of students: (a) those desiring a thorough training as stenographers and typists; (b) those desiring to go still further into the field of court reporting and secretarial training; (c) those desiring to enter the teaching profession; and (d) those commercial teachers desiring advanced training.

The ground covered by the special subjects offered by this department is as follows: Stenography and Typewriting, two years; Court Reporting, one year; Secretarial Training, one year; and Method of Teaching Commerce, one year.

Equipment. The Office Training department is well equipped with the latest office appliances and fixtures, including the standard types of typewriters, duplicators, mimeographs, dictaphones, and filing cabinets.

Each student is given access to equipment upon payment of a fee required for the course in which he is registered. All equipment and apparatus is kept in constant repair, and students are taught, under the direction of the instructors, how to keep the apparatus they use in proper repair and efficiency.

400. **Elementary Stenography and Typewriting.** (a) **Gregg Shorthand**: Theory manual covered thoroughly. Shorthand penmanship given special attention. Dictating machines used in preparation of assignments for class work. Primary, Intermediate, and Complete certificates granted.

Texts: Gregg: Shorthand Manual. Gregg: Writer.

(b) **Rational Typewriting.**† The theory and practice of touch typewriting, covering mastery of the alphabet, numerals, mechanial arrangement of business correspondence and legal forms, tabulating, and speed practice. Special attention is given to the mechanics of the typewriter.

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* On leave of absence.

† By special permission of instructor, 400 (b), Typewriting, may be omitted, with a reduction of one credit. This applies particularly to students of schools other than Commerce.

Commerce students starting Stenography, having had previous training in typewriting, will not be excused from 400 (b); budgets of an advanced character wil be assigned them. Credit will not be given for first semester's work in stenography, unless the course is carried the full year.

Degree course, sophomore year, and Vovational course, first year; either semester; 4 credits; 4 recitations; 4 laboratory periods of one hour each.

Fee: $2.00. Text: Rational Typewriting.

401. **Elementary Stenography and Typewriting.** A continuation of course 400. Speed practice finished through the principal series and phrase letters. Elementary office equipment studied and used. Typewriting Speed Certificates granted.

Degree course, sophomore year; and Vocational course, first year; either semester; 4 credits; 4 recitations; 4 laboratory periods.

Fee: $2.00. Text: Gregg Shorthand Manual, Rational Typewriting.

402. **Advanced Stenography and Typewriting.** Dictation covering vocabularies of representative business, such as real estate, law and collections, banking and financial, life and fraternal insurance, publishing, railway, manufacturing, civil service. The typewriting periods will be taken up with transcription of dictation. 80-, 100-, and 120-word speed certificates granted.

Course 412 must be taken concurrently with this course by Commerce students.

Degree course, junior year; and Vocational course, second year; first semester; 4 credits; 4 recitations; 4 laboratory periods of one hour each.

403. **Advanced Stenography and Typewriting.** A continuation of course 402. Court and lecture reporting introduced. Course 413 must be taken concurrently with this course by Commerce students.

Degree course, junior year; and Vocational course, second year; second semester; 4 credits; 4 recitations; 4 laboratory periods of one hour each.

Fee: 2.00. Text: Eldridge: Dictation Exercises. Gregg Writer.

404. **Reporters' Course.** Designed for those having finished course 403 and desiring to specialize in court or convention reporting.

Elective; senior year; first semester; 2 credits; 1 lecture; 3 laboratory periods of one hour each.

Fee: $1.00. Text: Expert Shorthand Speed Course.

405. **Reporters' Course.** A continuation of course 404.

Elective; senior year; second semester; 2 credits; 1 lecture; 3 laboratory periods of one hour each.

Fee: $1.00. Text: The Gregg Reporter.

410. **Typewriting and Office Training.** Designed especially for students not enrolled in Stenography, but who desire a knowledge of Typewriting and Office Appliances. (a) **Typewriting**: Covering the same ground as course 400-b. Not open to stenography students.

(b) **General Office Methods**: Office records and systems, relation between employer and employee; office equipment and its efficient arrangement. Especial attention will be given to training students in office methods that apply to their particular branch of work.

Elective, all courses; either semester; 2 credits; 4 laboratory periods.

411. **Typewriting and Office Training.** Continuation of 410. Not open to Stenography students.

Elective, all courses; either semester; 2 credits; 4 laboratory periods.

Fee: $2.00. Text: Rational Typewriting.

412. **Office Training for Stenographers.** Designed to give such knowledge and training as is called by employers, "experience." This course is so arranged that it is an integral part of course 402, Advanced Stenography and Typewriting. Topics covered: Attractive arrangement of business letters; applying for a position; office routine; inclosures, remittances, and banking; filing systems; office appliances; shipping information; business ethics and bibliography; legal papers and transactions; telegraph and telephone; printing and proofreading; a day's work coordinated into an organized whole.

Junior year; first semester; 2 credits; 1 lecture; 3 laboratory periods of one hour each. Required of all taking course 402.

Fee: $1.00. Text: Office Training For Stenographers.

413. **Secretarial Training for Stenographers.** Continuation of course 412. Actual service in the College administrative offices required. Office efficiency problems studied.

Junior year; second semester; 2 credits; 1 lecture; 3 laboratory periods of one hour each. Required of all taking course 403.

414. **Bibliography.** Advanced library training for secretaries and others, in order that they may know where and how to find quickly all information regarding any important field of knowledge. Method of indexing books and general filing. Twelve lectures and problems will be given by experts in the various fields, covering the main principles, chief authorities, and the sources of material.

Dewey Decimal Classification: 3 lectures and problems by the College Librarian. Subject Headings: three lectures and problems by the College Cataloguer.

Elective; junior year; second semester; 1 credit; 1 lecture.

416. **Expert Typists' Course.** Designed to give expert finger training, word and sentence drills, mastery of the key-board, drills for speed and endurance, errorless typewriting. Certificates of Proficiency and Awards for speed and accuracy will be issued.

Prerequisite: One-year's work in typewriting.

Either semester; 1 credit; one 3-hour laboratory period.

Fee: $1.00. Text: Expert Typewriting.

417. **Expert Typists' Course.** A continuation of course 416. Special emphasis will be laid on Tabulating, Billing, Manifolding, and Mimeographing. Artistic typewriting, based upon the following points: even touch, absolute accuracy, and judicious display, will be a strong feature of the course.

Prerequisite: Commerce 416.

Elective; either semester; 1 credit; one 3-hour laboratory period.

Fee: $1.00. Text: Expert Typewriting.

SCHOOL OF ENGINEERING AND MECHANIC ARTS

GRANT ADELBERT COVELL, Dean.

Four-years courses leading to the degree of Bachelor of Science are offered in the School of Engineering as follows:

A course in Civil Engineering.*
A course in Electrical Engineering.
A course in Highway Engineering.
A course in Industrial Arts.
A course in Irrigation Engineering.
A course in Mechanical Engineering.

A three-years vocational course in Mechanic Arts is also offered. While this course does not lead to a degree, a certificate or diploma will be awarded to those students who complete it.

CIVIL AND HIGHWAY ENGINEERING

GORDON VERNON SKELTON, Professor
REX EARLE EDGECOMB, Assistant Professor
SAMUEL MICHAEL PATRICK DOLAN, Instructor
DEXTER RALPH SMITH, Instructor

COURSE IN CIVIL ENGINEERING*

The purpose of the course in Civil Engineering is to give the student thorough theoretical instruction, accompanied by as much laboratory and field practice as possible. The course includes such basic studies as Mathematics, Chemistry, Physics, and Materials of Engineering, Applied Mechanics, and Hydraulics, in addition to the technical work given by this department. The student has the opportunity, during the senior year, to select his work along lines that he is most interested in.

Recognizing the value of drawing to the professional engineer, not only as a means of expressing his ideas and of carrying out his plans, but also as a means by which the young graduate may enter some of the most desirable positions, the department lays special emphasis upon this subject. Much drawing is also required in connection with the preparation of plans and working drawings, as part of the office work of the higher technical courses.

The work in Surveying begins with the freshman year and continues through the sophomore year, with from six to nine hours of field practice a week. The student serves in subordinate positions at first, and gradually advances as a knowledge of the instru-

*No work below senior grade will be given in Civil Engineering during the year 1916-17.

ments is acquired. After having served his term as an apprentice, he is placed in charge of field parties and is held responsible for the results accomplished. During the freshman year he is given practice in land surveying and leveling, and during the sophomore year in topographic and railroad surveying. At all times, conscientious attention to duty, accuracy, and speed will be demanded. Every student keeps full and accurate notes of all work done in the field. These, after being criticised, are transcribed and filed with the instructor.

Equipment. In addition to joint use with the other engineering departments of the testing laboratories described elsewhere, this department has a suite of well-lighted rooms, suitably arranged on the second floor of Mechanical Hall. This suite includes an office, recitation, and lecture rooms; an instrument room, and draughting and designing rooms, together with a well-equipped blue-print room with a cylindrical electrical blue-print machine, sun frames, and washing pans.

The draughting and designing rooms are well lighted and fully equipped with thoroughly modern and convenient drawing tables, supplied with individual lockers for instruments and other apparatus. The instrument room is conveniently arranged, having an individual glass-front case for each instrument and its accompanying equipment, which includes marking pins, tape, range-poles, notebook, etc. The instrument equipment includes the following: twelve transits, four of which are provided with solar attachment; nine levels, four plane-tables, one compass and two current meters, all high-class instruments of various standard makes and styles; a sufficient supply of level and stadia rods, range-poles, tapes, chains, plain and prismatic compasses, aneroid barometers, clinometers, planimeters, plumb-bobs, hand levels, etc., together with a well-selected assortment of specifications and blue-print plans of engineering structures for illustrative purposes.

DEGREE COURSE IN CIVIL ENGINEERING	Semester	
Senior Year	1st	2nd
Highway Bridges (C. E. 513, 514)	4	4
Engineering Seminar (C. E. 605, 606)	1	1
Reinforced Concrete (C. E. 557)	4	
Contracts and Specifications (C. E. 607)		2
Electives (From group 1, 2, 3, or 4)	7	9
	16	16

	Semester	
Group 1	1st	2nd
Highway Engineering (C. E. 407)	4	
Economics of Highway Construction (C. E. 410)		2
Highway Laboratory (Advanced) (Exp. E. 233)	2	
Road Machinery (M. E. 302)		1
Precise Surveying and Geodesy (C. E. 252)		3
Electives	1	3
	7	9
Group 2		
Sanitary Engineering (I. E. 701)	3	
Hydraulics Laboratory (Exp. E. 262)		2
Water Supply Engineering (I. E. 301)	4	
Hydraulic Pumps and Motors (I. E. 202) or Chemistry of Water (Chem. 403)		2
Study of Electric Machinery (E. E. 402)		4
Electives		1
	7	9
Group 3		
Structural Engineering (C. E. 515, 516)	3	2
Study of Electric Machinery (E. E. 402)		4
Electives	4	3
	7	9
Group 4		
Railway Engineering (C. E. 281, 282)	3	3
Study of Electric Machinery (E. E. 402)		4
Electives	4	2
	7	9

COURSE IN HIGHWAY ENGINEERING

There are few lines of public endeavor where more money is being spent, or where a higher degree of technical skill and training is required, than in the field of highway engineering. The purpose of this course is to meet the demand in this State and throughout the Northwest for men equipped to take charge of road

and city street construction and maintenance work. Aside from the opportunity for useful and honorable service, no field, it is believed, offers greater encouragement in a financial way to the young man of ambition and ability.

Thorough theoretical instruction is accompanied by as much laboratory and field practice as possible. The course includes such basic studies as Mathematics, Chemistry, Physics, Drawing, Materials of Engineering, Applied Mechanics, and Hydraulics, in addition to the technical work given by this department.

The department of Experimental Engineering is equipped with complete and thoroughly up-to-date testing laboratories, including the very latest and best cement- and highway-testing machinery, thus affording students in Highway and in Civil Engineering courses the opportunity of studying first hand the strength and properties of the various engineering materials.

In the study of highways, special reference is made to the conditions and needs of Oregon. Due consideration is given to the construction and maintenance of dirt, gravel, and broken-stone roads as well as to the higher types. In consequence of the vast area of the State, this class of roads must, of necessity, constitute the greater part of its highways for many years.

DEGREE COURSE IN HIGHWAY ENGINEERING

	Semester	
Freshman Year	1st	2nd
Trigonometry, College Algebra (Math. 11, 21)	5	
Elementary Analysis (Math. 31)		5
General Chemistry (Chem. 100, 101)	3	3
Mechanical Drawing (C. E. 107)	3	
Engineering Drawing (C. E. 111)		3
Descriptive Geometry (M. E. 152)	3	
Library Practice (Libr. 1)	½	
Hygiene (Phys. Ed. 10)	½	
Plane Surveying (C. E. 222)		5
Gymnasium (Phys. Ed. 15, 16)	½	½
Drill (Military 1, 2)	1	1
Spherical Trigonometry (Math. 15)	1	
	17½	17½

Sophomore Year	Semester 1st	2nd
Differential Calculus, Integral Calculus (Math. 51, 52)	4	4
Engineering Physics (Phys. 101, 102)	4	4
Topographic Surveying (C. E. 223)	5	
Railroad and Canal Surveying (C. E. 272)		5
Gymnasium (Phys. Ed. 17, 18)	½	½
Drill (Military 3, 4)	1	1
Electives (Restricted)	3	3
	17½	17½
Junior Year		
Statics and Dynamics (M. E. 251)	5	
Strength of Materials (M. E. 252)		3
Roads and Pavements (C. E. 405)	3	
Graphic Statics (C. E. 511)	2	
Hydraulics (I. E. 102)		3
Cement and Highway Laboratory (Exp. E. 231)	2	
Structural Materials Laboratory (Exp. E. 232)		3
Military Science (Theo. Inst. 1, 2)	1	1
Masonry and Foundations (C. E. 552)		3
Drill (Military 5, 6)	1	1
*Electives (Restricted)	3	3
	17	17
Senior Year		
Highway Bridges (C. E. 513, 514)	4	4
Engineering Seminar (C. E. 605, 606)	1	1
Reinforced Concrete (C. E. 557)	4	
Contracts and Specifications (C. E. 607)		2
Road Machinery (M. E. 302)	1	
Highway Engineering (C. E. 407, 408)	4	4
Economics of Highway Construction (C. E. 410)		2
Advanced Highway Laboratory (Exp. E. 233)	2	
**Electives		3
	16	16

*Approved Electives: English, Modern Language, Economics, National Government, State and Municipal Governments, Geology, Differential Equations, Least Squares.

**Chemistry of Road Materials, Design of Highway Structures or Materials. Laboratory (Advanced Course).

The following courses are offered:

107. Mechanical Drawing. The use of instruments and the elementary principles of mechanical drawing are taught by a graded series of plates, including simple practice sheets, geometric constructions, principles of orthographic projection, shading, and finally, the complete development of a working blue print of some simple device from sketches. Particular attention is given to free-hand lettering, general neatness, and accuracy.

Highway, Irrigation, and Mining Engineering; first semester; 3 credits; 3 laboratory periods.

Fee: $0.50. Text: French: Engineering Drawing.

111. Engineering Drawing. A continuation and extension of the previous work in drawing, with special reference to application in Highway and Irrigation Engineering. Practice in tracing and in blue and black line process printing will be given.

Prerequisite: C. E. 105.

The course in Highway Engineering and Irrigation Engineering; freshman year; second semester; 3 credits; 3 laboratory periods.

Fee: $0.50. Text: French: Engineering Drawing.

222. Plane Surveying. This course includes recitations, lectures, field and office work in the theory and practice of plane surveying. The theory and construction of the different surveying instruments are studied, and practice will be given in making their tests and adjustments. The United States public land surveys and land laws are studied. Forms of field notes, methods of balancing and plotting surveys, computing areas and like work, will have due consideration. Proper emphasis will be placed upon chain surveying. Surveys will be made of assigned plots, and descriptions prepared. Resurveys will be made where more than ordinary difficulty is encountered in the interpretation of descriptions and existing evidence.

Prerequisite: Math. 11 and C. E. 107.

The course in Highway and Irrigation Engineering and Landscape Gardening; freshman year; second semester; 5 credits; 2 recitations; 3 laboratory periods.

Fee: $1.00. Text: Breed & Hosmer: Plane Surveying.

223. Topographic Surveying. This course will include the execution of a complete topographic survey of an assigned tract, including the base line measurement, transit, stadia, and plane table work, plotting, and finishing the map.

Prerequisites: C. E. 222 and 107.

The courses in Highway Engineering, Irrigation Engineering, and Landscape Gardening; sophomore year; first semester; 5 credits; 1 recitation; 4 laboratory periods.

Fee: $1.00. Text: Breed & Hosmer: Plane Surveying.

225. City Surveying. (Elective.) A study of the necessary precision; a survey of a portion of the city; also a new addition, including the preparation of plots, establishment of grades, etc.; survey and office work for preparation of plans for street improvement; preparation of estimates, etc.

Senior year; first semester; 3 credits; 1 recitation; 2 laboratory periods.

Fee: $1.00.

232. Plane Surveying. In this course substantially the same ground will be covered as in course 222, except that there will be but two-thirds as much field practice.

Prerequisites: Math. 11, 21, 31, and Mechanical Drawing.

The courses in Mining, Forestry, and Logging Engineering; freshman year; second semester; 4 credits; 2 recitations; 2 laboratory periods.

Fee: $1.00. Text: Breed & Hosmer: Plane Surveying.

234. Plane Surveying. An abridgment of course 222 designed to meet the requirements of students in Forestry and Logging Engineering. As much time as possible will be given to the study and use of the type of instruments used in the Forestry service. Some time will be given to the retracing of lines from original descriptions and field notes and to different methods of determining the meridian.

Prerequisites: Math. 11, 21, 31, and Mech. Draw.

The courses in Forestry and Logging Engineering; freshman year; second semester; three credits; one recitation; 2 laboratory periods.

Fee: $1.00. Text: Breed & Hosmer: Plane Surveying.

235. Topographic Surveying. A condensation of course 223, and in addition requires a rough topographic survey of a forested section.

Prerequisite: C. E. 232 or 222.

The courses in Forestry and Logging Engineering; sophomore year; first semester; 3 credits; 1 recitation; 2 laboratory periods.

Fee: $1.00. Text: Breed & Hosmer: Plane Surveying.

242. Farm Surveying and Leveling. This course is designed for Agricultural students, and consists of problems of chaining, elementary transit work, and in leveling. Most emphasis will be put upon leveling and its application to drainage and general irrigation work. Problems will be given in profile and contour work as applied to farm drainage, road construction, and irrigation.

Agricultural course; sophomore year; first semester; 2 credits; 1 recitation; 1 laboratory period.

Fee: $1.00. Text: Pence & Ketchum: Surveyor's Manual.

243. Topographic Surveying. This course is designed especially for those taking the Irrigation Farming course, and is an enlargement on C. E. 242. A complete topographic survey and map of an assigned area will be made. Special emphasis will be put on the study of the relation of surface topography to methods of water distribution, drainage, etc., all illustrated by the assigned survey and map. Methods of locating ditches and of making estimates on grading for the same will be studied from the contour map.

Prerequisite: C. E. 242.

Irrigation Farming course; junior year; first semester; 2 credits; 2 laboratory periods with assigned lectures where required.

Fee: $1.00. Text: Breed & Hosmer: Plane Surveying.

252. Precise Surveying and Geodesy. A study of the precise methods of surveying and leveling, base line measurements, precise triangulation, determination of true meridian and latitude.

Prerequisites: C. E. 222, 223, 272.

Elective; senior year; second semester; 3 credits; 2 recitations; 1 laboratory period.

Fee: $1.00.

254. Plane Surveying. This is a condensation of course 222, and is designed to meet the needs of Mechanical and Electrical students who have not time for the longer course.

The course in Electrical Engineering; junior year; second semester; 2 credits; 2 laboratory periods.

Fee: $1.00. Text: Breed & Hosmer: Plane Surveying.

272. Railroad and Canal Surveying. This course will include a study of the simple compound, and vertical curves, and of earthwork. Students will solve many problems both in the class room and in the field, and will make a survey of a canal, highway, or railroad, including a reconnoissance, preliminary survey, location

survey, and estimates of earthwork. Emphasis will be placed on yardage estimates, cross-sectioning and earthwork computations, and details of construction.

Prerequisites: C. E. 222 and 223.

Highway and Irrigation Engineering and Landscape Gardening; sophomore year; second semester; 5 credits; 2 recitations; 3 laboratory periods.

Fee: $1.00. Text: Allen: Railroad Curves and Earthwork

274. **Railroad Surveying.** This course is designed especially for the Logging Engineering course, and takes up the survey of a railroad line through rough wooded country, including a reconnoissance, preliminary, and location surveys of such a line. A complete estimate of the yardage, and also of the cost of the road is made. The course also includes the study of the simple, compound, vertical, and transition curves.

Prerequisites: C. E. 223 or 233.

Course in Logging Engineering; sophomore year; second semester; 4 credits; 2 recitations; 2 laboratory periods of three hours each.

Fee: $1.00. Text: Allen: Railroad Curves and Earthwork.

281. **Railway Engineering.** Study of the methods of railway construction and maintenance, standard structures, trestles, tunnels, culverts, minor bridges, ballast, rails and rail supports and fastenings, yards and terminals. This course will be preceded by a brief review of the simple and compound curve and the railway spiral.

Prerequisite: C. E. 272.

Senior year; first semester; 3 credits; 2 recitations; 1 laboratory period.

Text: Webb: Railway Construction.

282. **Railway Engineering.** Continuation of course 281.

Senior year; second semester; 3 credits; 2 recitations; 1 laboratory period.

Text: Webb: Railway Construction.

405. **Roads and Pavements.** A study of the fundamental principles of location, construction, and maintenance of roads, as well as a thorough study of the materials used in road and street building. Asphalt, brick, wood block, stone, concrete, and other forms of street pavements are carefully studied. This course is given in connection with a laboratory course, Exp. E. 131.

The courses in Highway Engineering, Irrigation Engineering, and Landscape Gardening; junior year; first semester; 3 credits; 3 recitations.

407. Highway Engineering. Economic grades and proper location for different soils and surfacing materials. Surface and sub-surface drainage. Culvert design and construction. Construction and maintenance of earth, sand-clay, gravel, macadam, concrete, brick, and other types of roads. Dust preventives and road binders. Preliminary surveys and estimates. Specifications.

Senior year; first semester; 4 credits; 3 lectures; 1 laboratory period.

408. Highway Engineering. Continuation of course 40.

Senior year; second semester; 4 credits; 2 lectures; 2 laboratory periods.

410. Economics of Highway Construction. Economic and social advantages of improved roads. The traffic census. Local and centralized systems of control. Highway laws of different states. Organization of construction and engineering forces. Cost data. Methods of handling work. Forms of contract—lump sum, unit price, percentage and cost plus fixed sum.

Senior year; second semester; 2 credits; 2 recitations.

511. Graphic Statics. The study of the graphic methods of the solution of stresses in cranes, derricks, and roof and bridge trusses, and such similar problems. The course is a draughting room course and is made up of a series of problems to be solved graphically and checked analytically.

The courses in Highway, Irrigation, and Mechanical Engineering; junior year, first semester; 2 credits; 2 laboratory periods of three hours each.

Fee: $0.50.

513. Highway Bridges. Design of wood and steel highway bridges and trusses of the ordinary Pratt or Howe truss type, including the complete design, stress diagram, and detail drawings of the same. Both analytical and graphical methods will be applied to the determination of stresses in trusses under static and wind loads, and under static, moving, concentrated, and distributed loads.

Prerequisites: M. E. 251, 252.

Senior year; first semester; 4 credits; 2 recitations; 2 laboratory periods of three hours each.

Fee: $1.00. Text: Spofford: Theory of Structures.

514. **Highway Bridges.** A continuation of course 513. Advanced work in highway bridge design is taken up, including draw, cantilever, suspension, and arch bridges.

Senior year; second semester; 4 credits; 2 recitations; 2 laboratory periods.

Fee: $1.00. Text: Spofford: Theory of Structures.

515. **Structural Engineering.** This course will include the original design, with the stress sheets, plans, and working drawings for a roof truss, plate girder, pin-connected bridge, and steel arch.

Senior year; first semester; 3 credits; 3 laboratory periods.

Fee: $1.00.

516. **Structural Engineering.** Continuation of course 515.

Senior year; second semester; 2 credits; 2 laboratory periods.

Fee: $1.00.

552. **Masonry and Foundations.** A study of the properties of stone, brick, lime, cement, and concrete as building materials, and of their uses in foundations, retaining walls, piers, and dams; the theory of the masonry arch, retaining wall and dam. Recitations, lectures, and work in draughting and computing room.

The courses in Highway Engineering and Irrigation Engineering; junior year; second semester; 3 credits; 3 recitations.

555. **Design of Highway Structures.** A draughting-room course in the design of different kinds of structures required in highway work. It includes the design of short-span, reinforced concrete slab bridges, short-span I-beam bridges, culverts, tunnels, retaining walls for side-hill roads, etc. A study will be made also of the effect of drainage of roads and drainage areas upon the design of bridges

Highway Engineering course; elective; senior year; 2 credits; 2 laboratory periods.

Fee: $1.00.

557. **Reinforced Concrete.** A study of the fundamental principles of reinforced concrete design as applied to beams, girders, and columns. Designs are made of beam, girder, slab, and arch reinforced concrete highway bridges, and also of reinforced concrete retaining walls and irrigation structures. A detailed drawing is prepared of one reinforced concrete highway bridge.

The courses in Highway and Irrigation Engineering; senior year; first semester; 4 credits; 2 recitations; 2 laboratory periods.

Fee: $1.00. Text: Turneoure & Maurebi: Principles of Reinforced Concrete.

605. Engineering Seminar. The members of the senior class in the courses of Highway and Irrigation Engineering, and the professors and instructors, constitute the Engineering Seminar, which meets once a week. The purpose of this seminar is to bring the student in touch with engineering literature and practice. To this end, a number of journal reviews and papers on engineering subjects will be presented and freely criticised each week. The work will follow a previously arranged program.

Senior year; first semester; 1 credit.

606. Engineering Seminar. See course 605.

Senior year; second semester; 1 credit.

607. Contracts and Specifications. A study of the general principles and laws of contracts as applied to engineering, including the preparation and study of specifications and contracts based upon engineering structures designed by the individual student.

Senior year; second semester; 2 credits; 2 recitations.

GRADUATE COURSE IN HIGHWAY ENGINEERING

From Tuesday, January 2, 1917, to end of first semester.

This short course in Highway Engineering is given by the department of Highway Engineering in cooperation with the departments of Experimental Engineering and Irrigation Engineering and is intended for graduate engineers who wish to specialize in some line of highway work, or for others properly prepared. The purpose of the course is to review the principles and current practice of Highway Engineering.

The various courses are complete in themselves and any one course may be taken without the others if the applicant's preparation is suitable for that course.

Instruction will be given by means of lectures, assigned reading, and laboratory practice. Special lectures by non-resident engineers will be provided where possible. No classes will be formed unless a sufficient number of students apply. During the year 1917 classes will not be arranged for more than 16 credit hours a week.

Those intending to take the course should write Professor Skelton in advance.

The following courses are offered:

Road Design. Two times a week.

Construction of Roads. Three times a week.

Highway Bridges. Three times a week.

Cement and Highway Laboratory. Three laboratory periods a week.

Street Design and Construction. Three times a week.

Reinforced Concrete Highway Structures. Three times a week.

Contracts and Specifications. Two times a week.

The Hydraulics of Highway Drainage and Construction. One laboratory period a week.

ELECTRICAL ENGINEERING

RICHARD HAROLD DEARBORN, Professor
LAWRENCE FISHER WOOSTER, Assistant Professor
WILLIS DHU AINE PEASLEE, Instructor
CHARLES ERNEST OAKES, Instructor

Since the advent of steam as a motive power, it is probable that no agency has so deeply affected the course of history and the intimate life of a large proportion of the human race as has the electric current, whether used in the transmission of intelligence, to furnish light, or to provide power for transportation and the industries.

Already the electrical industries are counted among the greatest in the world; their employees number more than a hundred thousand in the United States alone; their business in this country doubles every five years; and their field is ever expanding.

Notwithstanding this fact, most of the business is controlled by comparatively few corporations. The competition for desirable positions is therefore keen; and since the field in Electrical Engineering for the independent engineer is limited, only men of exceptional ability and energy attain the higher and more desirable positions.

Accordingly, no man is advised to take Electrical Engineering who does not consider himself, by taste and ability, exceptionally fitted therefor.

The College course is designed especially to train the young engineer in the theory of his profession, such practical work as is given in shop and laboratory being subordinated to this end. Practical acquaintance with actual conditions can be acquired only in

the field, during vacation and after graduation. For this reason, and in order to supplement his college education, the student is urged to spend at least a part of his vacation in some line of electrical industry.

Starting with the foundation subjects of mathematics, science, drawing, and shopwork, the student proceeds through the study of form expression in Descriptive Geometry, Mechanism, the laws of Mechanics, Strength of Materials, stress in structures and machinery; through the study of electricity and its application to machinery, the characteristic performance of electrical apparatus, its design and operation; through the study of thermodynamics as applied to various types of heat engines, and finally to the composite power system involving the steam or hydro-electric power plant and the system for transmitting and distributing electrical energy.

Equipment. The laboratory of this department occupies a large part of the west half of the first floor of Mechanical Hall, and is divided into several rooms, one for testing, one for instruments, and another for supplies. Besides the equipment therein, including generators, motors, and other apparatus, the machinery in the College Power Plant and sub-station, is available for study and testing purposes. Three-phase electrical energy is supplied by the long-distance transmission line or by the local generating unit as desired.

In the laboratory is a 6½x15 foot switchboard, consisting of three asbestos wood panels on which are mounted a number of voltmeters and ammeters for direct and alternating current; a power factory meter; a frequency meter, and synchroscope; a set of synchronizing lamps; circuit breakers; switches; and a large number of plug terminals, the lead of which extend to the four machine platforms; two slate panels with instruments and switches for direct-current machines; and an arc light regulating panel. Immediately adjacent thereto is a controller, auto-transformer and rheostat rack, six feet high by sixteen feet in length.

The machine platforms just mentioned are four feet wide by fourteen feet long, and have upon them the following equipment: one five, one seven-and-a-half, one ten, and one fifteen horsepower, three-phase, induction motor; two five, two seven-and-one-half, two ten, and two twelve-and-one-half kilowatt, 125-volt direct-current generators; one ten-kilowatt double-current generator,

and one two-kilowatt rotary converter; two two-and-one-half kilowatt induction motor generator sets; one two-and-one-half kilowatt synchronous motor generator set; one seven-and-one-half kilowatt revolving field alternator, with three additional rotors, and one seven-and-one-half kilowatt revolving field alternator, from both of which current of one-, two-, three-, four-, and six-phases may be taken; one five-arc light regulating, one ten-kilowatt 110,000-volt high tension testing, one ten-volt 1000-ampere welding, one five kilowatt 15,000 volt wireless, three 7½ kilowatt, 2200-220-110-volt transformers with ten taps each in the secondary, giving nine different voltages from 24 to 220 volts, with 87 percent taps in both primary and secondary for transformation from three- to two-phase or the reverse, and a number of ordinary transformers and compensators.

The instruments available comprise standard portable volt, ampere, and watt meters which are divided into two groups, one of which is used for routine laboratory work, the other reserved for thesis and other tests in which greater accuracy is desired. In addition to this equipment, the departments of Physics and Electrical Engineering maintain an instrument standardization laboratory equipped with two one-hundred ampere storage cells and a group of dry cells to furnish potentials up to one hundred and fifty volts. The precision instruments and apparatus consist of a Leeds and Northrup potentiometer with certified standard cells and a complete line of standard shunts from one one-thousandth to ten ohms, a Weston laboratory standard voltmeter with ranges of 1, 100, and 200 volts and Siemens and Halske laboratory standard ammeters with ranges from 2.5 to 50 amperes and a similar wattmeter with five and ten ampere range.

DEGREE COURSE IN ELECTRICAL ENGINEERING

	Semester 1st	2nd
Freshman Year		
Trigonometry, College Algebra (Math. 11, 21)	5	
Elementary Analysis (Math. 31)		5
General Physics (Phys. 1, 2)	3	3
Mechanical Drawing (M. E. 151)	2	
Descriptive Geometry (M. E. 152)		3
Foundry (Ind. Arts 171)	2	
Woodworking (Ind. Arts 112)		2
Library Practice (Libr. 1)	½	
Hygiene (Phys. Ed. 10)	½	
Modern English Prose (Eng. 81, 82) or Adv. German or Adv. French (Mod. Lang. 207, 208, or 107, 108)*	3	3
Drill (Military 1, 2)	1	1
Gymnasium (Phys. Ed. 15, 16)	½	½
	17½	17½
Sophomore Year		
Differential and Integral Calculus (Math. 51, 52)	4	4
Electrical Physics (Physics 105)	3	
Electrical Measurements (Physics 106)		3
General Chemistry (Chem. 100, 101)	3	3
Introduction to Electrical Engineering (E. E. 121, 122)	1	1
Mechanical Drawing (M. E. 153)	3	
Mechanism (M. E. 204)		3
Blacksmithing (Ind. Arts 151)	2	
Machine Shop (Ind. Arts 206)		2
Drill (Military 3, 4)	1	1
Gymnasium (Phys. Ed. 17, 18)	½	½
	17½	17½

*By special permission a student may elect beginning German or French, (Modern Language 201, 202, or 101, 102).

Junior Year	Semester 1st	2nd
Electrical Engineering (E. E. 101, 102)	4	4
Electrical Engineering Laboratory (E. E. 201, 202)	3	3
Statics and Dynamics (M. E. 251)	5	
Strength of Materials (M. E. 252)		3
Steam Machinery (M. E. 307)	3	
Hydraulics (I. E. 102)		3
Plane Surveying (C. E. 254)		2
Drill (Military 5, 6)	1	1
Military Science (Theo. Inst. 1, 2)	1	1
	17	17

Senior Year		
Electrical Engineering (E. E. 103, 104)	4	3
Electrical Design (E. E. 105)		1
Electrical Laboratory (E. E. 203)	3	
Electric Railways (E. E. 309)	2	
Illuminating Engineering (E. E. 316)		2
Telephony and Telegraphy (E. E. 313)		2
Applied Mechanics Laboratory (Exp. E. 205)	3	
Power and Hydraulic Laboratory (Exp. E. 206)		3
Optional	4	5
	16	16

Suggested Options		
Steam Power Plant Design (M. E. 316)	3	
Public Service Regulation (E. E. 317)	2	
Periodical Literature (E. E. 301)	1	
Practical Public Speaking (English 105)	3	
Central Stations (E. E. 318)		2
Electrical Laboratory (E. E. 204)		3
Electric Railways (E. E. 310)		3
High Voltage Engineering (E. E. 308)		2
Thesis (E. E. 306)		2

The following courses are offered:

101. **Electrical Engineering.** Study of the sine wave and periodic alternating quantity; harmonic analysis; laws governing the flow of current and energy; the magnetic and electrostatic

circuit, production of rotating field by means of polyphase alternating currents in a distributed winding; losses in electric circuits; elementary theory of transmission lines.

Open only to juniors in Electrical Engineering. Course 101 must be taken concurrently with 201, and 102 concurrently with 202.

Junior year; first semester; 4 credits; 4 recitations.

Text: Christie: Electrical Engineering.

102. **Electrical Engineering.** Continuation of course 101.

Junior year; second semester; 4 credits; 4 recitations.

Text: Christie: Electrical Engineering.

103. **Electrical Engineering.** A study of the equipment of power plants, transmission lines, and distributing systems, and of the technical and economic problems connected with the generation, transmission, and distribution of electrical energy.

In connection with this course, inspection trips are made to the properties of various power companies. The expense of these trips will approximate twenty dollars, and should be anticipated by every Electrical Engineering student in his senior year.

Prerequisites: E. E. 101, 102, 201, 202.

Senior year; first semester; 4 credits; 4 lectures.

104. **Electrical Engineering.** A continuation of course 103.

Senior year; second semester; 3 credits; 3 lectures.

105. **Electrical Design.** The design of transmission lines and distribution systems, both overhead and underground, with particular attention to costs.

Senior year; second semester; 1 credit; 1 lecture.

121. **Introduction to Electrical Engineering.** A general survey of the field of electrical engineering and the applications of electricity.

Sophomore year; first semester; 1 credit; 1 recitation.

Text: Norris: An Introduction to the Study of Electrical Engineering.

122. **Introduction to Electrical Engineering.** A continuation of course 121.

Sophomore year; second semester; 1 credit; 1 recitation.

Text: Norris: An Introduction to the Study of Electrical Engineering.

201. **Electrical Engineering Laboratory.** Open only to juniors in Electrical Engineering and must be taken concurrently with

101, which it parallels. Study of electrical instruments; wave form and polarity of alternating currents; current, electromotive force and power relations in circuits involving resistance, inductance, and capacity; principles of operation of direct current dynamos and motors.

Consists of one laboratory period a week. Student is required to submit a preliminary report before performing experiment, and a final report upon its completion.

Junior year; first semester; 3 credits; 1 laboratory period.

Fee: $2.50. Deposit: $3.00. Text: Karapetoff: Experimental Electrical Engineering.

202. **Electrical Engineering Laboratory.** Continuation of course 201. Must be taken concurrently with course 102. Study of hysteresis and eddy current losses in magnetic circuits, electromotive force and energy losses in electrical circuits; the separation of losses in direct current machinery; efficiency and loading tests of direct and alternating current machinery; properties of insulating materials.

Junior year; second semester; 3 credits; 1 laboratory period.

Fee: $2.50. Deposit: $3.00. Text: Karapetoff: Experimental Electrical Engineering.

203. **Electrical Engineering Laboratory.** Characteristic performance of alternating current machinery, including alternator, synchronous and induction motor, synchronous converter and static transformer with parallel operation and pump back tests.

Preliminary and final reports are required.

Prerequisites: E. E. 101, 102, 201, 202.

Senior year; first semester; 3 credits; 1 laboratory period.

Fee: $2.50. Deposit: $3.00. Text: Karapetoff: Experimental Electrical Engineering.

204. **Electrical Engineering Laboratory.** Complete engineering and commercial tests on standard electrical machinery, including standard acceptance tests on machines and plants, and special tests for engineering information. Tests will be run on outside plants under commercial operating conditions.

Prerequisite: E. E. 203.

Technical engineering reports are required.

Senior year; second semester; 3 credits; 1 laboratory period.

Fee: $2.50. Deposit: $3.00.

301. **Study of Current Periodical Literature.** Presentation of abstracts and discussion of current articles in electrical periodicals. Special emphasis will be laid upon English, address, and manner of presentation.

Elective to seniors in Electrical Engineering.

Senior year; first semester; 1 credit; 1 recitation.

Text: Current Periodicals.

306. **Thesis.** Elective, by permission to seniors in Electrical Engineering. Only those whose past record indicates ability successfully to complete a satisfactory thesis, will be permitted to make this election.

Senior year; second semester; 2 credits.

308. **High Voltage Engineering.** A study and experimental investigation of high voltage and high frequency phenomena.

Elective to seniors in Electrical Engineering.

Senior year; second semester; 2 credits; 2 recitations.

Text: Peek: Dielectric Phenomena in High Voltage Engineering.

309. **Electrical Railways.** A general study of the application of electricity to street and interurban railways, covering traffic conditions, speed, time, curves, and rolling stock.

Prerequisites: E. E. 101, 102, 201, 202, or E. E. 403.

Required of seniors in Electrical Engineering.

Senior year; first semester; 2 credits; 2 recitations.

Text: Harding: Electric Railway Engineering.

310. **Electric Railways.** Continuation of course 309. A study of conditions governing the electrification of trunk lines; systems of electrification and transportation economics.

Prerequisite: E. E. 309.

Senior year; second semester; 3 credits; 3 recitations.

Text: Electric Traction for Railway Trains.

313. **Telephony and Telegraphy.** A general study of the application of electricity to the transmission of intelligence. Manual and automatic telephony, duplex and quadruplex telegraphy, submarine and wireless telegraphy.

Prerequisites: E. E. 101, 102.

Senior year; second semester; 2 credits; 2 recitations.

316. **Illuminating Engineering.** A study of artificial light sources and the application of these sources to illumination, both exterior and interior.

Senior year; second semester; 2 credits; 2 recitations.

Text: Wickenden: Illumination and Photometry.

317. **Public Service Regulation.** A study of regulation by commissions, service rules, appraisals, depreciation, and rate making.

Senior year; first semester; 2 credits; 2 recitations.

Text: Hayes: Public Utilities.

318. **Central Stations.** A study of the problems arising in the operation of electric systems. Operating problems, public policy, competition, cost accounting, rate study, extensions, etc.

Senior year; second semester; 2 credits; 2 recitations.

403. **Study of Electrical Machinery.** Open to non-electrical students in the School of Engineering. A practical course designed to meet the needs of Civil, Mechanical, and Mining Engineers. Class room and laboratory study of electrical instruments, current, electromotive force and power relations; the operation, care, and management of familiar types of dynamos, motors, both alternating and direct current, and transformers.

Required of seniors in Mechanical, Logging, and Mining Engineering and of certain groups in Civil Engineering.

Prerequisites: Elementary Chemistry, Physics, Calculus, Mechanics.

Junior or senior year; first semester; 3 credits; 1 recitation; 1 laboratory period.

Fee: $2.50. Deposit: $3.00. Text: Gray: Principles and Practice of Electrical Engineering.

406. **Electrical Lumbering Machinery.** A special study of the application of electricity to the lumbering and logging industry.

Prerequisite: E. E. 403.

Senior year; second semester; 2 credits; 2 recitations.

408. **Electric Mining Machinery.** A study of the use of electricity in mines and mining operations.

Prerequisite: E. E. 403.

Senior year; second semester; 2 credits; 2 recitations.

410. **Electric Machine Drive.** The characteristics of electric motors and their applications to machine shop tools and allied industries.

Prerequisite: E. E. 403.

Senior year; second semester; 2 credits; 2 recitations.

EXPERIMENTAL ENGINEERING.

SAMUEL HERMAN GRAF, Professor
CARL LAFAYETTE KNOPF, Instructor
RAY BOALS, Instructor
FRED MERLE MILLER, Instructor

The courses in engineering laboratory practice are designed to familiarize the student with processes of investigation; to afford experience in conducting and reporting experimental engineering work; to secure data which shall verify and supplement theoretical instruction; and, to some extent at least, to give a practical knowledge of construction and management of machinery and apparatus.

Appropriate divisions of this work are regularly taken by students in all branches of Engineering, Forestry, and Industrial Arts, and may be elected by students in other courses. Special courses are offered, as listed in what follows, to meet the needs of the students in the different lines of work. An earnest effort is made, not so much to impart a mass of detail, as to develop in the student his powers of observation and his capacity for independent thought.

Reports are required of all experiments, and are regarded as a most important part of the work. They are carefully read and criticised as to form, neatness, conciseness, accuracy of expression and spelling, as well as accuracy of technical data and calculations. With this training, when the student completes the work, he should know how to prepare an acceptable engineering report, or how to arrange data for publication.

Equipment. Appropriate portions of the equipment for this work are utilized by all departments in Engineering and Forestry. The equipment comprises the following divisions: a materials-testing laboratory, a cement-testing laboratory, a steam laboratory, and a gas-engine and hydraulic laboratory. These divisions have in common the equipment for the preliminary work, such as calculating devices, planimeters, Amsler integrator, micrometers, and other general apparatus.

The materials-testing laboratory occupies the northwest corner of the first floor of Mechanical Hall and contains the following: a 150,000-pound Riehle universal testing machine fitted with extension table for beams up to 16 feet in length; a 50,000-pound Riehle automatic and autographic testing machine; a 60,000-pound-inch Olsen torsion-testing machine; a 400-foot-pound drop-testing ma-

chine and a static load-testing machine, both of which were built in the College shops; a Case tempering furnace with pyrometer; Scleroscope and Brinell ball hardness testers; Tassin metallographic outfit; and auxiliary apparatus including a deformeter, torsion indicator, compression micrometers, several extensometers, deflectometers, and other minor pieces.

A part of the materials laboratory also is devoted to the testing of materials for highway construction. This equipment includes the following: Olsen impact machine for toughness tests; Riehle machine for hardness tests; ball mill, molding machine, and impact machine for cementing value tests on rock dust; rattler for abrasion tests on macadam or paving-rock, another for paving-brick; core drills and saw for cutting stone specimens; shakers and sieves for mechanical analysis of sand and aggregates, including a set of Tyler standard screen scale sieves; penetrometer, viscosimeter, float test, Osborne adhesive machine, centrifuges, and other appliances for making physical tests of bituminous cements and road oils.

The cement testing laboratory, also located in Mechanical Hall, is equipped with convenient iron-topped tables for mixing, intended to accommodate six students each. Apparatus is provided sufficient for making all the standard A. S. C. E. tests, as well as for some additional experiments. There are a large number of briquette, cube, and special cylinder molds, three Vicat needles, Gillmore needles, screens, including a standard set, damp closet, aging tanks, boiling test apparatus, autoclave, briquette molding machine, a 1000-pound Fairbanks cement-testing machine, permeability apparatus for testing various mixtures or water-proofing compounds, and small apparatus including balances, specific gravity flasks, trowels, sampling irons, etc.

The steam laboratory, located in the New Heating Plant, contains the following machines: a 7x8 throttling engine used principally for experiments on valve setting, a 9x10 Ideal automatic high-speed engine driving a 30 KVA, 3-phase generator, a 15 BHP, two-stage Kerr turbine, an 8x18 simple Murray Corliss engine, and a 6¼ and 10½x6¼ Sturtevant vertical compound engine. The last three of these are so arranged that they may be run either condensing or with atmospheric exhaust. The condenser and vacuum pump are so equipped that the cooling water may be measured by means of a Venturi meter and the condensed steam

by a Kennicott water-weigher. The engines are all fitted with gauges, sampling pipes, indicator connections, and brakes of various types.

For tests on boilers and their auxiliaries there are available the equipments of both the new and the old heating plants. The former consists of three Flanner water-tube boilers aggregating 700 horse-power; these are oil fired and fitted with modern auxiliary equipment, including feed water and oil meters, thermometer wells, fiue gas sampler, etc. In the old plant there are three fire-tube boilers of about 170 horse-power total capacity, for which cord wood, and waste from the College wood shop are used for fuel.

Of smaller power laboratory equipment there may be mentioned a General Electric steam meter, pressure gauge tester, Schaeffer and Budenberg indicator calibrating device, seven indicators including a Trill instrument for continuous diagrams, several reducing wheels, two steam calorimeters, fiue gas analysis apparatus, two pyrometers, draught gauges, recording and indicating pressure gauges, etc.

For work on power transmission, a transmission dynamometer and a special belt-testing machine are provided. Tests may also be made on lubricants, bearing metals, and different types of bearings, by means of a Golden bearing and oil dynamometer, or a pendulum type oil testing machine. There are also at hand the usual minor pieces, as fiash point apparatus, viscosimeter, etc.

The gas engine and hydraulic laboratory is located in the old Power Plant building. The gas engine equipment consists of three four-cycle and three two-cycle gasoline and oil engines, and an 8-inch Reeco-Ericson, hot-air engine. All of these are especially fitted for testing and demonstration, the largest, a 20-H. P. Bessemer oil engine, being direct connected to a high pressure pump. In the same room are also installed a Gardner air compressor and two centrifugal blowers for work on air compression and transmission. The hydraulic section contains the following: a centrifugal pump driven by a rated variable speed motor, several steam pumps, a 4x6 Goulds triplex pump, 12-inch Doble laboratory water motor, hydraulic ram, 2-inch Venturi meter, current meter, two ordinary service meters, calibrating tanks, orifice boxes with suitable plates and orifices, weirs, hook gauge, and other small apparatus. In ad-

dition to work in the laboratory, measurements and tests of neighboring streams and installations may be made.

The following courses are offered:

201. Applied Mechanics Laboratory. A study of experimental investigation, reduction of data, mechanical calculating devices, and the preparation of neat, concise, and accurate reports. The calibration of various measuring instruments such as gauges, pyrometers, transmission dynamometers, etc., is then taken up. After this follow exercises in the measurement of power, including a test of the transmitting capacity and slip of belting. Transverse, tensile, compressive, torsion, and other standard tests of the common materials of construction are made; the heating value of a sample of coal is determined; the course being then concluded by two exercises on the properties of an assigned lubricating oil.

Prerequisites: Phys. 101 and 102, and Math. 51 and 52. Statics and Dynamics, (M. E. 251), and Theory and Practice of Steam Engineering, (M. E. 305), should also be taken in conjunction with this course.

Course in Mechanical Engineering; junior year; first semester; 3 credits apportioned as follows: preparation, ½ credit; laboratory, 1 credit; report, 1½ credits.

Fee: $3.00. Text: Carpenter & Diederichs: Experimental Engineering.

202. Power and Hydraulic Laboratory. A continuation of course 201, beginning with the use and calibration of the indicator and planimeter. Tests are then made on steam and gas engines, a boiler, an impulse water wheel, pumps, an air compressor, and other power equipment. Exercises are given in the setting of Corliss and slide valves, and the course is concluded with an economy test of a steam turbine operating condensing.

This work is covered in fifteen laboratory exercises, one each week, and a careful report of each experiment is required.

Prerequisite: Exp. E. 201. Advanced Steam Engineering, (M. E. 306), must be taken in conjunction with this course.

Course in Mechanical Engineering; junior year; second semester; 3 credits; apportioned as for course 201.

Fee: $3.00. Text: Carpenter & Diederichs: Experimental Engineering.

203. Advanced Mechanics Laboratory. A rather general course in experimental mechanics dealing with more advanced studies of materials, fuels, lubricants, bearing metals, belting, etc., with special reference to the application of the results to the requirements of the mechanical engineer in actual practice. Reports required.

Prerequisites: Exp. E. 201 and 202.

Course in Mechanical Engineering; senior year; first semester; 3 credits, apportioned as for courses 201 and 202.

Fee: $3.00. Text: Carpenter & Diederichs: Experimental Engineering.

204. Advanced Power Laboratory. A course similar in nature to the preceding, but dealing with power and hydraulic machinery. Various tests and studies are made on the following: a triplex pump, an air compressor, a centrifugal blower, a steam turbine, a compound engine, and finally, a complete test of a simple condensing Corliss engine, including the heat balance and a verification of Clayton's analysis. Complete reports required.

Prerequisite: Exp. E. 203.

Course in Mechanical Engineering; senior year; second semester; 3 credits; apportioned as for the preceding.

Fee: $3.00. Text: Carpenter & Diederichs: Experimental Engineering.

205. Applied Mechanics Laboratory. Fifteen experiments consisting of exercises selected chiefly from courses 201 and 203. A course designed especially for the seniors in Electrical Engineering.

Prerequisites: Phys. 101 and 102, Math. 51 and 52, and all of the Mechanical Engineering courses required of Electrical Engineering juniors. Advanced Steam Engineering (M. E. 306), should be taken in conjunction.

Course in Electrical Engineering; senior year; first semester; 3 credits, distributed as for course 201.

Fee: $3.00. Text: Moyer: Power Plant Testing.

206. Power and Hydraulic Laboratory. Similar in grade and purpose to the preceding. Consists of exercises selected from courses 202 and 204.

Prerequisite: Course 205.

Course in Electrical Engineering; senior year; second semester; 3 credits, apportioned as in the preceding.

Fee: $3.00. Text: Moyer: Power Plant Testing.

207. **Applied Mechanics Laboratory.** This course is similar, in range of equipment studied, to course 201, but since it is intended for students in the Industrial Arts course who do not have some of the theoretical work in power engineering, the work is taken up in a more general manner, stress being laid on those principles and details which are of special value to the teacher of manual training. Some time is also taken to explain the theory involved, and the students are taught to prepare neat and accurate reports of their work.

Prerequisites: Mat. 11, and Phys. 1 and 2.

Course in Industrial Arts; senior year; first semester; 3 credits, apportioned as follows: laboratory, 1 credit; report and preparation, 2 credits.

Fee: $3.00. Text: Moyer: Power Plant Testing.

208. **Power and Hydraulic Laboratory.** A course similar in grade to the preceding, designed for seniors in the Industrial Arts course. The work consists of fifteen laboratory exercises along the lines of those for course 202, and the usual reports are required.

Prerequisite: Exp. E. 207.

Required in Industrial Arts; senior year; second semester; 3 credits, apportioned as for course 207.

Fee: $3.00. Text: Moyer: Power Plant Testing.

210. **General Engineering Laboratory.** A course designed for seniors in Mining Engineering and Ceramics, or for others who desire a brief, comprehensive course in mechanical laboratory practice. The work consists of ten exercises selected from courses 201 and 202, and embraces tests on materials, hydraulic machinery, and steam and gas engines. Reports are required as in the preceding.

Prerequisites: Phys. 101 and 102, and Math. 51 and 52.

Courses in Mining Engineering and Ceramics; senior year; first semester; 2 credits, apportioned as follows: laboratory, 1 credit; report and preparation, 1 credit.

Fee: $2.00. Text: Moyer: Power Plant Testing.

231. **Cement and Highway Laboratory.** An experimental study of Portland cement; standard A. S. C. E. and other methods of cement testing; examination of sands, grading of aggregates, determination of voids, etc., abrasion, hardness, toughness, cementing value, and other tests on macadam rock; tests of paving brick; standard tests on bituminous compounds.

This course is of broad scope, but is still sufficiently detailed to give the student a good working basis for the intelligent interpretation and preparation of specifications for the materials treated.

Prerequisites: Phys. 101 and 102 and Math. 51 and 52. Roads and Pavements, (C. E. 405), should be taken in conjunction with this course.

Courses in Highway Engineering and Irrigation Engineering; junior year; first semester; 2 credits, apportioned as follows: laboratory, 1 credit; preparation and report, 1 credit.

Fee: $3.00. Text: Hatt & Scofield: Laboratory Manual for Testing Materials. U. S. Office of Public Roads' Bulletins, No. 38 and 44.

232. **Structural Materials Laboratory.** Standard tests of timber, iron, steel, brick, stone, etc., with special reference to the methods and specifications adopted by the American Society for Testing Materials, and other national engineering organizations. Following the general tests, some time is devoted to work on plain and reinforced concrete.

Prerequisites: Phys. 101 and 102, and Math. 51 and 52. This course should be preceded by course 231, and Strength of Materials (M. E. 252), should be taken in conjunction with it.

Courses in Highway and Irrigation Engineering; junior year; second semester; 3 credits, apportioned as follows: laboratory, 1 credit; preparation and report, 2 credits.

Fee: $3.00. Text: Hatt & Scofield: Laboratory Manual for Testing Materials.

233. **Advanced Highway Laboratory.** Following course 231, and designed particularly for those specializing in Highway Engineering. Different road and paving materials and binders are tested and their relative values determined. Sheet asphalt mixtures and bituminous mortars are studied, to determine the effects of various changes in the grading of the aggregates. Finally, samples of various types of roads and pavements are analyzed for density, composition, and grading, with special reference to their conformity with specifications under which built.

Prerequisites: Exp. E. 231, and C. E. 405.

Course in Highway Engineering; senior year; first semester; 2 credits; apportioned 1 to laboratory work and 1 to report.

Fee: $3.00.

235. Advanced Materials Laboratory. An advanced course offered as an elective to students who have completed course 232, and who desire additional laboratory work on materials. In the past, tests have been made on reinforcing steel, reinforced beams, hooped columns, water-proofing of concrete, thermal conductivity of concrete, study of stresses by strain gauge, etc., but the course is varied according to the special interests and desires of the students electing the work.

The course on Reinforced Concrete (C. E. 557), must either precede this course or be taken at the same time. The course cannot be given unless elected by at least five students.

Either semester as desired by majority; 2 credits: laboratory, 1 credit; report, 1 credit.

Fee: $3.00.

238. Timber Testing. A special course designed to meet the requirements of the students in Forestry. The work is covered in eight laboratory exercises, embracing cross-bending, compression, sharing, cleavage, and other standard tests of timber; a study of the effect of moisture content on strength; and a study of impact loads. The formulas for the reduction of data from tests are explained; and the students are taught the preparation of neat, accurate reports, such being required on all tests. In general, the methods and bulletins of the U. S. Forest Service will be used as a guide in the work.

Prerequisites: Phys. 1 and 2.

Course in Forestry; senior year; second semester; 1 credit.

Note: The work is covered in one three-hour laboratory period a week during the first half of the semester, for which one-half credit is allowed. The other half credit is given for the reports.

Fee: $2.00. Text: Record: Mechanical Properties of Wood.

240. Logging Materials. A course for students in Logging Engineering, identical for the first half of the semester with course 238. During the second half of the semester studies and tests are made on the materials of particular interest to the logging engineer, as for example, bending tests on full-size timbers, tension tests on cable, rope, and on wrought iron tie rods, etc. In all these experiments time is taken to explain the principles involved, and to point out their practical applications.

Prerequisites: Phys. 101 and 102.

Course in Logging Engineering; senior year; second semester; 2 credits: laboratory, 1 credit; reports, 1 credit.

Fee: $3.00. Text: Record: Mechanical Properties of Wood.

255. Steam Laboratory. A brief practical course on steam engines, boilers, and auxiliaries, intended for students in Logging Engineering. The work consists of eight exercises, including tests and studies of the following: pressure and vacuum gauges; steam calorimeters; injectors and feed pumps; boilers; slide-valve, automatic, and Corliss engines. A report is required for each exercise.

Note: Elementary Steam Engineering (M. E. 303), must be taken in conjunction with this course.

Course in Logging Engineering; junior year; first semester; 1 credit.

Fee: $2.00.

262. Hydraulic Laboratory. Study of methods of measuring water, calibration of weirs, orifices, water meters, etc. Determination of friction and loss of head in pipe lines and fittings. Study of water hammer, and test of hydraulic ram. Tests on water wheel, centrifugal, triplex, and other pumps. The work is covered in fifteen three-hour laboratory exercises, and a report of each test is required.

Prerequisites: Math. 51 and 52, and I. E. 102.

Course in Irrigation Engineering; senior year; second semester; 2 credits: laboratory, 1 credit; reports, 1 credit.

Fee: $2.00.

265. Hydraulic Laboratory. A brief course of a practical nature intended to accompany the course in Hydraulics (I. E. 101), for students in Irrigation Farming. Studies and tests are made on the following: pressure and vacuum gauges; methods of measuring water; flow of water through pipes and orifices; hydraulic ram; water wheel; and various types of pump. The work is covered in eight laboratory exercises, a report being required for each.

Note: Hydraulics, I. E. 101, must be taken in conjunction with this course.

Course in Irrigation Farming; senior year; first semester; 1 credit.

Fee: $2.00.

272. Gas-Engine Laboratory. Study of mechanical details of engines, battery and magneto ignition systems, carburetors, and methods of governing. Analysis of gas engine cycles from indi-

cator diagrams. Mechanical efficiency, regulation, and fuel economy tests. Economy, power, and tractive effort of automobiles.

The work is covered in fifteen laboratory exercises, and a report is required for each.

Prerequisite: The course on Internal Combustion Motors (M. E. 346), must either precede the course, or be taken in conjunction with it.

Course in Mechanical Engineering; senior year; second semester; 2 credits; laboratory, 1 credit; reports, 1 credit.

Fee: $2.00.

291. Experimental Research Problems. An opportunity is given for advanced and suitably prepared students who are interested in engineering research, to work out original problems. These may be either of their own choosing, or suggested by the department, and may cover any subject within the scope of the department laboratories.

Prerequisites: Must be approved in each case, as they would vary with the work proposed.

Elective to seniors and graduate students; first semester; 2 credits.

Fee to be arranged.

292. Experimental Research Problems. A continuation of course 291.

Elective to seniors and graduate students; second semester; 2 credits.

Fee to be arranged.

INDUSTRIAL ARTS

HENRY CLAY BRANDON, Professor
WILLIAM McCAULLY PORTER, Instructor
AMBROSE ELLIOTT RIDENOUR, Instructor
HARVEY GODFREY McCOMB, Instructor
CHARLES GEORGE WILTSHIRE, Instructor
DARWIN GREENE THAYER, Instructor
WALTER FRANKLIN MADDISON, Instructor

There is a steadily increasing demand in Oregon for competent teachers of manual training. These instructors teach in both the elementary and high-school grades. In fact, the up-to-date school provides for manual, or constructive, work of various kinds from the first grade up. The well-trained teacher must therefore understand both the technique and theory of his subject as adapted to the needs of pupils.

Below the seventh grade this manual instruction for both boys and girls is given by the regular grade teachers; but the supervisor and special teacher of manual training should be able to organize this work and correlate it with the other school subjects, and particularly with the later formal course in manual arts. For the boys, this will take the form of instruction in woodworking, metals, machine shop, and in some schools, vocational training in the various trades. For the girls, it will lead to the study of the several phases of home economics.

A college degree course of the same general standard as the other B. S. courses is provided, in order that the young men who specialize in this field may receive a preparation that will place them on a par with high-school teachers in other branches. The relation of industrial instruction in the elementary and secondary schools to the industries of life, is more fundamental and direct than most of the other branches taught. It also has its important relations to higher education. It becomes necessary, therefore, to give these instructors a training that will make them more than masters of the mechanical processes.

The properly prepared teacher of industrial arts must have an appreciative understanding of the origin and development of the industries; their relation to economic, social, and political life; and a profound conviction of the importance and dignity of their contribution to the progress of mankind. He should also have the broad sympathies of the cultured man, in order to enable him to set before his pupils high and worthy ideals of life. The artisan, artist, or professional man is first of all a man and a citizen, and our schools must make him aware of his high privileges and responsibilities.

The Industrial Arts department is a part of the School of Engineering and has under its supervision all the shop courses offered in the other departments of the College.

Equipment. This department provides the necessary equipment for carrying on the different lines of shop work in the degree and vocational courses.

The Wood Shop, supplied with the best machines and tools the market affords, contains twenty-four double benches of modern design, accommodating forty-eight students. Each bench is provided with patent rapid action vises for holding the work, and is furnished with two sets of hand tools, consisting of ripsaws, cut-

off saws and backsaws, planes, chisels, paring gouges, marking gauges, try-squares, hammers, dividers, and oilstones. The machine equipment of this shop consists of fifteen wood-turning lathes, each furnished with a set of tools; one iron saw-table with rip and cut-off saws, one band saw, one jig saw, 24-inch surface planer, 16-inch glue joiner, post boring machine, one hollow chisel mortiser and one belt sander, built by the students, and two grindstones. There are also two glue tables with clamps of various sizes and one steam and gas glue heater of three gallons capacity. The power is furnished by a three-phase induction motor of 15-horse-power.

The Forge Shop contains forty-two down-draught forges of the most approved pattern. Blast is furnished by a steel pressure blower driven by a 10-horse-power induction motor, and the smoke and gases are removed by an 80-inch exhaust fan, driven by a 20-horse-power motor. Each forge is provided with anvil, hammers, hardies, tongs, and other small tools. An emery grinder, built by students, has been added to the equipment. There are also swedge blocks and vises at convenient points in the room for general use.

The Machine Shop contains one 24x24-inch iron planer, one 15-inch shaper, one 12-inch shaper, one universal milling machine, one universal tool grinder, one wet tool grinder, one radial drill, one 20-inch drill press, one sensitive drill press, one 20-inch engine lathe, one 16-inch engine lathe, one 16-inch universal turret lathe, one 14-inch modern geared lathe, five 14-inch engine lathes, two 10-inch speed lathes, one shop saw, one automatic knife grinder, and twelve bench vises. A 20-horsepower induction motor furnishes the power. A tool room adjacent contains the small tools, such as twist drills, taps, dies, reamers, calipers, gauges, and scales. These tools are given out to the students on the check plan.

The Plumbing and Steam Fitting Shop is equipped with all of the hand tools necessary for cutting, threading, and general pipe work, as well as gasoline torches, soldering outfits, and other apparatus for making lead-pipe connections and wiped joints.

The Foundry contains a 22-inch Colliau cupola having a capacity of two tons per hour, one 1200-pound crane ladle, one 800-pound crane ladle, bull ladles, and hand ladles, one 16-inch brass furnace, brass molder's tub, crucibles, one large core-oven, one portable core-oven, one two-ton jib crane, one wall crane for

charging floor, one Delano pulley molding machine No. 2, besides shovels, rammers, and small tools to accommodate twenty students at one time. An emery grinder, built by the students, has just been added.

DEGREE COURSE IN INDUSTRIAL ARTS

	Semester 1st	2nd
Freshman Year		
Modern English Prose (Eng. 81, 82)	3	3
Trigonometry (Math. 12)		3
Commercial Geography (Com. 200)	3	
General Chemistry (Chem. 100, 101)	3	3
Shop Drawing (Ind. Arts 301, 302)	2	2
Manual Training (Ind. Arts 103, 104)	3	3
Industrial Arts Drawing (Art 411)		2
Library Practice (Libr. 1)	½	
Hygiene (Phys. Ed. 10)	½	
Drill (Military 1, 2)	1	1
Gymnasium (Phys. Ed. 15, 16)	½	½
	16½	17½
Sophomore Year		
Modern Language or Approved Elective	3	3
General Physics (Phys. 1, 2)	3	3
Patternmaking, Foundry (Ind. Arts 135, 174)	3	3
Woodwork (Ind. Arts 113)	2	
Industrial Arts Design (Art 412)	1	
Drawing (M. E. 156)		3
Drill (Military 3, 4)	1	1
Gymnasium (Phys. Ed. 17, 18)	½	½
Electives	3	3
	16½	16½

	Semester 1st	2nd
Junior Year		
Modern Language or Approved Elective	3	3
General Psychology (Ind. Ed. 101)	3	
Educational Psychology (Ind. Ed. 102)		2
Principles of Education (Ind. Ed. 131)		3
Forging (Ind. Arts 155)	2	
Hammered Metal Work (Ind. Arts 156)		2
Elementary House Planning (Arch. 701)	3	
Descriptive Geometry (M. E. 152)		3
Commercial Woods (For. 506)	2	
Plumbing (Ind. Arts 270)		2
Drill (Military 5, 6)	1	1
Military Science (Theo. Inst. 1, 2)	1	1
Electives	2	
	17	17
Senior Year		
Special Methods (Ind. Ed. 172, 173)	2	2
History and Theory of Vocational Education (Ind. Ed. 125)	2	
Machine Shop (Ind. Arts 208, 209)	2	2
Manual Training for Elementary Grades (Ind. Arts 231)		2
Machine Drawing and Design (M. E. 207)	3	
Applied Mechanics Lab. (Exp. E. 207)	3	
Power and Hydraulics Lab. (Exp. E. 208)		3
Electives	8	6
	16	16

The following courses are offered:

C-1. **Carpentry and Cabinetmaking.** The purpose of this course is to teach the pupil the elements of joinery as applied in cabinetmaking and the building trades. The beginning work is devoted to the principles of joining and to tool operations as involved in furniture making and interior finish, including design and construction, the proper use of tools, growth and strength of woods, shrinkage, warpage, and seasoning of timber, staining and polishing. Considerable attention is given to the making of working drawings of simple pieces of furniture which are built in the shops. A study of the steel square and its uses is taken up the second and the third years, and the practical use of the square

are given in brace and detailed roof construction. This work will be developed through the construction of parts of houses, barns, roofs, and bridges. In like manner, the construction of cornices, gutters, brackets, columns, window frames, and stairways is attempted. The erection of buildings in reduced scale and full sized sections of buildings is a strong feature of the course.

Supplementary lectures will be given upon the proper care of edged tools; the various woods used in building construction, their proper selection and treatment; the measurement of lumber, glues, nails, screws, bolts, nuts, pins, straps, and other fastenings. Roof trusses, spans and braces, and method of calculating their proper sizes; stair building, woodworking machinery, paints, shellacs, and varnishes; estimates and practice in working problems that are taken from the student's work, from trade journals and from actual plans and specifications of houses. These are some of the prominent features of the work.

Vocational course; Mechanic Arts; first year; first semester; 4 credits; 4 laboratory periods a week.

Fee: $6.00. Deposit: $2.00.

D-1. Carpentry and Cabinetmaking. Continuation of C-1; first year; second semester; 4 credits; 4 laboratory periods a week.

Fee: $6.00. Deposit: $2.00.

C-2. Carpentry and Cabinetmaking. Continuation of D-1; second year; first semester; 4 credits; 4 laboratory periods a week.

Fee: $6.00. Deposit: $2.00.

D-2. Carpentry and Cabinetmaking. Continuation of C-2; second year; second semester; 4 credits; 4 laboratory periods a week.

Fee: $6.00. Deposit: $2.00.

C-3. Carpentry and Cabinetmaking. Continuation of D-2; third year; first semester; 4 credits; 4 laboratory periods a week.

Fee: $6.00. Deposit: $2.00.

D-3. Carpentry and Cabinetmaking. Continuation of C-3; third year; second semester; 4 credits; 4 laboratory periods a week.

Fee: $6.00. Deposit: $2.00.

E-1. Patternmaking. The purpose of this course is to teach the elements of machine patternmaking. The student begins his course with exercises involving the use of bench tools, and the reading of working drawings. These exercises emphasize the

necessity of draught, core prints, core boxes, of allowance for shrinkage of iron and other metals, and its effect on different shapes and thickness of castings. The student is taught how to join timber to prevent warpage and distortion of patterns by using segments, staves, ribs, etc. He is taught the meaning of trade names, such as boss, fillet, flange, rib, etc.; how to operate power machinery; to keep in repair belts and line shafting; to sharpen planer, and jointer knives, band saws; and how to select materials, such as glue, lumber, shellac, and fasteners.

Much of the constructive work is upon parts of machines that are being built in the College shops, such as pulleys, pipes, fittings, valves, gear wheels, dynamo frames, lathes, emery grinders, gas engines, and other machinery.

More advanced work includes the calculation, laying out, and construction of globe valves; spur, bevel, and worm gearing propeller blades and cams.

Vocational course; Mechanic Arts; first year; first semester; 4 credits; 4 laboratory periods a week.

Fee: $6.00. Deposit: $2.00. Text: Purfield: Wood Patternmaking.

F-1. **Patternmaking.** Continuation of E-1.

First year; second semester; 4 credits; 4 laboratory periods a week.

Fee: $6.00. Deposit: $2.00. Text: Purfield: Wood Patternmaking.

E-2. **Patternmaking.** Continuation of F-1.

Second year; first semester; 4 credits; 4 laboratory periods a week.

Fee: $6.00. Deposit: $2.00.

F-2. **Patternmaking.** Continuation of E-2.

Second year; second semester; 4 credits; 4 laboratory periods a week.

Fee: $6.00. Deposit: $2.00.

E-3. **Patternmaking.** Continuation of F-2.

Third year; first semester; 4 credits; 4 laboratory periods a week.

Fee: $6.00. Deposit: $2.00.

F-3. **Patternmaking.** Continuation of E-3.

Third year; second semester; 4 credits; 4 laboratory periods a week.

Fee: $6.00. Deposit: $2.00.

G. **Woodworking.** This is a course in woodworking, including instruction in the care and use of bench tools. The student becomes an adept in the use of the steel square by exercises in brace and rafter cutting and roof framing, followed by lectures on various types of barn constructions. The practical work involves the construction of models of roofs, trusses, buildings, and parts of buildings reduced in scale.

Vocational course in Agriculture; first year; first semester; 2 credits; 2 laboratory periods.

Fee: $3.00. Deposit: $2.00.

J-1. Course in Forging. The purpose of this course is to teach the principles of forging as applied in the average jobbing shop. It deals with the method of building fires so as to obtain best results in heating; care and operation of fires and forges; the use of tools in the working out of nuts, bolts, bending of eyes, forging staple, gate hooks; bending and welding of rings and links; making of hooks, clevises, and the parts of wagons and farm machinery; the forging of tools of high carbon steel and high speed steel such as chipping chisels, lathes, sharpers, planers, and mill tools; blacksmith's and mechanic's hammers; knives, hatchets, draw knives, and other tools.

Special attention is given to the composition of iron and the various low and high speed carbon steels; and the treatment especially adapted for each grade, to annealing, tempering, and case hardening, with some lectures on the history and production of iron.

The student will have opportunity to get practical repair work on machinery brought in from the College farm—such work as plow sharpening, wagon and machine repairing. In fact, he will come in contact with most of the work that it done in an average jobbing shop.

Vocational course; Mechanic Arts; first year; first semester; 4 credits; 4 laboratory periods.

Fee: $6.00.

K-1. Course in Forging. Continuation of J-1; first year; second semester; 4 credits; 4 laboratory periods.

Fee: $6.00.

J-2. Course in Forging. Continuation of K-1; second year; first semester; 4 credits; 4 laboratory periods.

Fee: $6.00.

K-2. Course in Forging. Continuation of J-2; second year; second semester; 4 credits; 4 laboratory periods.

Fee: $6.00.

J-3. Course in Forging. Continuation of K-2; third year; first semester; 4 credits; 4 laboratory periods.

Fee: $6.00.

K-3. Course in Forging. Continuation of J-3; third year; second semester; 4 credits; 4 laboratory periods.

Fee: $6.00.

L. Blacksmithing. The student enters upon work having direct application to farming, such as the making and mending of farm implements, chains, clevises, and hooks; the ironing of whiffletrees and neck yokes; the repairing and sharpening of plows and other farm machinery. Short talks and demonstrations are given on the method of building fires so as to obtain the best results in heating, descriptions of fans and forges, the uses of tools for various forgings, and a study of the proper means of heating and treating materials to be used.

Vocational course in Agriculture; first year; second semester; 2 credits; 2 laboratory periods.

Fee: $3.00.

M-1. Course in Plumbing. The purpose of this course is to teach the students those things that will meet the needs of the average plumber. The work consists of instruction and practice in the care and handling of tools; in working with fittings, traps, valves, faucets, etc.; in working with sewer, soil, waste, water, and gas lines; in cutting and threading water pipe to measurements, using different fittings; in making fine and wiping solder, and in wiping upright joints; in laying out and constructing plumbing for buildings of two or more stories, including apartments and offices; in making range boiler and other hot-water connections; and in the practical uses of the soldering iron. The following subjects secure attention: joint wiping under varying conditions, sewer pipe laying, farm plumbing with the use of septic tanks, water supply systems, plumbing without the use of lead, sheet lead working, and estimating of plumbing construction.

Vocational course; Mechanic Arts; first year; first semester; 4 credits; 4 laboratory periods.

Fee: $6.00.

N-1. Course in Plumbing. Continuation of M-1.
First year; second semester; 4 credits; 4 laboratory periods.
Fee: $6.00.

M-2. Course in Plumbing. Continuation of N-1.
Second year; first semester; 4 credits; 4 laboratory periods.
Fee: $6.00.

N-2. Course in Plumbing. Continuation of M-2.
Second year; second semester; 4 credits; 4 laboratory periods.
Fee: $6.00.

M-3. Course in Plumbing. Continuation of N-2.
Third year; first semester; 4 credits; 4 laboratory periods.
Fee: $6.00.

N-3. Course in Plumbing. Continuation of M-3.
Third year; second semester; 4 credits; 4 laboratory periods.
Fee: $6.00.

P-1. Foundry. In the foundry course, the importance of foundry practice in the industrial trades is fully recognized. Modern practices and methods, as carried out in the best commercial foundries, are closely followed. The work is varied and is such as to keep students alive with interest and to tax their ability enough to make them think. The course comprises the following: definition and names of tools, characteristics of molding sands, use and care of tools and flasks. The first exercises are intended to familiarize the student with the proper molding condition of the sand and the correct use of the hammer and other tools. A variety of forms add interest to the work and present progressively the problems of joints, parting lines, follow boards, match plates, gates for molds, pouring basins and shrinkage gates. The patterns in general use are those for the numerous machine projects under development in the Industrial Arts department. Among other things, the student is given work germane to supporting copes, uses of gaggers, and the use of solders and how to set them; facings such as sea coal, plumbago, talc, charcoal, and the preparation of facing mixtures; molding with good patterns broken castings, skeleton patterns; sweeps; molding of sheaves, pulleys, manhole covers, and rings; brackets; gas engine cylinders; lathe beds, in open sand and pit work, are emphasized. In core making are given materials of core making, core mixtures, uses of core boxes, sweeps, core arbors, and core rods, provisions for setting large cores by hand and with crane, methods of venting, core baking, and the painting of cores.

In cupola management the student becomes proficient in preparing the cupola, in charging and pouring off.

The work also includes practice in making castings in brass, bronze, and aluminum, and the making of alloys. Additional lectures are given on malleable castings, loam molding, steel founding, mixing and melting of iron, machine molding, and foundry appliances. The student is taught to keep account of the supplies and labor and be in a position to tell the cost of any article produced in the foundry, also the value of such articles as are turned out of commercial shops.

Vocational course; Mechanical Arts; first year; first semester; 4 credits; 4 laboratory periods.

Fee: $6.00. Text: International Correspondence School pamphlets.

Q-1. Foundry. Continuation of P-1.

First year; second semester; 4 credits; 4 laboratory periods.

Fee: $6.00. Text: International Correspondence School pamphlets.

P-2. Foundry. Continuation of Q-1.

Second year; first semester; 4 credits; 4 laboratory periods.

Fee: $6.00.

Q-2. Foundry. Continuation of P-2.

Second year; second semester; 4 credits; 4 laboratory periods.

Fee: $6.00.

P-3. Foundry. Continuation of Q-2.

Third year; first semester; 4 credits; 4 laboratory periods.

Fee: $6.00.

Q-3. Foundry. Continuation of P-3.

Third year; second semester; 4 credits; 4 laboratory periods.

Fee: $6.00.

T-1. Machine Shop Practice. For students who specialize in machine shop practice, there is work in chipping and filing straight and plane surfaces, filing two pieces to fit, and instruction in laying off and boring, followed by turning of various kinds of materials at different speeds and estimating of time and cost of work done by using different methods such as with and without gauges, gigs, etc., straight and taper turning, right and left hand thread cutting, single, double, square, and cutting of rack spur bevel and worm gears. There is instruction in the use and classification of gauges, micrometers, and calipers. The advantages of the uses of taps and dies, gigs, and special tools, are taken up; as are also the methods

of center squaring, straight and taper turning and fitting, outside and inside screw cutting, chucking and reaming, finishing and polishing, drill tap and mandrel grinding, tap boring, uses of milling machine; tool making, such as taps, reamers, mill cutters, and gauges.

Practical experience is acquired through the construction of machinery, such as lathes, gas engines, steam engines, emery grinders, and through general repair work of the College.

Time cards and stock of material are kept of all work, so that the matter of cost of production is given careful consideration.

Vocational course; Mechanic Arts; first year; first semester; 4 credits; 4 laboratory periods.

Fee: $6.00. Deposit: $2.00. Text: Starrett's Hand-book.

U-1. **Machine Shop Practice.** Continuation of T-1.

First year; second semester; 4 credits; 4 laboratory periods.

Fee: $6.00. Deposit: $2.00. Text: Starrett's Hand-book.

T-2. **Machine Construction.** Continuation of U-1.

Second year; first semester; 4 credits; 4 laboratory periods.

Fee: $6.00. Deposit: $2.00.

U-2. **Machine Construction.** Continuation of T-2.

Second year; second semester; 4 credits; 4 laboratory periods.

Fee: $6.00. Deposit: $2.00.

T-3. **Tool and Gig Making.** Continuation of U-2.

Third year; first semester; 4 credits; 4 laboratory periods.

Fee: $6.00. Deposit: $2.00.

U-3. **Tool and Gig Making.** Continuation of T-3.

Third year; second semester; 4 credits; 4 laboratory periods.

Fee: $6.00. Deposit: $2.00.

103. **Manual Training.** Designed to meet the needs of those students who desire to teach manual training in the sixth, seventh, eighth, and ninth grades of the public schools. A course in wood construction and design, including theory and practice in the proper use of tools; a study of the growth and structure of woods; shrinkage, warpage, and seasoning of timber; staining and finishing. Considerable attention is given to a study of shop methods, equipment, courses of study, and proper methods of conducting class work.

Course in Industrial Arts; freshman year; first semester; 3 credits; 3 laboratory periods.

Fee: $4.50. Deposit: $2.00. Text: Griffith: Essentials of Woodwork.

104. **Manual Training.** Continuation of 103; freshman year; second semester; 3 credits; 3 laboratory periods.

Fee: $4.50. Deposit: $2.00. Text: Griffith: Essentials of Woodwork.

105. **Woodwork.** This course, which is designed for Mining Engineering students, consists primarily of a series of constructive exercises in carpentry and joining, accompanied by lectures dealing with the care and use of bench tools; the use of the steel square in framing and laying out work.

After completing the first constructive exercises, the student will take up mine timbering, truss and bridge construction.

Mining Engineering; freshman year; first semester; 2 credits; 2 laboratory periods.

Fee: $3.00. Deposit: $2.00.

106. **Woodwork.** The purpose of this course is to give instruction in the care and use of modern woodwork benches and their equipment. Six lectures will be given in this course, each lecture followed by a practical application. Skill in the manipulation of tools cannot be obtained in this short time, but instruction and practice will be given in sharpening chisels, planes, and other edge tools; in jointing, setting, and filing handsaws.

The principal feature of this course will be the instruction and practice in the use of the steel square in brace work and rafter construction.

The course in Agriculture; freshman year; first or second semester; 1 credit; 1 laboratory period.

Fee: $1.50. Deposit: $2.00.

110. **Woodwork.** A course for Logging Engineering students, consisting of a series of constructive exercises in carpentry and joining, accompanied by lectures dealing with the care and use of bench tools, and the proper method of laying out work.

Logging Engineering course; freshman year; first semester; 2 credits; 2 laboratory periods.

Fee: $3.00. Deposit: $2.00.

111. **Woodwork.** A continuation of course 110 for Logging Engineering students. This course takes up the use of the steel square in building construction, and the design and construction of trestles, trussed roofs, and timber bridges.

Logging Engineering course; freshman year; second semester; 2 credits; 2 laboratory periods.

Fee: $3.00. Deposit: $2.00.

113. **Woodwork.** Correct use of the steel square in laying out practical carpenter work, windowsills and doorsills, bay and circular windows, steps, stairs, etc.; detailed construction of the window and door frames, sills, caps, weights, and fastenings in relation to the rough framework and the exterior and interior finish of the building are taken up.

In like manner, the construction of cornices, gutters, brackets, columns, and newel posts is taken up.

As soon as the students become familiar with the detailed construction of the above, they are assigned problems involving original design and construction.

Practice in reading plans, filling out material bills, and estimating the cost of material and labor, is a strong feature of the course.

So far as possible, drawings furnished by the architectural department are used in this work.

Ind. Arts and elective; freshman year; first semester; 2 credits; 2 laboratory periods.

Fee: $3.00. Deposit: $2.00.

116. **Cabinetwork.** This course consists of the designing and construction of furniture according to the ability of the individual student. Mixing of stains, fillers, and various finishes, with their application, is a strong feature of the course.

Included in the work is a study of the design and construction of drawers and panel work, and primary upholstering.

Elective; freshman year; second semester; 2 credits; 2 laboratory periods.

Fee: $3.00. Deposit: $2.00.

131. **Patternmaking.** This course consists of a series of exercises in planing and chiseling to familiarize the student with the proper use of tools; of practical exercises emphasizing the necessity of draught core prints, core boxes; of exercises showing the necessary allowance for shrinkage of iron and other metals, and its effect on different shapes and thicknesses of castings. Exercises in wood-turning are given in conjunction with lectures on the lathe, its care and management, and the care and use of turning tools. From the simple exercise the student soon advances to the construction of patterns of parts of machinery and other structures, such as pulleys, pipe fittings, valves, gear wheels, dynamo frames, gas and steam engines, lathes, emery grinders, and other pieces of machinery.

The lectures explain the correct methods of constructing the more complicated work, the principles of molding directly related to patternmaking, shrinkage of metals, kinds of lumber best suited for patternmaking, the working and twisting of woods, glue and metal fastenings, making cores and core boxes, methods of marking and storing patterns, estimating the weight of metal castings.

Course in Mechanical Engineering; freshman year; first or second semester; 2 credits; 2 laboratory periods.

Fee: $3.00. Deposit: $2.00. Text: Purfield: Wood Patternmaking.

132. **Patternmaking.** This course and the following are a continuation of Patternmaking and are intended for engineering students who desire to devote further time to the subject, or for those who are engaged in the preparation of these, or construction work.

The work will consist largely in making patterns for steam and gas engines and other complicated machines.

Elective; first or second semester; 2 credits; 2 laboratory periods.

Fee: $3.00. Deposit: $2.00.

133. **Patternmaking.** This course is offered to students having had the equivalent of a two-credit course in patternmaking, and comprises the construction of the more complicated patterns and core boxes necessary for the building of steam and gas engines or other machine parts.

Elective; first or second semester; 1 credit; 1 laboratory period.

Fee: $1.50. Deposit: $2.00.

134. **Patternmaking.** Continuation of course 132.

Elective; second semester; 2 credits; 2 laboratory periods.

Fee: $3.00. Deposit: $2.00.

135. **Wood Turning and Patternmaking.** The principles of wood turning are taken up with reference to their application to the useful arts. This leads to patternmaking, which forms the greater part of the semester's work. One hour a week is used for shop lectures and recitations upon topics of vital importance to the work, such as selection of material, fastenings and joints, shrinkage of wood, allowance for shrinkage of metal, etc.

The course in Industrial Arts; sophomore year; second semester; 3 credits; 3 laboratory periods.

Fee: $4.50. Deposit: $2.00. Text: Purfield: Wood Patternmaking.

136. **Patternmaking.** This is a continuation of course 135, and is intended for those who desire to obtain a more detailed knowledge of the subject. The student has opportunity to enter more fully into constructive work in patternmaking, by making patterns and core boxes for parts of machines to be built in the College shops.

Elective; junior or senior year; first or second semester; 3 credits; 3 laboratory periods.

Fee: $4.50. Deposit: $2.00.

137. **Woodwork.** A general course consisting of a series of constructive exercises in simple cabinet making, accompanied by lectures on the care and use of bench tools and the use of the steel square in building construction and in some elementary patternmaking consisting of patterns emphasizing the necessity for draught, core prints, core boxes, and shrinkage. Exercises in wood turning will be given in conjunction with the lathe, its care and management, and the care and use of wood-turning tools.

Course in Electrical Engineering; first or second semester; 2 credits; 2 laboratory periods.

Fee: $3.00. Deposit: $2.00.

151. **Blacksmithing.** The student is taught to make and manage the forge fire; to shape iron by bending, upsetting, drawing, and welding. Many useful articles are made, consisting of hooks, staples, rings, clevises, and chains.

Logging Engineering, Mechanical Engineering, and Electrical Engineering; sophomore year; first semester; 2 credits; 2 laboratory periods.

Fee: $3.00.

152. **Toolmaking and Tempering.** This course is devoted to the study of the heat treatment of steel as exemplified in making and tempering tools, springs, and other articles of steel.

Prerequisite: Course 151.

The course in Mechanical Engineering; sophomore year; second semester; 1 credit; 1 laboratory period.

The course in Logging Engineering; sophomore year; second semester; 1 credit; 1 laboratory period.

Fee: $1.50.

153. **Blacksmithing.** A course for students in Agriculture. After completing the first exercise, the student enters upon work having direct application to farming, such as the mending of farm

implements, making and mending of chains, clevises, and hooks; ironing of whiffletrees and neckyokes; sharpening of tools.

Agricultural course; sophomore year; first semester; 1 credit; 1 laboratory period.

Fee: $1.50.

154. **Blacksmithing.** A continuation of course 152, for students wishing to take an entire year of blacksmithing.

Elective; sophomore year; second semester; 2 credits; 2 laboratory periods.

Fee: $3.00.

155. **Forging.** This course deals with the equipment of the blacksmith shop, and includes exercises in bending, shaping, upsetting, and welding iron. Some instruction is given also in hardening and tempering steel, and in brazing. The course is accompanied with lectures on the management of the fire, methods of construction, and shop equipment.

The course in Industrial Arts; junior year; first semester; 2 credits; 2 laboratory periods.

Fee: $3.00.

156. **Hammered Metal Work.** This course consists of hand wrought metal and enamel work, including hard and soft soldering, the formation of bowls, trays, boxes, lamp shades. The design and construction of furniture fittings.

The course in Industrial Arts; junior year; second semester; 2 credits; 2 laboratory periods.

158. **Forging and Tool Dressing.** After the minimum amount of preliminary work in forging iron, the remainder of the time is devoted to making, tempering, and dressing chisels, drills, and other steel tools.

The course in Mining Engineering; freshman year; second semester; 2 credits; 2 laboratory periods.

Fee: $3.00.

171. **Foundry Practice.** This course includes a study of the foundry equipment; care and management of cupolas; mixing and melting of iron; molding in green and dry sand; preparation of cores; casting in iron and brass.

The course in Mechanical Engineering; freshman year; first semester; 2 credits; 2 laboratory periods.

Fee: $3.00. Text: International Correspondence School pamphlets.

173. **Foundry Practice.** A course in all respects equivalent to course 171.

The course in Electrical Engineering; freshman year; first or second semester; 2 credits; 2 laboratory periods.

Fee: $3.00. Text: International Correspondence School pamphlets.

174. **Foundry Practice.** More comprehensive than course 171.

Industrial Arts; sophomore year; second semester; 3 credits; 3 laboratory periods.

Fee: $4.50.

175. **Advanced Foundry Practice.** Continuation of 171 and 173.

Elective; 2 credits; 3 laboratory periods.

Fee: $3.00.

202. **Machine Shop.** The work in the machine shop includes both bench and machine work. Upon first entering the shop the student is taught the principles of chipping, filing, and hand finishing. This occupies the first half of the semester. Machine work is then taken up through a series of exercises on lathe, shaper, planer, drill press, and milling machine. One hour of the student's time is required each week in the class room to attend lectures, work problems, or prepare other work assigned by the instructor.

The courses in Mechanical and Logging Engineering; sophomore year; second semester; 1 credit; 1 laboratory period.

Fee: $1.50. Deposit: $2.00. Text: Halsey: Machine Shop Methods.

203. **Machine Shop.** A continuation of course 202 devoted to machine construction and milling machine work. Special attention is paid to economical shop methods of doing work.

The course in Mechanical Engineering; junior year; first semester; 2 credits; 2 laboratory periods.

Fee: $3.00. Deposit: $2.00. Text: Halsey: Machine Shop Methods.

205. **Machine Shop.** This and the following courses are a continuation of 203.

Mechanical Engineering course; second semester; 3 credits; 3 laboratory periods.

Fee: $4.50. Deposit: $2.00.

206. **Machine Shop.** A course similar to course 202, designed to meet the requirements of students in Electrical Engineering.

The course in Electrical Engineering; sophomore year; second semester; 2 credits; 2 laboratory periods.

Fee: $3.00. Deposit: $2.00. Text: Halsey: Machine Shop Methods.

207. **Machine Shop.** Continuation of 206.

Elective; Electrical Engineering students; junior year; first semester; 2 credits; 2 laboratory periods.

Fee: $3.00. Deposit: $2.00. Text: Halsey: Machine Shop Methods.

208. **Machine Shop.** This course begins with the hand processes of chiseling, filing, and polishing, which are followed by a detailed study of the lathe, drill press, planer, and shaper, taught by means of carefully planned exercises. The course includes one hour a week of lecture or recitation work to supplement the instruction given in the shop.

The course in Industrial Arts; senior year; first semester; 2 credits; 2 laboratory periods.

Fee: $3.00. Deposit: $2.00. Text: Halsey: Machine Shop Methods.

209. **Machine Shop.** A continuation of course 208 in which the student becomes familiar with the more complicated machines such as turret lathes, and milling machines. Shop methods are studied with reference to economical production. The student, as far as possible, enters upon construction of machinery and apparatus for College equipment.

The course in Industrial Arts; senior year; second semester; 2 credits; 2 laboratory periods.

Fee: $3.00. Deposit: $2.00. Text: Halsey: Machine Shop Methods.

212. **Machine Shop.** Similar to 202.

Elective; first semester; 2 credits; 2 laboratory periods.

Fee: $3.00. Deposit: $2.00.

213. **Machine Shop.** Continuation of 212.

Elective; second semester; 2 credits; 2 laboratory periods.

Fee: $3.00. Deposit: $2.00.

228. **Dairy Mechanics.** This course is arranged for the students of Dairy Manufactures. An attempt is made to give in a brief way through lectures and laboratory work, a knowledge of plumbing, setting of line shafting, and the operation and repair of machinery, electric wiring, and the operation of electrical ma-

chinery. This work is given by instructors in the plumbing and machine shops, and in the electrical laboratory.

Dairy Manufactures; senior or junior year; second semester; 1 credit; 1 laboratory period.

Fee: $3.00.

231. Manual Training for Elementary Grades. This course deals with the design and construction of cardboard work, weaving, basket and mat work, stencil cutting, bookbinding, and other industrial subjects such as are taught in the first six grammar grades.

Prerequisite or parallel: Course 171 Industrial Education.

Course in Industrial Arts; senior year; second semester; 2 credits; 2 laboratory periods.

270. Plumbing. Course similar to M-1.

Elective; 2 credits; 2 laboratory periods; first and second semesters.

Fee: $3.00.

301. Shop Drawing. This course is intended for those students who are specializing in Industrial Arts. In the beginning the work is devoted to the learning of the elements of drawing, the general use of the drawing instruments, lettering general constructions, methods of representation and free-hand sketching. Considerable attention will be given to drawings of pieces of furniture and constructions in wood that may be worked out in the shops.

Course in Industrial Arts; first semester; 2 credits; 2 laboratory periods.

302. Shop Drawing. Continuation of 301.

Second semester; 2 credits; 2 laboratory periods.

MECHANIC ARTS

This is a vocational course extending through three years, during which the student devotes at least one-third of his time to shop work and trade drawing. English, mathematics, chemistry, physics, and elementary economics are also included in order to balance the course and give it educational value.

The student is permitted to specialize in the vocational work according to his individual preferences and qualifications. The choice of work includes Cabinetmaking, Patternmaking, Machine Shop Work, Plumbing, Blacksmithing, and Foundry Work.

This is not to be regarded as a preparatory course for the degree courses in engineering. Such preparation can best be obtained in the regular accredited high schools of the State. Neither is it intended that this course shall entice students away from the high schools, but that it shall fill a need not generally provided for by the secondary schools of the State.

It is the purpose of this course to assist those who expect to make their way in the world by their manual skill in various lines of activity—those who feel that they cannot afford to take a degree course in college, but desire to get some vocational training in special lines, and at the same time secure the broadening influence of education in English, mathematics, and elementary science. While it is not the primary aim to train foremen and superintendents, it is believed that students after completing the course and gaining a few years of practical experience will be able to hold positions of responsibility, or to go into business for themselves.

The shops are equipped with the latest approved machinery and are well suited to carry on these practical courses.

This work is open to students who have completed the eighth grade, or equivalent, of the common schools, and who are sixteen years of age. Those who complete the three years of work and take all of the work outlined will be entitled to a diploma. In order to secure a diploma in Patternmaking, Carpentry and Cabinetmaking, Machine Shop Practice, or Plumbing, at least two years must be devoted to the desired subject. The other year may be devoted to selected courses subject to the approval of the head of the department. A general shop course may be taken by combining one year of Machine Shop, one year of Blacksmithing, and one year of Foundry Work; or one year of Woodworking, one year of Foundry, and one year of Machine Shop.

VOCATIONAL COURSE IN MECHANIC ARTS

	Semester 1st	Semester 2nd
First Year		
Vocational English (Eng. G, H)	3	3
Algebra (Math. A, B)	5	5
Elementary Commercial Geography (Com. H)	2	
Elementary Industrial History (Com. K)		2
Vocational Drawing (M. E. A-1, B-1)	2	2
*Shop Work (According to trade selected)	4	4
Drill (Military, A, B)	1	1
Gymnasium (Phys. Ed. 11, 12)	½	½
	17½	17½
Second Year		
Advanced Vocational English (Eng. I, J)	3	3
Shop Arithmetic (Math. O)	4	
Plane Geometry (Math. L)		4
Trade Drawing (M. E. A-2, B-2)	2	2
Chemistry (Chem. A, B)	3	3
*Shop Work (According to trade selected)	4	4
Drill (Military C, D)	1	1
Gymnasium Phys. Ed. 13, 14)	½	½
	17½	17½
Third Year		
Geometry and Trigonometry (Math. T)	4	
Elementary Industrial Problems (Com. J)		3
Commercial Law (Com. L)	2	
Shop Accounting (Com. F)		2
Trade Drawing (M. E. A-3, B-3)	2	2
Physics (Phys. A, B)	3	3
*Shop Work (According to trade selected)	4	4
Drill (Military E, F)	1	1
Electives	2	2
	18	17

* Shop Work. The student will choose the general line of shop work which he desires to pursue from the following: Cabinetmaking, Pattern-making, Machine Shop Work, Plumbing, Blacksmithing, and Foundry Work.

IRRIGATION ENGINEERING

THOMAS ANDERSON HENDRICKS TEETER, Professor

Successful agriculture in the arid parts of Oregon is based on the sceience of irrigation. The widespread development of irrigation lands in this and other states of the arid west, by means of both gravity supplies and pumping systems, has extended the necessary qualifications of the engineer to include a knowledge of irrigation methods, pumping, and power machinery. The province of the engineer, therefore, comprises the development, conservation, and economical use of limited water supplies. The failure of our irrigation projects is almost invariably caused by the employment of incompetent engineers and managers. In recognition of the need, in the Pacific Northwest, for Engineers trained in irrigation and hydraulics, the course in Irrigation Engineering has been established.

Realizing, however, that the young engineer is frequently obliged to take charge of work which properly falls outside of the field in which he has specialized, the course in Irrigation Engineering is arranged to cover as broad a field as practicable, in order that the graduate may experience little difficulty in accommodating himself to the available positions. The curriculum in this department has for its purpose, in the freshman and sophomore years, the laying of a foundation on which to build the more specialized and technical work of the junior and senior years. The last two years are intended to equip the student with a well-rounded knowledge of hydraulics and irrigation engineering—a knowledge which will enable the student to hold a responsible position in reclamation work.

The work of this department is designed to furnish a thorough course of theoretical instruction accompanied by practice in the various lines of irrigation engineering. The course, moreover, is made practical by a large proportion of laboratory and field practice in conjunction with the theoretical work. Special stress is laid on the solution of problems, and experiments in the laboratory. Emphasis is laid on skill in handling surveying and water-measuring instruments. The student is taught how to make stream measurements; design, lay out, and construct dams, canals, headworks, diversion weirs, flumes, pipe lines, and distributing systems.

Inspection trips are conducted in the junior and senior years to afford the students an opportunity to familiarize themselves with actual engineering work.

Electives. Ample opportunity is given the student to elect courses outside of the School of Engineering. This provision is made that the student may be encouraged to study Economics, Political Science, Accounting, English, and Modern Languages, a knowledge of each of which is helpful, if not essential, in the engineering profession. In addition, the School of Agriculture offers to the student of irrigation engineering, special courses in forage crops, as well as climatology, farm drainage, soil physics and their relations to the growth of crops on irrigated lands.

Equipment. The excellent equipment of the Civil, Highway, and Experimental departments, as described under these respective titles, is available for use by the students in Irrigation Engineering. Besides the draughting rooms and laboratories, the student has the use of transits, levels, plane-tables, current meters, and tapes, for practical work, as well as pumps, water meters, rams, and small water wheels of the Experimental Engineering laboratories for experimental work. Facilities for experiments with small weirs, orifices, and devices for measuring irrigation water are provided.

In addition to the above facilities, the proximity of the Willamette and Mary's rivers, Oak Creek, and the mill race of the Corvallis Flouring Mills, affords excellent opportunities for practice in stream gauging. For those students who desire to prepare themselves for positions as managers of irrigation projects, the elective courses in Irrigation and Drainage will give access to the equipment of that department.

DEGREE COURSE IN IRRIGATION ENGINEERING

Freshman Year	Semester 1st	2nd
Trigonometry, College Algebra (Math. 11, 21)	5	
Elementary Analysis (Math. 31)		5
General Chemistry (Chem 100, 101)	3	3
Mechanical Drawing (C. E. 107)	3	
Engineering Drawing (C. E. 111)		3
Descriptive Geometry (M. E. 152)	3	
Library Practice (Libr. 1)	½	
Hygiene (Phys. Ed. 10)	½	
Plane Surveying (C. E. 222)		5
Drill (Military 1, 2,)	1	1
Gymnasium (Phys. Ed. 15, 16)	½	½
Spherical Trigonometry (Math. 25)	1	
	17½	17½

Sophomore Year.	Semester 1st	2nd
Differential Calculus, Integral Calculus (Math. 51, 52)	4	4
Engineering Physics (Physics 101, 102)	4	4
Topographic Surveying (C. E. 223)	5	
Railroad and Canal Surveying (C. E. 272)		5
Gymnasium (Phys. Ed. 17, 18)	½	½
Drill (Military 3, 4)	1	1
Electives (Restricted)	3	3
	17½	17½
Junior Year.		
Statics and Dynamics (M. E. 251)	5	
Strength of Materials (M. E. 252)		3
Roads and Pavements (C. E. 405)	3	
Graphic Statics (C. E. 511)	2	
Hydraulics (I. E. 102)		3
Cement and Highway Laboratory (Exp. E. 231)	2	
Structural Materials Laboratory (Exp. E. 232)		3
Masonry and Foundations (C. E. 552)		3
Military Science (Theo. Inst. 1, 2)	1	1
Drill (Military 5, 6)	1	1
Electives (Restricted)	3	3
	17	17
Senior Year.		
Engineering Seminar (C. E. 605, 606)	1	1
Reinforced Concrete (C. E. 557)	4	
Contracts and Specifications (C. E. 607)		2
Hydrology (I. E. 303)	1	
Water Supply (I. E. 305)	3	
Irrigation Engineering (I. E. 401)	2	
Design of Irrigation Structures (I. E. 402)		2
Hydraulics Laboratory (Exp. E. 262)		2
Hydraulic Pumps and Motors (I. E. 201)	2	
Soil Physics (Agron. 103)		3
Irrigation Farming (Agron. 302)		3
Water Law (I. E. 601)	1	
Electives (Approved)	2	3
	16	16

The following is a list of approved electives from which the student must choose, as indicated above, two or three credit hours each semester in those years in which elective courses are offered. Unless the student has credit for at least three credit hours of modern languages, he will not be permitted to register for less than twelve credits of any modern language course. Unless satisfactory credits are produced, no student will be permitted to register for less than six credits of economics, when such electives are chosen.

	Semester	
Sophomore and Junior Years.	1st	2nd
Modern English Prose (Eng. 81, 82)	3	3
French, German or Spanish (Mod. Lang. 101, 102, 103, 104, 201, 202, 203, 204, 301, 302, 304)	3	3
Commercial Georgaphy (Com. 202)	3	
Principles of Economics (Com. 212)		3
General Accounting, Special Accounting (Com. 107, 108)	2	3
Senior Year.		
Forage Crops (Agron. 203)	2	
Land Drainage (Agron. 301)		3
Highway Bridges (C. E. 513, 514)	4	4
Water Power (I. E. 204)		3
Electrical Machinery (E. E. 403)	3	
Electric Machine Drives (E. E. 410)		2
Advanced Materials Lab ratory (Exp. E. 235)		2
Climatology (Agron. 303)		1
Irrigation Farming (Agron. 306)	2	
Drainage Engineering (I. E. 501)	2	2

The following courses are offered:

101. **Hydraulics.** A practical application of the principles of hydraulics to irrigation farming, arranged especially for agricultural students. A study of the laws of water pressure in tanks, pipes, and flumes; the measurement of water by weirs, orifices, and current meters; the study of losses of head in pipes and the consequent effect on the discharge. The design of open channels; seepage losses; the operation of rams, pumps, and scoop wheels.

Elective for seniors in Agriculture; senior year; first semester; 2 credits; 2 lectures.

This course can be taken only in conjunction with Exp. Eng. 265, a 1-credit laboratory course, covering the same field.

Text: Merriman: Elements of Hydraulics.

102. **Hydraulics.** A technical course dealing with the elementary laws of liquids in motion and at rest; the weight and pressure of water on gates and dams; velocity and discharge through orifices, tubes, pipes, and flumes; fluid friction, losses of head, and time of emptying reservoirs.

Prerequisite: M. E. 251.

Required of juniors in Highway, Irrigation, Electrical, and Mining Engineering; junior year; second semester; 3 credits; 3 lecture periods.

Text: Russell: Text-book on Hydraulics.

201. **Hydraulic Pumps and Motors.** The application of the principles of hydraulics to the design, construction, and operation of pumps and water wheels; the various forms of wheels and pumps, their adaptability, and efficiency.

Prerequisite: Hydraulics, I. E. 102.

Required of seniors in Irrigation Engineering; senior year; first semester; 2 credits; 2 lecture periods.

204. **Water Power.** A general study of the development of water power on streams; the effect of pondage, storage, and load factor on the capacity and efficiency of the plant and equipment; a detailed study of the characteristics of modern water turbines, together with an investigation of the speed regulation and manner of governing large plants. Practical problems in the design of plants will constitute a part of this course.

Prerequisite: Water Supply Engineering, I. E. 305 or Irrigation Engineering I. E. 401.

Elective for seniors or graduates in Irrigation Engineering; senior year; second semester; 3 credits; 3 lecture periods.

Fee: $1.00. Text: Meade: Water Power Engineering.

303. **Hydrology.** A recitation and problem course dealing with the character of drainage basins; relations between rainfall and runoff; estimating flow from watersheds; variations in seasonal discharge, a study of current meters, and other instruments and methods for determining stream flow; the hydrograph and its use; the duration curve; the ripple curves and their relations to power and storage studies.

Prerequisite: I. E. 101 or 103.

Required of seniors in Irrigation Engineering; elective for Agronomy students, senior year; first semester; 1 credit; 1 recitation.

Text: Hoyt & Grover: River Discharge.

305. **Water Supply Engineering.** Preliminary investigations for determining the available supply of water for irrigation and domestic purposes; the use of the mass diagram in the study of storage; ground water resources; the source of water supplies; manner of conveying and storing water; requirements for fire protection; the economics of pumping and the proper installation of pumping plants. The solution of numerical problems is required of the student.

Prerequisites: C. E. 511, I. E. 102.

Required of seniors in Irrigation Engineering senior year; first semester; 3 credits; 2 lecture periods; 1 laboratory period.

Fee: $1.00. Text: Turneaure & Russell: Water Supply Engineering.

401. **Irrigation Engineering.** Investigations and surveys; the operation and maintenance of large irrigation projects from the engineer's point of view; precipitation, run-off, underground flow, fluctuation of stream flow; storage; methods of determining losses due to evaporation and seepage; canal linings; the phenomena of water logging and alkali deposits; drainage; the duty of water; irrigation by pumps; the location and construction of irrigation systems; diversion weirs, headgates, flumes and drops; the theory and practice of water measurements, water records, methods practiced in other countries.

Prerequisite: I. E. 102.

Required of seniors in Irrigation Engineering; senior year; first semester; 2 credits; 2 lecture periods.

Text: Etcheverry: Irrigation Structures, Vol. III.

402. **Design of Irrigation Structures.** This course deals with the storage and conveyance of water; the design of headworks and flumes; the selection of dam sites; investigations of the stability of dams in use; the design of a dam by Wegman's method; the design of pipe lines, earthen dams, and reservoirs; the design of flash boards and movable dams, hollow dams, and their application to storage and pondage. This course consists entirely of numerical problems with occasional lectures on the solution of the same.

Prerequisites: C. E. 511, I. E. 401, and I. E. 102.

Required of seniors in Irrigation Engineering; senior year; second semester; 2 credits; 2 three-hour laboratory periods.

Fee: $1.00.

501. **Drainage Engineering.** Surveys for, and design of, large drainage systems; open ditch construction, dredging and cleaning of large drainage channels; methods of computing sizes of tile drains; plans, reports and records; estimates of costs; preparation and enforcement of specifications; division of costs; inspection of drain tile.

Prerequisite: I. E. 102.

Elective for seniors in Highway and Irrigation Engineering; senior year; 2 credits; 2 lecture periods to be arranged.

Fee: $1.00. Text: Parsons: Drainage Engineering.

602. **Water Law.** A study of riparian rights; the early development of the water laws of the arid regions; doctrine of appropriation; beneficial use; comparison of California and Colorado doctrines; rights of appropriations; law of storage and diversion; rights of way; relation of water law and land law; relation of water to land appurtenant; prescription; abandonment; federal water laws; state control; water laws of Oregon; adjudication; irrigation and drainage district law; duties of state engineer; a brief comparison of Canadian and foreign water laws.

Text: Davis: The Law of Irrigation.

701. **Sanitary Engineering.** Drainage systems of populous districts, including chemical and bacterial purification of sewage; collection and disposal of garbage; street cleaning; separate and combined water carriage systems; surveys, plans, and specifications; law of flow and determination of size and capacity; brick, terracotta, cement, and concrete sewers.

Prerequisite: I. E. 102.

Senior year; first semester; 3 credits; 2 recitations; 1 laboratory period.

Fee: $1.00. Text: Folwell: Sewerage.

802. **Hydrography and Navigation.** This consists of a brief study of the figure of the earth and the celestial sphere, followed by methods of determining latitude, longitude, time, and azmuth from the sun and stars; the location of soundings, maritime charting and mapping; and the fundamentals of navigation. Numerical problems are assigned to supplement the field work.

Prerequisites: C. E. 222-223, and Spherical Trigonometry.

Elective for juniors and seniors; second semester; 3 credits; 2 recitations; 1 laboratory period.

Fee: $1.00.

MECHANICAL ENGINEERING

GRANT ADELBERT COVELL, Professor
MARK CLYDE PHILLIPS, Associate Professor
FAY HARRY ROSENCRANTS, Assistant Professor
JOSEPH BENJAMIN YODER, Instructor

The course in Mechanical Engineering has for its purpose the preparation of young men for positions of usefulness and responsibility in the industrial life of the country.

The Pacific Northwest is just now entering upon a period of rapid progress in the building of railroads, the development of water power, the marketing of forest products, and the upbuilding of manufactories, all of which require men conversant with the general principles of engineering. It is the purpose of all engineering courses to contribute to this general advancement, by turning out graduates equipped with the necessary knowledge and skill to make them active factors in this great work.

It is the general plan of the course in Mechanical Engineering to lay a broad foundation in English, Mathematics, Chemistry, and Physics, acompanied by Drawing and Shopwork, during the first two years of the course. The work of the last two years is more technical and professional in its nature, consisting in a study of the principles involved in the development of power by steam engines, water wheels, gas and gasoline engines, and steam turbines. It also involves a critical study of the design of machines and materials entering into their construction, as well as tests to determine their efficiency.

Instruction is given by means of lectures, recitations, and laboratory exercises. The scientific principles involved in machines and mechanical movements to the solution of problems in mechanical engineering. In the shops, the student learns the use of tools and the value of different methods of doing work from the standpoint of economical construction. In the draughting room, he learns to make working drawings and blueprints of machines, and to formulate designs of his own.

With these advantages to aid him, the ambitious student should be able to take and maintain a position in the general industrial and engineering development which is the leading and characteristic feature of the age in which we live.

Equipment. The laboratory equipment for this department in mechanics and power measurement, is described under Experi-

mental Engineering. The shops are under the supervision of the department of Industrial Arts.

In addition to equipment listed under these two departments, there are two large draughting rooms, each with 40 drawing tables, drawing boards for each student, and a blue-print room, with printing frame, wash trays, etc.

DEGREE COURSE IN MECHANICAL ENGINEERING

	Semester	
Freshman Year	1st	2nd
Modern English Prose (English 81, 82)*	3	3
Trigonometry, College Algebra (Math. 11, 21)	5	
Elementary Analysis (Math. 31)		5
General Chemistry (Chem. 100, 101)	3	3
Mechanical Drawing (M. E. 151)	2	
Descriptive Geometry (M. E. 152)		3
Foundry (Ind. Arts 171)	2	
Patternmaking (Ind. Arts 131)		2
Library Practice (Libr. 1)	½	
Hygiene (Phys. Ed. 10)	½	
Drill (Military 1, 2)	1	1
Gymnasium (Phys. Ed. 15, 16)	½	½
	17½	17½
Sophomore Year		
Differential and Integral Calculus (Math. 51, 52)	4	4
Engineering Physics (Physics 101, 102)	4	4
Mechanical Drawing (M. E. 153)	3	
Mechanism (M. E. 204)		3
Commercial Geography (Com. 200)*	3	
Principles of Economics (Com. 210)*		3
Blacksmithing (Ind. Arts 151)	2	
Toolmaking and Tempering (Ind. Arts 152)		1
Machine Shop (Ind. Arts 202)		1
Drill (Military 3, 4)	1	1
Gymnasium (Phys. Ed. 17, 18)	½	½
	17½	17½

*Upon approval of the Dean, students may substitute a Modern Language for English in the freshman year and for Commercial Geography and the Principles of Economics in the sophomore year.

Junior Year	Semester 1st	2nd
Statics and Dynamics (M. E. 251)	5	
Strength of Materials (M. E. 252)		3
Theory and Practice of Steam Engineering (M. E. 305)	3	
Advanced Steam Engineering (M. E. 306)		3
Applied Mechanics Laboratory (Exp. E. 201)	3	
Power and Hydraulic Laboratory (Exp. E. 202)		3
Graphic Statics (C. E. 511)	2	
Machine Shop (Ind. Arts 203, 205)	2	3
Military Science (Theo. Inst. 1, 2)	1	1
Drill (Military 5, 6)	1	1
Hydraulics (I. E. 102)		3
	17	17
Senior Year		
Machine Design (M. E. 205, 206)	4	3
Steam Boilers (M. E. 309)	2	
Electrical Machinery (E. E. 403)	3	
Steam Power Plant Design (M. E. 316)		3
Advanced Mechanics Laboratory (Exp. E. 203)	3	
Advanced Power Laboratory (Exp. E. 204)		3
Gas Engine Laboratory (Exp. E. 272)		2
Internal Combustion Motors (M. E. 346)		2
Heating and Ventilating (M. E. 331)	3	
Seminar (M. E. 351, 352)	1	1
Elective		2
	16	16

The following courses are offered:

A-1. **Vocational Drawing.** Similar to M. E. 151 except more stress is laid on the elementary principles, as the course is designed for students who have had no high-school training in drawing.

Vocational course; Mechanic Arts; first year; first semester; 2 credits; 2 laboratory periods.

B-1. **Vocational Drawing.** A continuation of A-1.

Vocational course; Mechanic Arts; first year; second semester; 2 credits; two laboratory periods.

*Upon approval of the Dean, students may substitute a Modern Language for English in the freshman year and for Commercial Geography and the Principles of Economics in the sophomore year.

A-2. **Vocational Drawing.** Continuation of B-1. As the student becomes competent he is given practical machine drafting on work through the Shops, similar to that of M. E. 153.

First semester; 2 credits; 2 laboratory periods.

B-2. **Vocational Drawing.** Continuation of A-2.

Second year; second semester; 2 credits; 2 laboratory periods.

A-3. **Vocational Drawing.** Continuation of B-2.

Third year; first semester; 2 credits; 2 laboratory periods.

B-3. **Vocational Drawing.** Continuation of A-3.

Third year; second semester; 2 credits; 2 laboratory periods.

151. **Mechanical Drawing.** The use of instruments and elementary principles of mechanical drawing are taught by a graded series of plates, including simple practice sheets, principles of orthographic projection, etc., supplemented by recitations and lectures from a standard text.

As soon as practicable the copy sheets are discontinued and the student is required to make sketches and working drawings of typical machine details, such as pulleys, fly wheels, crank shafts, pump details, etc., from actual machines available in shops and drawing room. In addition, a special drill in free-hand lettering is given at the beginning of each period throughout the course.

Electrical Engineering, Mechanical Engineering; freshman year; Logging Engineering, sophomore year; first semester; 2 credits; 2 laboratory periods.

Text: French: Engineering Drawing.

152. **Descriptive Geometry.** This course consists of the graphic solution of problems involving the projection of lines, surfaces, and solids. Special effort is made to make the work as practical as possible and to make clear the application of Descriptive Geometry to actual drafting-room problems.

Electrical Engineering, Mechanical Engineering, Mining Engineering; freshman year; second semester; 3 credits; 2 recitations; 2 laboratory periods.

Text: Ferris: Elements of Descriptive Geometry.

153. **Mechanical Drawing.** A continuation of course 151 and includes laying out of gear-teeth curves and conventional methods of representing different kinds of gears. Exercises in structural-steel drafting are also given, as well as sheet-metal layouts of a large variety of intersections, joints, etc., from principles learned in Descriptive Geometry. The remainder of the semester is de-

voted to practical machine drafting of machines and apparatus to be built in the College Shops. All articles built in the Shops are first detailed in the drawing room by the students from sketches and other data, and blueprints sent to pattern and machine shops. A number of standard sizes and a standard title are used, and every effort is made to have the work conform as closely as possible to good drafting-room practice.

Electrical Engineering and Mechanical Engineering; sophomore year; first semester; 3 credits; 3 laboratory periods.

Text: French: Engineering Drawing.

204. Mechanism. A study of mechanical movements, including velocity ratios; transmission of motion by linkwork, gearing, cams, and belting.

The course in Electrical and Mechanical Engineering; sophomore year; second semester; 3 credits; 2 recitations; 2 two-hour laboratory periods.

The course in Logging Engineering, junior year; second semester; 3 credits; 2 recitations; 2 two-hour laboratory periods.

Text: Keown: Elements of Mechanism.

205. Machine Design. This course consists largely in applying the principles discussed in mechanism and in mechanics to the design of machine parts. The work includes among other things the study of screws, fastenings, shafting, belting, fly wheels, wheels, gearing, and machine frames.

Senior year; first semester; 4 credits; 4 recitations.

Text: Kimball & Barr: Machine Designs.

206. Machine Design. This course supplements and is directly dependent upon the recitation work of course 125.

The work is taken up from a practical point of view and applies such theory as is consistent with the approved methods of design. Designs and complete working drawings are made of machines.

Senior year; second semester; 3 credits; 3 laboratory periods.

Text: Kimball & Barr: Machine Designs.

207. Machine Drawing and Design. A course in mechanical drawing involving the elementary principles of machine design.

Industrial Arts course; senior year; first semester; 3 credits; 1 recitation; 2 laboratory periods.

251. Statics and Dynamics. This is essentially a course in theoretical and applied mechanics. Force systems are analyzed and their effects upon rigid bodies, both at rest and in motion, are

carefully studied. Methods of finding centers of gravity and moments of inertia are investigated, and their practical application is brought to the student's attention by solving a number of problems. The principles of work, energy, friction, and impact, are all studied with reference to their importance in the field of engineering.

Prerequisites: Differential and Integral Calculus, Math. 51, 52.

All courses in Engineering; junior year; first semester; 5 credits; 5 recitations.

Text: Hancock: Applied Mechanics for Engineers.

252. Strength of Materials. In this course the general principles of mechanics are applied to the elements of engineering structures to determine their strength and fitness.

Some of the features are tensile and crushing strength of different engineering materials; srength and stiffness of beams or girders under different systems of loading, and various methods of support; supporting power of posts or columns; the application of torsion to shafts as a means of transmitting power.

The work throughout is exemplified by numerous problems which the student is required to solve.

Prerequisite: Statics and Dynamics, M. E. 251.

All courses in Engineering; junior year; second semester; 3 credits; 3 recitations.

Text: Boyd: Strength of Materials.

302. Road Machinery. This course is designed to familiarize the student with the purpose, care, and manipulation of the different forms of power-driven road machinery, both steam and gas, as exemplified in modern road construction.

The course in Highway Engineering; senior year; first semester; 1 credit; 1 laboratory period.

303. Elementary Steam Engineering. This course deals with the principles of steam engineering in a very elementary manner. Its purpose is to familiarize the student with the type of steam machinery largely used in the logging industry, such as donkey engines, logging locomotives, etc. This course is supplemented by course 255 in Experimental Engineering which must be taken in conjunction.

Course in Logging Engineering; junior year; first semester; 2 credits; 2 recitations.

Text: Allen & Bursley: Heat Engines.

305. Theory and Practice of Steam Engineering. This course includes a study of the elementary thermodynamic laws of gases and vapors with reference to their application to engineering practice, and aims to fulfill the essential thermodynamic requirements of the gas and steam engineer. The work will be supplemented throughout with problems.

Prerequisites: Differential and Integral Calculus, Math. 51, 52.

The course in Mechanical Engineering; junior year; first semester; 3 credits; 3 recitations.

Text: Heck: Steam Engines and Turbines.

306. Advanced Steam Engineering. A continuation of course 305, in which more time is spent on the application of the principles of thermodynamics to power plant machinery and to a study of the interrelation of power plant apparatus, including steam prime movers and boilers and their auxiliaries.

The courses in Mechanical and Electrical Engineering; senior year; either semester; 3 credits; 3 recitations.

Text: Heck: Steam Engines and Turbines.

307. Steam Machinery. This course covers in an elementary way the thermodynamics of gases, the principles of combustion and steam generation, and in general the application of heat to the production of mechanical power. The mechanical construction of the machinery essential to the process of power generation, such as the steam engine, the steam turbine, the gas engine, and the steam boiler, is also briefly discussed.

The course in Electrical Engineering; junior year; first semester; 3 credits; 3 recitations.

Text: Allen & Bursley: Heat Engines.

309. Steam Boilers. A study of the construction and operation of steam boilers, superheaters, economizers, heaters, boiler feeding devices, oil burning devices, and chimneys. It is the aim of this course to familiarize the student with modern methods and apparatus involved in the economic generation of steam.

Prerequisite: Course 305.

The course in Mechanical Engineering; senior year; first semester; 2 credits; 2 recitations.

Text: Notes.

312. Steam Turbines. The steam turbine has taken its place as one of the important factors in transforming energy into work. Hence the principles involved in its construction and operation

should be well understood by engineering students. This course considers the flow of steam through pipes and nozzles and its action on turbine buckets. The effects of superheating are noted and some attention is given to steam turbine design.

Elective; senior year; second semester; 2 credits; 2 recitations.

Text: Roe: Steam Turbines.

316. Steam Power Plant Design. The work in this course includes the design and working drawings of steam power-plant problems. Among other things considered, are the location of plants; the selection of engines, boilers, pumps, and heaters; the general arrangement of parts, including the connections, piping, and auxiliaries.

The course in Mechanical Engineering; senior year; second semester; 3 credits; 1 recitation; 2 laboratory periods.

Fee: $0.75. Text: Gebhardt: Steam Power Plant Engineering.

325. Compressed Air and Refrigeration. A course devoted to the theory, design, and operation of air compressors, fans, and blowers, the first part of the semester, and to the study of the theory and operation of commercial refrigeration systems the latter part.

Prerequisite: M. E. 305.

Elective in the senior year of the Mechanical and Electrical Engineering courses; first semester; 2 credits; 2 recitations.

Text: Thorkelson: Air Compression and Transmission.

331. Heating and Ventilating. Study of modern methods for the heating and ventilating of buildings. An outline of the work includes a study of several approved systems of heating by means of steam, hot water, or air; methods of computing radiating surface; effective methods of ventilation; general design, construction, and operation of plant.

The course in Mechanical Engineering; senior year; first semester; 3 credits; 1 recitation; 2 laboratory periods.

Text: Hoffman: Heating and Ventilation.

346. Internal Combustion Motors. In this course the application of thermodynamics to the internal combustion engine cycles, is studied with reference to the economy of operation. The theory of the combustion of gases and of the gasification of the liquid and solid fuels commonly met with in internal combustion engine practice, is discussed. The remainder of the time is devoted to a study of details, auxiliaries, and operation.

Prerequisites: M. E. 305, 306.

Courses in Mechanical Engineering; senior year; second semester; 2 credits; 2 recitations.

Text: Streeter: Internal Combustion Motors.

351. Seminar. The seminar meets once each week to study progress and development in the field of mechanical engineering. Technical literature will be reviewed; assignments will be made in advance, covering new or special features of engineering work. Students are required to submit carefully prepared reports, criticisms, or comments.

The course in Mechanical Engineering; senior year; first semester; 1 credit; 1 recitation.

352. Seminar. A continuation of course 351.

The course in Mechanical Engineering; senior year; second semester; 1 credit; 1 recitation.

SCHOOL OF FORESTRY

GEORGE WILCOX PEAVY, Dean.
HAROLD STEPHENSON NEWINS, Assistant Professor
CHARLES JUNIUS CONOVER, Instructor

NON-RESIDENT LECTURERS.

E. T. ALLEN, Western Forestry and Conservation Association
J. D. YOUNG, Inman-Poulsen Lumber Company
E. O. SIECKE, Deputy State Forester
T. T. MUNGER, Federal Forest Service
J. C. O'GORMAN, Wisconsin Logging Company
GEO. M. CORNWALL, Editor "The Timberman"
C. H. FLORY, Federal Forest Service

Oregon is the foremost timber state in the Union. Of the standing timber remaining uncut in the United States fully twenty percent is within the boundaries of the State of Oregon. According to the best available estimates, this stumpage aggregates approximately 480 billion feet, board measure. Over 11 million acres of timber land, carrying 360 billion board feet of timber are privately owned and 13 million acres, carrying 120 billion board feet, are in the National Forests. The timber in private hands is being cut as the interests of the owners direct. That in public ownership is being sold according to the requirements of the local markets. All National Forest timber is for sale.

This dual ownership of timber opens up two fields. The first is distinctly that of harvesting an immense crop of mature timber. Under the present system of taxation and with the prevailing rates of interest, private enterprise cannot profitably grow timber. The interest of the private owner is largely at an end with the removal of the standing timber. This is the sphere of the logging engineer. The domain within the National Forests is dedicated to the production of timber for all time. It is the policy of the Forest Service to restock the cutover areas and to plant all denuded areas which are capable of growing timber. The planting, growing, and protecting of timber crops, is the special field of the technical forester.

The profession of logging engineering is of recent development. In the past, low prices for standing timber, easy logging and high prices for lumber have made profits to the lumberman sure, and these same conditions have not demanded economy in operation. With high-priced stumpage, timber difficult of access, and low prices for lumber, a revolution in the entire lumber in-

dustry has been forced. It was a case of economy in operation or financial failure. Bringing the logs over rough country to the mill involves many engineering problems. Among these are the construction of logging railroads, the installation of sky line and ground logging devices, and the operation of special steam and electrical logging equipment. The course in Logging Engineering is designed to equip young men for this field. The course as outlined in this catalogue was prepared under the direction of some of the ablest timbermen in the Pacific Northwest, and the strictly technical subjects in the course are taught by one of the foremost logging engineers in the United States.

The forests of the United States are in the West. In this region the student of forestry is in immediate contact with the conditions he is studying. Oregon alone has 24 million acres of forest land. The greater part of this acreage is west of the Cascade Mountains and consequently easily accessible from the College at Corvallis. There, an immense laboratory for observation and field work is at the very doors of the School of Forestry. Through a cooperative agreement with the Forest Service, the entire school goes into the Santiam National Forest for two weeks each spring for field work. This work, largely cruising and mapping, is under the direct supervision of officers of the Forest Service, and the results of the work are accepted by the Government. Some of the largest sawmills in the world are but two hours travel from the College. Pulp mills, wood distillation plants, box and furniture factories are easily accessible. In addition to this, summer work in the forests or in logging camps is easy to obtain, and is expected of all forestry and logging students. All this points to the fact that here is the ideal place to study the profession of Forestry.

Forestry work in this country is yet in its infancy; but it is developing rapidly. When the full economic importance of our forest resources is understood, more intensive methods will be required and many times the number of men now employed will be needed. The Forest Service is steadily raising the requirements for admission to its ranks. Nontechnical men who cannot meet the new requirements are naturally retired. The field for the technically trained man is consequenty becoming broader. The State, too, is feeling the need of trained men in Forest-protection work. As time goes on this field will be much more extensive.

The work in Forestry is in charge of technically trained men, all of whom have had experience in Federal Forestry work. In

this, as well as in logging engineering, technical subjects are not permitted to crowd out other subjects requisite in an education. The logging engineer and the forester are prepared for citizenship by courses in sociology, political economy, state and local government, tax and labor problems, and other kindred subjects. The fact that the professional man should be prepared for leadership in his community, as well as for success in his chosen work, is always kept clearly in view.

Equipment. For the first time since the creation of the school of Forestry at the College it has been possible to provide adequate facilities for properly handling the work. A three-story forestry building, eighty feet wide and one hundred and forty feet long, is being constructed to house the work in forestry and logging engineering. This building will contain roomy laboratories for work in silviculture, dendrology, mensuration, forest protection, technology, drafting, and logging engineering. These laboratories will be well supplied with the various forms of instruments and equipment which the peculiar work of each requires.

In addition to the laboratories, space is to be devoted to a collection of manufactured wood products, designed to show the various uses to which wood many be put, and to a forest museum in which will be assembled large specimens of all commercial woods of the United States. All available publications dealing with forestry and logging subjects are provided for the use of students.

FORESTERS' SHORT COURSE.

(November 6, 1916 to April 13, 1917.)

There are many men in the nontechnical grades of the Forest Service who desire special instruction along certain lines. There are others who desire to get into State Forestry work or into the nontechnical work of the Forest Service. This course is planned to be of assistance to such men. The work is designed to fit the needs of the individual. For example, one who desires work in cruising and elementary surveying may take those subjects. One who desires to do special work in drafting may devote the greater portion of his time to that work. At the same time the student may take such other subjects as will best satisfy his requirements.

SUGGESTED SHORT COURSE SUBJECTS

	Semester 1st	2nd
Forest Protection (For. A. B.)	3	3
Forest Measurements (For. C. D.)	3	3
Forest Surveying and Mapping (For. E. F.)	3	3
Forest Improvements (For. G. H.)	3	3
Forest Administration (For. K. L.)	1	1
	13	13

DEGREE COURSE IN GENERAL FORESTRY

The following lists of subjects are recommended for students in general forestry and in logging engineering respectively. For graduation the College requires the student to complete 136 credit hours. Of this number, the student in general forestry must take 60 hours of professional work, 25 hours of science, 18 hours in general subjects and 6 hours in mathematics. In logging engineering the student must complete 60 hours of professional work, 10 hours of science, 18 hours of general subjects and 6 hours in mathematics. In all cases the student's course of study must be approved by the Dean of the School. Only in exceptional cases will the outlines for the Freshman and Sophomore years be modified.

Freshman Year.	Semester 1st	2nd
Modern English Prose (Eng. 81, 82)	3	3
Trigonometry (Math. 14)	3	
Elementary Analysis (Math. 34)		3
General Forestry (Forestry 101, 102)	4	1
Elementary Mensuration (Forestry 304)		4
General Chemistry (Chem. 100, 101)	3	3
Forest Botany (Botany 30, 31)	3	3
Library Practice (Lib. 1)	½	
Hygiene (Phys. Ed. 10)	½	
Drill (Military 1, 2)	1	1
Gynnasium (Phys. Ed. 15, 16)	½	½
	18½	17½

Sophomore Year.	Semester 1st	2nd
General Physics (Physics 1, 2)	3	3
General Zoology (Zool. 108, 109)	3	3
Elementary Mensuration (Forestry 305)	4	
Forest Pathology and Taxonomy (Bot. 35)		4
Silviculture (Forestry 201, 202)	3	3
Forest Geology (Geology 161)	3	
Forest Protection (Forestry 505)		3
Drill (Military 3, 4)	1	1
Gymnasium (Phys. Ed. 17, 18)	½	½
	17½	17½
Junior Year.		
National Government (Com. 320)	3	
State and Municipal Government (Com. 322)		3
Advanced Mensuration (Forestry 301, 302)	6	4
Forest Entomology (Entom. 304)		3
Advanced Silviculture (Forestry 203, 204)	3	2
Elementary Economics (Com. 210)	3	
Forest History and Economics (For. 103)		3
Military Science (Theo. Inst. 1, 2)	1	1
Military Drill (Military 5, 6)	1	1
Uses of Wood (Forestry 506)	2	
Senior Year.		
Forest Finance (Forestry 350)	5	
Working Plans (Forestry 352)		5
Dendrology (Forestry 501, 503)	5	3
Lumbering (Forestry 404)		5
Forest Improvements (Forestry 405)	3	
Timber Technology (Forestry 502)		4
Timber Testing (Exp. E. 238)		1
Seminar (Forestry 408, 409)	1	1
Adminstration (Forestry 410)	3	

DEGREE COURSE IN LOGGING ENGINEERING

Freshman Year.	Semester 1st	2nd
Modern English Prose (Eng. 81, 82)	3	3
Trigonometry (Math. 14)	3	
Elementary Analysis (Math 34)		3
General Forestry (Forestry 101, 102)	4	1
Elementary Mensuration (Forestry 304)		4
General Chemistry (Chem. 100, 101)	3	3
Woodwork (Ind. Arts. 110, 111)	2	2
Library Practice (Lib. 1)	½	
Hygiene (Phys. Ed. 10)	½	
Drill (Military 1, 2)	1	1
Gymnasium (Phys. Ed. 15, 16)	½	
	17½	17½

Sophomore Year		
Engineering Physics (Physics 101, 102)	4	4
Principles of Economics (Com. 210)	3	
Labor Problems (Com. 213)		3
Blacksmithing (Ind. Arts 151)	2	
Toolmaking and Tempering (Ind. Arts 152)		1
Machine Shop (Ind. Arts 202)		1
Elementary Mensuration (Forestry 305)	4	
Mechanical Drawing (M. E. 151)	2	
Dendrology (Forestry 504)		3
Forest Protection (Forestry 505)		3
Drill (Military 3, 4)	1	1
Gymnasium (Phys. Ed. 17, 18)	½	½
	16½	16½

Junior Year.	Semester 1st	2nd
National Government (Com. 320)	3	
State and Municipal Government (Com. 322)		3
Mensuration (Forestry 301, 302)	6	4
Logging Railroads (Forestry 601, 607)	3	3
Logging Materials (Exp. E. 240)		2
Elements of Steam Engineering (M. E. 303)	2	
Steam Laboratory (Exp. E. 255)	1	
Mechanism (M. E. 204)		3
Military Science (Theo. Inst. 1, 2)	1	1
Drill (Military 5, 6)	1	1
Senior Year.		
Logging Engines (Forestry 602)	4	
Bridge Construction (Forestry 603)		3
Logging Devices and Equipment (For. 604, 605)	5	4
Lumbering (Forestry 404)		5
Forest Valuation (Forestry 350)	5	
Timber Technology (Forestry 502)		4
Timber Testing (Exp. E. 238)		1
Electrical Machinery (E. E. 403)	3	
Electrical Lumbering Machinery (E. E. 404)		2
Special Subjects (Forestry 606)		2
Logging Management (Forestry 407)		3

The following courses are offered:

A. **Forest Protection.** Causes of forest fires. The methods of controlling forest fires. The proper organization of fire patrol over definite areas. Fire fighting devices. Lookout stations, telephone lines, roads and trails, with reference to fire control. Different methods applicable to different regions.

Forester's Short Course; first semester; 3 credits; 3 recitations.

B. **Forest Protection.** A continuation of Course A.

Forester's Short Course; second semester; 3 credits; 3 recitations.

C. **Forest Measurements.** The fundamental principles involved in computing the solid contents of logs and trees. Method of constructing scale rules. Height measures. Forest Service

methods of cruising timber. Other methods. Discounts for defects. Volume tables. Practical demonstrations in the woods.

Forester's Short Course; first semester; 3 credits; 1 recitation, 2 laboratory periods.

Fee: $1.00.

D. Forest Measurements. A continuation of Course C.

Forester's Short Course; second semester; 3 credits; 1 recitation, 2 laboratory periods.

Fee: $1.00.

E. Forest Surveying and Mapping. A study of the United States system of land surveys. Retracing surveyed lines. Methods employed in marking surveyed lines. The use of the compass; the surveyor's chain; plane table, Abney hand level. Practical field work in surveying. The use of the aneroid barometer in topographic surveying. The details of map making. Conventional signs used in mapping.

Forester's Short Course; first semester; 3 credits; 1 recitation, 2 laboratory periods.

Fee: $1.00.

F. Forest Surveying and Mapping. A continuation of course E.

Forester's Short Course, second semester; 3 credits; 1 recitation, 2 laboratory periods.

Fee: $1.00.

G. Forest Improvements. The construction of roads, trails, telephone lines, lookout stations, bridges, cabins, etc., costs.

Forester's Short Course; first semester; 3 credits; 2 recitations, 1 laboratory period.

H. Forest Improvements. A continuation of course G.

Forestry Short Course; second semester; 3 credits; 2 recitations; 1 laboratory period.

K. Forest Administration. The organization of the Federal Forest Service. The District Office. The National Forest. The State Forester's office. Organization of the State work. Forms used in the transaction of forest business. The preparation of reports.

Forester's Short Course; first semester; 1 credit; 1 recitation.

L. Forest Administration. A continuation of course K.

101. General Forestry. A preliminary survey of the whole field of forestry. A brief study of those conditions pointing to the need for conserving our natural resources. The forest regions of

the United States and the commercial trees native to those regions. Forest ownership, private, state, and national. The elements of state and national forest policy. The economic importance of the forests of the United States and of Oregon.

Freshman year; first semester; four credits; 4 lectures and recitations.

Reference texts: Van Hise: Conservation of National Resources. Moore & Brown: Elements of Forestry.

102. General Forestry. A continuation of course 101.

Forestry; freshman year; second semester; 1 credit; 1 recitation.

103. Forest History and Economics. The development of European forestry. Progress of American forestry. The economic importance of forest products. Transportation as affecting the lumber industry.

Forestry; Junior year; second semester; 3 credits; 3 lectures and recitations.

Reference text: Fernow: Economics of Forestry.

201. Silviculture. The art of establishing, developing, and reproducing trees, including their life-history, influences, modification, and growth. Forest description, covering general problems. Silvicultural systems of cutting, such as, selection, clear cutting, and coppice. Marking trees for various cuttings. Silvicultural management.

Forestry, sophomore year; 3 credits; 2 hours lecture; 3 hours field work.

Reference text: Graves: Handling of Woodlands.

Fee: $1.00.

202. Silviculture. The improvement of woodlands; clearings; thinnings; damage cuttings. Protection as related to silviculture. Forestation, including seed production, seed collection, seed preservation, and seed testing. Natural versus artificial regeneration. Nursery practice. Planting. Afforestation.

Prerequisite: Forestry 201.

Forestry; sophomore year; second semester; 3 credits; 2 lectures; 3 hours field work.

Reference text: Graves: Handling of Woodlands.

Fee: $1.00.

203. Advanced Silviculture. The practice of forestry in each silvicultural region of the United States, including study of physiography, management, protection, types, silvical characteristics

of important species, and market relations. Forest ecology, dealing with the reciprocal relations between trees and forests and their environment, including a study of types and their classification, forest formations, climate characteristics, soils, investigations, antecology, sinecology, and ecological experiments.

Prerequisite: Forestry 201 and 202.

Forestry; junior year; first semester; 3 credits; 2 recitations and 1 laboratory period.

Fee: $1.00.

204. **Advanced Silviculture.** Silvics, including the measure of tolerance, study of sample plots, economic possibilities of species, and reproduction characteristics. Each student will be required to make a detailed silvical study of some definite forest tract and present a thesis covering the work.

Prerequisites: Forestry 201, 202 and 203.

Forestry; junior year; second semester; 2 credits; 1 recitation; 1 laboratory period.

Fee: $1.00.

301. **Advanced Mensuration.** Log rules. Scaling of logs in board feet, cord measure. Making of volume tables and form factor tables. Growth studies. Yield tables. Public land surveying, including obtaining true meridian, adjustment of instruments, and methods of subdividing land. Complete valuation surveys, including application of the methods learned in courses 304 and 305 to areas of timberland. Field work at the mills and in the woods. Each student is required to assist in making a complete valuation survey and in preparing a complete report on a given piece of timber.

Forestry; junior year; first semester; 6 credits; 4 recitations; 2 field periods.

Reference text: Graves: Forest Mensuration.

Fee: $2.00.

302. **Advanced Mensuration.** A continuation of course 301.

Forestry; junior year; second semester; 4 credits; 3 recitations; 1 field period.

Reference text: General Land Office: Manual of Surveying.

Fee: $1.50.

303. **Forest Mapping.** Drill in the detail of Forest mapping. Forest Service plain lettering and conventional signs. Use of contour and road pens, ruling pen, cross section liner, pantograph, and lettering gauges. Crayon and ink coloring in Forest

Service legend, making of final reconnaissance and land classification maps.

Forestry; elective; freshman year, second semester; sophomore year, first semester; 2 credits; two laboratory periods.

304. **Elementary Mensuration.** Familiarizing students with the use of instruments employed in cruising timber: the box compass, the Forest Service standard compass, the Abney hand level, the Forest Service topographic hand level, trailer tape, cavalry sketching board. Practice in pacing. Methods of covering ground in timber cruising. Retracing Government surveys by use of original field notes. Use of light mountain transit. Stadia surveying. Triangulation.

Forestry; freshman year; second semester; 4 credits; 2 recitations; 2 field periods.

Fee: $1.50.

305. **Elementary Mensuration.** The use of Forest Service and other hypsometers, the Biltmore stock, the Forest Service cruiser's stick, calipers, diameter tape. Methods of estimating and measuring heights and diameters of trees without special instruments. Topographic surveying on forested areas. The keeping of field notes. Approved method of traversing. Practice in surveying with aneroid barometers, telescopic alidade plane table. Combinations of methods.

Forestry; sophomore year; first semester; 4 credits; 2 recitations; 2 field periods.

Fee: $1.50.

350. **Forest Finance.** Investments and costs in forest production. The value of forest property for destructive lumbering. Value of forest property for continued timber production. Appraisal of damages due to the destruction of forest property. Forest Taxation. Stumpage values. Comparison of forest values with agricultural values.

Forestry; senior year; first semester; 5 credits; 5 lectures and recitations.

Reference text: Chapman: Forest Valuation.

352. **Working Plans.** Consideration of data necessary in the preparation of working plans. Regulation of yield. The working plan report. Working plans for American forests.

Forestry; senior year; second semester; 5 credits; 5 lectures and recitations.

Reference texts: Roth: Forest Regulation. Recknagel: Theory and Practice of Working Plans.

404. Lumbering. The history of the lumber industry, including a study of the methods used in different regions. Special attention to lumbering operations in the Northwest. The transportation of logs from the woods to the mill. The use of steam machinery in skidding and hauling. Driving. The methods of milling. Seasoning and grading. The cost of logging and milling with reference to some definite operation. During the course, each student will be required to prepare a report from the data collected by personal study of some extensive logging and milling business.

Forestry; senior year; second semester; 5 credits; 2 recitations; 3 laboratory periods.

Reference text: Bryant: Lumbering.

405. Forest Improvements. A study of the planning, construction, and maintenance of the permanent improvements essential to the protection, administration, and use of a forest. Also the keeping of cost data for future estimating and supervision. Transportation improvements: roads, trails, bridges and signposts. Communication improvements: telephones, heliographs, wireless. Protective improvements: lookout stations, fire lines, tool caches. Quarters improvements: houses, cabins, barns, sheds, fences, water supply, drainage systems.

Forestry; senior year; first semester; 3 credits; 2 recitations; 1 laboratory period.

406. Field Work. This course is based upon practical work performed by the student between the sophomore and junior years or between the junior and senior years. The work must be done on some modern logging operation or in connection with some technical forestry work carried on by the State or by the Forest Service. A report based upon an approved outline must be submitted.

Forestry; junior or senior years; from 1 to 5 credits.

407. Logging Management. The business problems connected with logging. Organization of working crews. Cost of operations. Cost-keeping systems. Improved methods. Efficiency studies.

Forestry; senior year; second semester; 3 credits; 3 recitations.

408. **Seminar.** Preparation and discussion of reports of special subjects. Current forestry and lumbering literature. Each student is required to prepare a thesis on some assigned subject.

Forestry; senior year; first semester; 1 credit; 2 consultation periods.

409. **Seminar. Continuation of course 408.**

Forestry; senior year; second semester; 1 credit; 2 consultation periods.

410. **Administration.** An analysis of the organization of the Federal Forest Service. The district. The local administrative unit. Methods of conducting timber sale, grazing and special use business. Administration of State forestry business.

Forestry; senior year; first semester; 3 credits; 3 recitations.

Reference texts: Forest Service manuals and bulletins.

501. **Dendrology.** Classification and identification of forest trees, including a study of forest ecology and taxonomy. The silvical characteristics of commercial species. Life-history and requirements of trees.

Forestry; senior year; first semester; 5 credits; 3 recitations; 2 laboratory periods.

Reference texts: Sudworth: Trees of the Pacific Slope. Sargent: Trees of North America.

Fee: $2.00.

502. **Wood Technology.** Identification of wood by microscopic and macroscopic characteristics. Cell structure from a taxonomic standpoint. Defects due to knots, decay, and checks. Structural changes due to seasoning. Relation between moisture content and strength. Chemical properties. Utilization. The adaptation of wood to the minor industries. Wood preservation. Factors of decay and preservative methods. Relative value of preservatives.

Forestry; senior year; second semester; 4 credits; 3 recitations; 1 laboratory period.

Reference texts: Record: Economic Wood of the United States. Weiss: Preservation of Structural Timber. Kellogg: Lumber and Its Uses.

Fee: $2.00.

503. **Advanced Dendrology.** A continuation of course 501.

Forestry; senior year; second semester; 3 credits; 2 recitations; 1 laboratory period.

Fee: $1.50.

504. Dendrology. The course in dendrology is designed to suit the needs of the logging engineer without considering the silvical studies which are required in the general Forestry course. Species of commercial importance in the Pacific Northwest are studied and their relation to all other species is clearly defined.

Forestry; sophomore year; second semester; 3 credits; 1 recitation; 2 laboratory periods.

Reference text: Sudworth: Trees of the Pacific Slope.

Fee: $1.50.

505. Forest Protection. Protecting the forests from fire, insects, and fungi. The course deals primarily with protection from fire, laying emphasis on preventive methods such as sentiment making; laws, both state and federal; patrol; and the reduction of risk by slash disposal; fire lines; grazing, etc. Planning an adequate fire fighting system in all its scientific phases. The business of fire fighting, including discovery, communication, transportation to fire, equipment, organization and work done. Federal, state, and private fire-control organizations.

Forestry; sophomore year; second semester; 3 credits; 3 recitations.

Fee: $1.00.

506. Commercial Woods. The course is designed primarily to meet the requirements of the woodworker in choosing the species of wood best adapted to his needs, and in identifying the wood commonly used. Macroscopic and microscopic identification of different species. Dendrology and its significance in wood technology. Taxonomy, showing how trees are classed.

Industrial Arts; junior year; first semester; 2 credits; 1 lecture; 1 laboratory or field period.

Reference texts: Noyes: Wood and Forest. Kellogg: Lumber and Its Uses.

Fee: $1.00.

507. Uses of Wood. Properties which affect the values of the various species of wood. Particular advantage of wood for general building and construction. Planing mill products. Boxes and crates. Car construction, and secondary uses. Factory uses of commercial woods. Cost of lumber. Cost of building with different materials. Commercial grades. Defects. Utilization of in-

ferior woods. Durability. Cabinet and fancy woods. Identification of woods.

Forestry; junior year; second semester; 2 credits; 1 recitation; 1 laboratory period.

Reference text: Kellogg: Lumber and Its Uses.

601. Logging Railroads. Location of the road with reference to the method of logging. Title to rights of way. Clearing rights of way. Culverts. Cuts and fills. Grades and curves permissible under varying conditions. Switch backs. Inclines. Laying steel. Ballasting. A study of logging methods on different logging operations is made.

Forestry; junior year; 3 credits; 2 recitations; 1 laboratory period.

Fee: $1.50.

602. Logging Engines. A study of the construction and operation of engines used in logging operations. Laboratory and field work.

Forestry; senior year; first semester; 4 credits; 2 recitations; 2 laboratory periods.

603. Bridge Construction. This course deals with the construction of the peculiar type of bridges used in logging operations. Factor of safety. Costs. Preliminary laboratory exercises followed by studies on logging operations.

Forestry; senior year; second semester; 3 credits; 1 recitation; 2 laboratory periods.

Fee: $1.50.

604. Logging Devices and Equipment. Bridge, flume, and chute construction. Methods of slinging rigging. Types of cars. Skidding and loading devices. Electrical machines used in logging. Detailed investigation of costs and makes of equipment. Special reports accompanied by photographs, maps, and drawings will be required. At least three weeks of each semester must be devoted to the study of some up-to-date logging operation.

Forestry; senior year; second semester; 4 credits; 2 recitations; 2 laboratory periods.

605. Logging Devices and Equipment. A continuation of course 604.

Senior year; second semester; 4 credits; 2 recitations; 2 laboratory periods.

606. Special Subjects. A study of special topics connected with the logging industry. Tax law, freight rates, special laws, etc.

Elective; senior year; first semester; 2 credits.

607. **Logging Railroads.** A continuation of course 601.

Forestry; junior year; second semester; 3 credits; 2 recitations; 1 laboratory period.

Fee: $1.50.

SCHOOL OF HOME ECONOMICS

EXECUTIVE COMMITTEE
MARY ELIZA FAWCETT, Chairman
HELEN BRYCE BROOKS,
AVA BERTHA MILAM.

The School of Home Economics offers the following courses of study: a one-year vocational course, a four-weeks course in Food Preparation, Dressmaking, Textiles, etc., which is offered in connection with the Winter Short Course; a six-weeks course for teachers, offered in connection with the work of the Summer School; a night course of twelve weeks for women of mature years; two four-years courses, each of which leads to the degree of Bachelor of Science, and a graduate course leading to the degree of Master of Science.

Vocational Courses. The one-year Vocational course is provided especially for those women whose schooling may not qualify them to enter the degree courses, whose duties demand that they shall content themselves with a brief period of training for their life work, or whose aim in seeking training at the College is exclusively practical. The purpose of the other short courses in Home Economics is quite similar to this—to provide, in the short time assigned to the particular courses, the fullest and most fruitful training that is possible to offer with the facilities of a thoroughly modern School of Home Economics, and to present this training in such a way that it shall be most immediately and constructively helpful to the particular patrons of the given course. Only the one-year vocational course and the regular degree courses are outlined here, the others being presented in the usual special bulletins issued for the Winter Short Course and the Summer School.

Admission to any of the vocational courses demands an educational qualification not greater than an eighth grade or common school course; and in the instance of mature persons, otherwise capable of carrying on the work, even this qualification may be waived.

Degree Courses. These courses are planned fundamentally to equip women for their normal life service, that of home makers, as well as to prepare teachers of Home Economics, Extension Workers, Dietitians, and Institutional Managers.

Fundamentally, the young women in the School of Home Economics are offered such training as will help them to be prepared to adjust themselves readily to their environment. Since the relation of women to the economic world has undergone great changes during the last one or two decades, it follows that the education of young women must be such that it will prepare them to be efficient and serviceable to their community.

That the young women completing this course may be good citizens as well as good housekeepers; good business managers in their homes, as well as good cooks; broadly educated women, as well as specially trained workers, the courses of study in the School of Home Economics have been planned to give a liberal as well as a technical education.

Many opportunities are open for the woman capable of solving the problems of good food service for large numbers of people, and for experts in the management of large institutions. Equally attractive opportunities are available for the expert needlewoman, the tasteful designer of gowns, the competent dressmaker or milliner, the ladies' tailor, and the woman with artistic resources as a household decorator and furnisher. Opportunities for teaching Home Economics, not only in the high schools and colleges, but as supervisors in the common schools of cities, and in the consolidated community schools of progressive rural communities, are becoming more general and more desirable. Facilities for specializing in this work at the College are therefore given special attention.

More and more the life of the modern community is dependent upon institutions. Women are rapidly taking their places as executive and administrative leaders in the important functions of these institutions. Hospitals, Institutional Homes, Asylums, Educational Institutions, and Social Centers, are more and more demanding the service of the women of skilled technical accomplishments. There is a growing demand for dietitians in the hospitals and large institutions. The training in dietetics, catering, and business management offered the young women at the College through the School of Home Economics, assists in the liberal and practical preparation for this employment.

Quartered in a new building, provided with a thoroughly practical modern heating, ventilating, and sanitary system, and equipped with the most approved facilities for conducting the

work of the various departments, the School of Home Economics is in a very fortunate position for making its courses of the utmost value to its patrons—not only to its resident students, but to the communities of the State at large wherever its extension activities may penetrate.

Vocational Course.	Semester	
	1st	2nd
Food Preparation (D. S. H. 1)	5	5
Care of Children (D. S. J)		1
Hand Sewing and Garment Making, Dressmaking (D. A. K, L)	4	4
Sanitation and Care of the Home (D. S. K)	2	
Elementary Physiology (Zool. 211)	2	
Preventive Medicine (Bact. B)	1	
Home Nursing and Invalid Cookery (D. S. M)		2
House Furnishing (D. A. N)		2
Hygiene (Phys. Ed. 10)	½	
Gymnasium (Phys. Ed. 1, 2)	1	1
	15	15

REQUIREMENTS FOR GRADUATION IN SCHOOL OF HOME ECONOMICS

In order to secure the degree in Home Economics a minimum of 132 college credits must be completed. The subjects required in the Freshman and Sophomore years are prescribed. The subjects for the Junior and Senior years may be selected from the following groups:

Group I Degree Course

General group at least 18 credits.
Science group at least 6 credits.
Home Economics group at least 22 credits.
Free electives 17 credits.

Group II Degree Course

General group at least 18 credits.
Science group at least 6 credits.
Home Economics group at least 12 credits.
Free electives 27 credits.

DEGREE COURSES IN HOME ECONOMICS

Candidates for the degree of Bachelor of Science in Home Economics will pursue one of two prescribed group courses for the first two years. The freshman and sophomore years of both courses are similar but begin to differentiate in the direction of the aim of each course. The junior and senior years, however, allow liberal electives from the several groups of studies in Home Economics, a minimum number from each group being prescribed, besides a free choice varying from 17 to 27 credits from any school or department in College.

Group I comprises courses that offer to women the opportunity to prepare themselves to become teachers of Domestic Science and Domestic Art, or to become Dietitians, or Institutional Managers. The first two years, as prescribed, give the necessary foundation for any one of these occupations; the junior and senior years are elective by groups, a fact which provides for intensive specialization in any one of these departments.

	Semester	
Freshman Year	1st	2nd
General Chemistry, (Chem. 102, 103)	3	3
Hand Sewing, Garment Making, (D. A. 101, 102)	3	3
Freehand Drawing, Beg. Comp. (Art 102, 103)	2	2
College Rhetoric, (Eng. 31, 32)	3	3
Principles of Botany, (Bot. 22, 23)	2	2
Modern Language	3	3
Library Practice, (Lib. 1)		½
Hygiene, (Phys. Ed. 10)	½	
Gymnasium, (Phys. Ed. 5, 6)	1	1
	17½	17½
Sophomore Year		
Organic Chemistry; Chemistry of Foods, (Chem. 200, 402)	4	4
Food Preparation, (D. S. 101, 102)	3	3
Design and Color, (Art 204)	2	
Household Physics, (Phys. 131)	4	
Household Bacteriology, (Bact. 300)		3
Home Nursing, (D. S. 511)		3
Modern Language	3	3
Gymnasium, (Phys. Ed. 7, 8)	1	1
	17	17

The work of the junior and senior years may be elected from the groups below with the restrictions indicated at the head of each group.

General Group.

A minimum of 18 credits must be chosen from this group.
English, at least 6 credits.
Economics,)
Political Science,) at least 9 credits.
Sociology,)
Psychology, at least 3 credits.
History,
Language,
Mathematics.

Science Group.

A minimum of 6 credits must be chosen from this group.
Physiology (Prerequisite for Dietetics).
Zoology.
Chemistry.
Botany.
Bacteriology.

Home Economics Group.

A minimum of 22 credits must be chosen from this group.

	Semester	
(a) Domestic Science	1st	2nd
Dietetics, (D. S. 201)	4	
Dietetics, (Invalid Cookery) (D. S. 202)		2
Food Preparation, (D. S. 104, 105)	3	3
House Sanitation, (D. S. 301)	2	
Housewifery, (D. S. 510)		2
House Administration, (D. S. 501)		3
(b) Domestic Art		
Advanced Dressmaking, (D. A. 203, 204)	3	3
Advanced Textiles, (D. A. 601)		2
Costume Design, (D. A. 701)	2	
Dressmaking, (D. A. 201, 202)	3	3
Millinery, (D. A. 301)		2
House Construction, Decoration and Furnishing, (D. A. 501)	3	

(c) Home Administration	Semester 1st	2nd
Dietetics, (D. S. 201)	4	
Dietetics, (Invalid Cookery) (D. S. 202)		2
House Sanitation, (D. S. 301)	2	
Housewifery, (D. S. 510)		2
House Administration, (D. S. 501)		3
House Construction, Decoration and Furnishing, (D. A. 501)	3	
Food Preparation, (D. S. 104, 105)	3	3
Advanced Textiles, (D. A. 601)		2
Dressmaking, (D. A. 201, 202)	3	3

(d) Institutional Management		
Dietetics, (D. S. 201)	4	
Dietetics, (Invalid Cookery) (D. S. 202)		2
Institutional Management, (D. S. 504)	3	
Catering, (D. S. 210)		2
Food Preparation, (D. S. 104, 105)	3	3

(e) Education		
General Psychology, (Ind. Educ. 101)	3	either semester
Educational Psychology, (Ind. Educ. 102)	2	either semester
Principles of Education, (Ind. Educ. 131)	3	either semester
Special Methods in Home Economics, (Ind. Educ. 160)	3	either semester
Special Methods in Domestic Art, (Ind. Educ. 164)	2	either semester
Special Methods in Domestic Science, (Ind. Educ. 165)	2	either semester

Industrial Education 160 is prerequisite to Industrial Education 164 and 165.

Psychology, (Ind. Educ. 101) and Principles of Education, (Ind. Educ. 131) are open to juniors. Industrial Education 160 is open to juniors in the second semester.

(f) Applied Design		
Basketry, (D. A. 402)	2	
Hand Work and Weaving, (D. A. 405)		2
Design, (Art 204)	2	
Clay Modeling, (Art 413, 414)	2	2
Metal Work, (Art 600, 601)	2	2

Free Electives

An aggregate of 17 credits may be free electives. These may be chosen from any school or department in College, such as Agriculture, Forestry, Commerce, Pharmacy, etc., provided the prerequisites are met.

Group II comprises courses that offer to women the opportunity to prepare themselves in Domestic Science and Domestic Art primarily for use in the home, and at the same time afford abundant opportunity, by the freedom of election in the junior and senior years, for the gratification of individual inclination. Group II does not prepare students for positions as teachers or dietitians.

	Semester	
Freshman Year	1st	2nd
Elementary Household Chemistry, (Chem. 12, 13)	3	3
Hand Sewing, Garment Making, (D. A. 101, 102)	3	3
Freehand Drawing, Beg. Comp. (Art 102, 103)	2	2
College Rhetoric, (Eng. 31, 32)	3	3
Principles of Botany, (Bot. 22, 23)	2	2
Modern Language	3	3
Library Practice, (Lib. 1)		½
Hygiene, (Phys. Ed. 10)	½	
Gymnasium, (Phys. Ed. 5, 6)	1	1
	17½	17½
Sophomore Year		
General Science, (Physiology, Bacteriology, Physics)	4	4
Food Preparation, (D. S. 101, 102)	3	3
Design and Color, (Art 204)	2	
English	3	3
Home Nursing, (D. S. 511)		3
Modern Language	3	3
Household Accounting	1	
Gymnasium, (Phys. Ed. 7, 8)	1	1
	17	17

The work of the junior and senior years may be elected from the groups below with the restrictions indicated at the head of each group.

General Group

A minimum of 18 credits must be chosen from this group.

English, at least 6 credits.
Economics,)
Political Science,) at least 9 credits.
Sociology)
Psychology
History
Language
Mathematics

Science Group

A minimum of 6 credits must be chosen from this group.

Physiology (Prerequisite for Dietetics)
Zoology
Chemistry
Botany
Bacteriology

Home Economics Group

A minimum of 12 credits must be chosen from this group.

	Semester	
(a) Domestic Science	1st	2nd
Dietetics, (D. S. 203)	4	
Food Preparation, (D. S. 104, 105)	3	3
House Sanitation, (D. S. 301)	2	
Housewifery, (D. S. 510)		2
House Administration, (D. S. 501)		3
(b) Domestic Art		
Advanced Dressmaking, (D. A. 203, 204)	3	3
Advanced Textiles, (D. A. 601)		2
Costume Design, (D. A. 701)	2	
Dressmaking, (D. A. 201, 202)	3	3
Millinery, (D. A. 301)		2
House Construction, Decoration and Furnishing, (D. A. 501)	3	

(c) Home Administration	Semester 1st	2nd
Dietetics, (D. S. 203)	4	
House Sanitation, (D. S. 301)	2	
Housewifery, (D. S. 510)		2
House Administration, (D. S. 501)		3
House Construction, Decoration and Furnishing, (D. A. 501)	3	
Food Preparation, (D. S. 104, 105)	3	3
Advanced Textiles, (D. A. 601)		2
Dressmaking, (D. A. 201, 202)	3	3

(d) Institutional Management		
Dietetics, (D. S. 203)	4	
Institutional Management, (D. S. 504)	3	
Catering, (D. S. 104, 105)		2
Food Preparation, (D. S. 104, 105)	3	3

(e) Education		
General Psychology, (Ind. Educ. 101)	3	either semester
Educational Psychology, (Ind. Educ. 102)	2	either semester
Principles of Education, (Ind. Educ. 131)	3	either semester
Special Methods in Home Economics, (Ind. Educ. 160)	3	either semester
Special Methods in Domestic Art, (Ind. Educ. 164)	2	either semester
Special Methods in Domestic Science, (Ind. Educ. 165)	2	either semester

Industrial Education 160 is prerequisite to Industrial Education 164 and 165.

Psychology, (Ind. Educ. 101) and Principles of Education, (Ind. Educ. 131) are open to juniors. Industrial Education 160 is open to juniors in the second semester.

(f) Applied Design	Semester 1st	2nd
Basketry, (D. A. 402)	2	
Hand Work and Weaving, (D. A. 405)		2
Design, (Art 204)	2	
Clay Modeling, (Art 413, 414)	2	2
Metal Work, (Art 600, 601)	2	2

Free Electives

An aggregate of 27 credits may be free electives. These may be chosen from any school or department in College, such as Agriculture, Forestry, Commerce, Pharmacy, etc., provided the prerequisites are met.

DOMESTIC ART

HELEN BRYCE BROOKS, Professor
GRACE GILLETT, Instructor
BARBARA MOORE, Instructor
CORA ELIZABETH PLATT, Instructor
HELEN PEER, Instructor
JUNE SEELEY, Instructor
ANNA CASTLEBERRY, Instructor
MARGARET MOREHOUSE, Instructor

The following courses are offered:

K. Hand Sewing and Garment Making. Lectures relating to textiles, their production and manufacture, given for the purpose of assisting the home maker in her selection and use of the fabrics used in the home. Emphasis upon the care and storage of household linens. The laboratory work is planned to give the student practical experience in the making of all needlework problems that are to be met in the home.

Vocational course; first semester; 4 credits; 2 recitations; 4 laboratory periods.

Fee: $0.50.

L. Dressmaking. Follows Course K. Lectures relating to the manufacture of cloth, its adulteration, economical purchasing, and use. Laboratory work gives the student experience in the making of wash dresses, childrens' dresses, woolen dresses, and the renovating and making of one woolen dress. Draughting of patterns; the use of commercial patterns.

Vocational course;second semester; 4 credits; 2 lectures; 4 laboratory periods.

Fee: $0.50.

N. House Furnishing. A practical course in the decorating and furnishing of the entire house. The problems of the economic and artistic furnishing will be considered. Visits to house-furnishing stores for the purpose of selecting materials will be a feature of this course.

Vocational course; second semester; 2 credits; 2 lectures; 1 laboratory period.

Fee: $0.50.

101. **Sewing.** The fundamental principles of hand and machine sewing applied to household linens and undergarments. Darning, patching, and care of clothing are considered.

The study of the development of the textile industries will give a deep appreciation for fabrics, and the responsibility for thoughtful purchasing.

Freshman year; first semester; 3 credits; 1 recitation; 3 laboratory periods.

Fee: $0.50.

102. **Garment Making.** Continuation of course 101 in which draughting and making of undergarments will be presented. Simple embroidery stitches will be taught where such are applicable. The study of cotton will give an added value to the garments being made.

Prerequisite: Domestic Art 101.

Freshman year; second semester; 3 credits; 1 recitation; 3 laboratory periods.

Fee: $0.50.

201. **Dressmaking.** The fundamental principles of dressmaking; the draughting, making, and adjusting of patterns to measurements; the making of shirt waists, tailored skirts, and a simple cotton dress.

The textile work will be a study of linen.

Prerequisites: Domestic Art 101, 102; Art 102, 103.

Junior year; first semester; 3 credits; 1 recitation; 3 laboratory periods.

Fee: $0.50.

202. **Dressmaking.** Continuation of course 201.

The textile work will be a study of silk and wool.

Prerequisite: Domestic Art 201; Art 204.

Elective; 3 credits; 1 recitation; 3 laboratory periods.

Fee: $0.50.

203. **Tailoring.** This course has for its problem the making of a cloth jacket suit. Careful draughting of the patterns and excellence of construction and finish will be required.

Prerequisites: Domestic Art 202, 203.

Elective; second semester; 3 credits; 1 recitation; 3 laboratory periods.

Fee: $0.50.

204. **Advanced Dressmaking.** Draughting and making of elaborate gowns. Emphasis on color combinations, technique, suitability of design for material used, and for purposes intended.

Prerequisites: Domestic Art 202, 701.

Elective; first semester; 3 credits; 1 recitation; 3 laboratory periods.

Fee: $0.50.

301. **Millinery.** Designing and constructing buckram and wire frames. Making and placing of trimmings, renovation of materials, straw sewing, bow making, and the construction of a hat from foundation to completion.

Elective; second semester; 2 credits; 2 laboratory peirods.

Fee: $1.00.

401. **Basketry.** A form of decorative art which involves careful consideration of form, color, and design; these principles will be considered in the making of rugs, reed baskets, stools, and raffia baskets.

Elective; first semester; 2 credits; 3 laboratory periods.

Fee: $4.00.

404. **Handwork and Weaving.** The study of advanced handwork, knitting, weaving, embroidery stitches and design as applied to costume, embroidery, and decorative design for household purposes.

Elective; second semester; 2 credits; 3 laboratory periods.

Fee: $3.00.

501. **House Construction and Decoration.** Two lectures and two laboratory periods each week to the study of house construction and furnishings. The laboratory hours are devoted to the making of plans for medium-sized residences; the best utilization of space, the most economical placing of equipment, and the decoration and furnishing of a house in the most economical, sanitary, and artistic manner. The lectures relate to the development of house building and reasons for the selections. All phases of house furnishing will be studied—floor coverings, furniture, linens needed, curtain hangings, china, silver, pictures—in such a manner as to give a full grasp of a problem likely to be met by every student.

Elective; either semester; 3 credits; 2 recitations; 2 laboratory periods.

Fee: $0.50.

502. **House Construction and Decoration.** Continuation of 501.

Elective; second semester; 2 credits; 1 recitation; 2 laboratory periods.

Fee: $0.50.

601. **Advanced Textiles.** The identification of textile materials, their names, kinds, prices, and widths; variation in weave in regard to beauty and strength; the use and value of cotton, silk, wool, and linen for clothing and household furnishings. The identification of fibers and substitute material by means of the microscope; the chemical examination of fibers, including tests to determine content of cloth and adulteration; and proper use of materials in relation to cleansing and laundering.

Elective; second semester; 2 credits; 2 recitations; 1 laboratory period.

Fee: $0.50.

701. **Costume Design.** Study of the figure; sketching of garments, hats, and gowns; draughting of patterns; designing and modeling in material; study of design for embroidery and dress decoration.

Elective; first semester; 2 credits; 1 recitation; 2 laboratory periods.

Fee: $1.00.

DOMESTIC SCIENCE

AVA BERTHA MILAM, Professor
ALICE MARKS DOLMAN, Assistant Professor
SARAH LOUISE LEWIS, Assistant Professor
ALMA GRACE JOHNSON, Instructor
BERTHA DAVIS, Instructor
LAURA JEAN CHENEY, Instructor
LILLIAN WILES FRANCIS, Instructor
CHRISTIE MOORE, Instrucor
SIBYLLA HADWEN, Instructor
INEZ BOZORTH, Secretary

The Department of Domestic Science is located in the new Home Economics building and occupies the basement, first floor, and one-half of the second floor of the completed east wing of this structure. There are four large laboratories, with excellent modern equipment for all types of food preparation. A small laboratory is equipped with various kinds of cooking apparatus and is designed for experimental work. Adjoining the experimental laboratory is a

dining room large enough to accommodate twenty people. This is used for meal serving and enables the students to put into actual practice the knowledge gained elsewhere.

Equipment has been installed in the cafeteria for the use of classes in Industrial Management.

The following courses are offered:

H. Food Preparation. The study of food, its source, its economical purchase, storage, and use. The effect of heat and micro-organisms on food, the preservation of fruits and vegetables by canning, and changes undergone by food materials in the body. Laboratory work in the preparation of vegetables, fruits, meats, breads, cakes, and pastry with study of proper combinations and the careful estimation of costs and quantities.

Vocational course, first semester; 5 credits; 3 recitations; 4 laboratory periods.

Text: Kinne & Cooley: Foods and Household Management.

Fee: $6.00.

I. Food Preparation. A continuation of course H. Careful instruction in the preparation of menus and the selection of food that it may be properly adapted to the age and need of the consumer. Special attention to the preparation and service of meals.

Vocational course, second semester; 5 credits; 3 recitations; 4 laboratory periods.

Text: Kinne & Cooley: Foods and Household Management.

Fee: $6.00.

J. Care of Children. Lectures relating to proper feeding and care of the child; its physical, mental, and moral development from infancy through adolescence.

Vocational course, second semester; 1 credit; 2 lectures.

K. Sanitation and Care of the Home. Lectures and laboratory hours relating to the study of the home. The choice of site for a dwelling. General construction, lighting, heating, plumbing, disposal of waste, and general care of the dwelling house. Laboratory time devoted to the study of modern labor-saving devices of the household and the best cleaning agents, the care of floors and woodwork, and the common laundry operations. This course is optional with that of English.

Vocational course; first semester; 2 credits; 2 lectures; 1 laboratory period.

Fee: $0.50.

M. Home Nursing and Invalid Cookery. Lectures on the observation of symptoms, the administration of food and medicine, and the general care and comfort of the sick under home conditions.

The laboratory consists of the preparation of food for the sick and the manner of service.

This course is optional with that of English.

Vocational course, second semester; 2 credits; 2 lectures; 1 laboratory period.

Text: Aiken: Home Nurses Handbook of Practical Nursing.

Fee: $2.00.

101. Food Preparation. An introduction to the subject of foods in their scientific and economic aspect. Laboratory work in the preparation of foods, with a study of the changes brought about by the application of heat. Experiments to illustrate the principles involved in cookery. The classes prepare all the common foods, in many ways. The lecture work includes the production, manufacture, and use of all food materials.

Prerequisites: General Chemistry 102, 103.

Sophomore year, first semester; 3 credits; 2 recitations; 1 laboratory period.

Text: Sherman: Food Products.

Fee: $3.00.

102. Food Preparation. A continuation of course 101.

Sophomore year, second semester; 3 credits; 2 recitations; 1 laboratory period.

Fee: $3.00.

103. Food Preparation. A survey course of 101 and 102 for graduates of secondary schools with training in Domestic Science.

Sophomore year; first semester; 3 credits; 2 recitations; 1 laboratory period.

Fee: $3.00. Text: Sherman: Food Products.

104. Food Preparation. Elaboration of the principles taught in Food Preparation 101, 102. The laboratory work includes canning of fruits and vegetables, the making of jelly, and advanced work in vegetable cookery, meats and flour mixtures. The lectures are devoted to the study of nutrition and the cost of foods.

Prerequisites: Domestic Science 101 and 102. Organic Chemistry; Chemistry of Foods (Chemistry 200, 402.) Principles of Botany (Botany 20, 21.) Bacteriology 300.

Elective, first semester; 3 credits; 2 recitations; 1 laboratory period.

Fee: $3.50. Text: Stiles' Nutritional Physiology.

105. **Food** Preparation. A continuation of Food Preparation 104. Part of the time will be devoted to the preparation and serving of practice meals.

Elective, second semester; 3 credits; 2 recitations; 1 laboratory period.

Fee: $3.50. Text: Stiles' Nutritional Physiology.

110. **Experimental Cookery.** The various methods and temperatures used in cooking are tested as to results. Wood, alcohol, oil, gasoline, and electricity are all used to produce the required heat and their comparative cost and effectiveness are studied. Labor-saving cooking devices are experimented with and the results recorded.

Prerequisite: Domestic Science 104, 105.

Elective; second semester; 2 credits; 2 three-hour laboratory periods.

Fee: $2.00.

120. **Methods in Demonstration.** A course in which students are prepared to give public demonstrations in food preparation. Lectures are given on the results to be attained from demonstrations, equipment required, organization of plans, and general methods of procedure. Demonstrations are given by various teachers before the students, followed by student demonstrations.

Prerequisite: Domestic Science 104, 105.

Elective; second semester; 1 credit; 1 three-hour laboratory period.

Fee: $1.50.

180. **Food Preparation.** For women desiring knowledge of home cookery. A study of typical foods and their preparation in attractive forms, with the planning and serving of meals.

One evening lesson a week. A term of twelve lessons.

Either semester; hours to be arranged.

Fee: $2.50.

190. **Camp Cookery.** Instruction in various ways of combining into palatable and nutritious products such food materials as are available for use in camps. The making of different kinds of breads, as well as mulligans, griddle-cakes, and other camp dishes; practice during the latter part of the course in preparing food out

of doors by means of Dutch ovens; reflectors, and improvised cooking utensils.

Elective; junior or senior year in Forestry, Agriculture, Engineering and Commerce courses; second semester; 1 credit; 1 laboratory period.

Fee: $2.50.

191. **Food Preparation.** A course designed to help men in planning and preparing their own meals. Instruction is given in the uses of foods in the body, the factors affecting food requirements, and the making of menus suited to the needs of individuals under various conditions of living. The practical work includes the making of numerous dishes and the serving of well-balanced meals at a reasonable cost.

Elective to all men of the College; first semester; one credit; one laboratory period.

Fee: $2.00.

201. **Dietetics.** A scientific study of food materials in their relation to the daily dietary of families under various conditions of health and environment; a study of the dietary standards and the metabolism of carbohydrates, fats, and proteins. A comparison of the nutritive values of the common foods, made by computing, preparing, and serving dietaries of specific costs, furnishing specific nutrients.

Prerequisites: Domestic Science 104 and 105, Physiology 207, 208.

Elective; first semester; 4 credits; 2 recitations; 2 laboratory periods.

Fee: $4.00. Text: Rose: Laboratory Manual of Dietetics; Farmer: Boston Cooking School Cook Book; Hill: Practical Cooking and Serving; Sherman: Chemistry of Food and Nutrition.

202. **Dietetics.** The preparation of food for the young child. The preparation of invalid diets and the study of disease as affected by foods.

Prerequisite: Domestic Science 201.

Senior year, second semester; 2 credits; 1 recitation; 1 laboratory period.

Fee: $2.00.

203. **Dietetics.** A simplified course in dietetics dealing with a study of food materials in their relations to daily dietaries of families under various conditions of health and environment, and a

comparison of nutritive values of common foods made by computing, preparing, and serving dietaries of specific costs furnishing specific nutrients.

Prerequisites: Household Chemistry, 6 credits; General Science, 8 credits; Domestic Science 101, 102, 104, 105.

Elective, second semester of senior year, 4 credits; two recitations, two laboratory periods.

Fee: $4.00.

210. **Catering.** Designed to prepare students for positions in large institutions, and to enable them to establish and maintain tea rooms and lunch rooms, and to act as caterers for private entertainments. The students assist in the purchase, preparation, and service of foods in the cafeteria, and are expected to devote the equivalent of eighteen hours a week to the course.

Elective; senior year; either semester; 2 credits; 1 laboratory period of six hours.

Fee: $2.00.

301. **House Sanitation.** The house as a factor in health. Situation, surroundings, ventilation, heating, drainage, plumbing, lighting, and furnishing of the house. Investigation will be made of general sanitary conditions from a practical and scientific standpoint with special reference to the needs of the community, the household, and the school.

Prerequisite: Household Physics.

Junior year; first semester; 2 credits; 2 recitations.

Text: Talbot: House Sanitation (as guide).

501. **Household Administration.** This course deals with the organization and control of the family, the economic relations of the household, applying scientific and economic principles to its problems, including a study of the family income, and its equivalent in productive labor within the household. The family expenditures and their regulation. The study of the budget as a measure of standards of living; the domestic service problem and household efficiency.

Prerequisite: Economics 211.

Senior year; either semester; 3 credits; 3 recitations.

Text: Richards: The Cost Of Living.

504. **Institutional Management.** A course in the purchase of food and equipment in large quantities, methods of record keeping,

making of menus and the general methods of sanitation and care of buildings wherein many are housed.

Prerequisites: Domestic Science 104 and 105, Economics 211.

Parallel or prerequisite: Household Administration.

Senior year; either semester; 3 credits; 3 laboratory periods of three hours each.

510. **Housewifery.** A study in the efficient care of the house, from the chemical, economic, and practical standpoints, including such matters as the treatment of floors, walls, and woodwork; the removal of stains; the cleaning of rugs and carpets; laundering of household linen and clothing, and the selection of cleaning apparatus and machinery.

Prerequisites: General Chemistry 102, 103.

Fee: $0.50. Text: L. Ray Balderston: Laundering.

Junior year; either semester; 2 credits; 1 3-hour laboratory period.

511. **Home Nursing.** The scientific care of the patient under home conditions, including bathing, dressing, and the administration of foods and medicine. The study of the observation of symptoms; first aid to the injured; disinfection and the management of communicable diseases.

Sophomore year; either semester; 3 credits; 3 recitations.

Text: Maxwell & Pope: Practical Nursing.

550. **Modern Problems in Household Administration.** The topics assigned for research will be chemical, physiological, bacteriological, economical, or sociological, according to the preferences and training of the individual students.

Graduate year; first semester; credits to be arranged.

551. **Modern Problems in Household Administration.** A continuation of the research work commenced in course 550.

Graduate year; second semester; credits to be arranged.

560. **Social Ethics.** ½ credit; 1st semester.

701. **Special Research in Cookery.** In assigning research problems for graduate students, both the previous training and the students' preferences are considered. Assignment of problems to be worked upon during the year is made by the professor in charge.

Graduate year; first semester; credits to be arranged.

702. **Special Research in Cookery.** Continuation of research work commenced in course 701.

Graduate year; second semester; credits to be arranged.

SCHOOL OF MINES

HENRY MARTIN PARKS, Dean.

Four-years courses leading to the degrees Bachelor of Science in Mining Engineering, Ceramics, and Chemical Engineering are offered. The advanced degrees Mining, Ceramic, and Chemical Engineer are conferred upon the completion of the requisite amount of graduate work, as prescribed elsewhere in this catalogue.

Instruction is given by means of lectures and textbooks, supplemented by recitations, and by a great deal of work in the laboratories and field. While the more theoretical studies are not neglected, a determined effort is made to emphasize the practical application and value of all the subjects taught. For this reason, nearly fifty per cent of a student's time is spent in laboratory courses.

The School of Mines occupies a new, commodious, three-story and basement building especially designed for housing the lecture rooms and laboratories devoted to mining, metallurgy, ore dressing, geology, ceramic engineering, chemical engineering, and closely allied subjects.

The first two years in all three departments are identical, and are intended to give the student a thorough comprehension of those studies basic to all branches of engineering: namely, Mathematics, Physics, Chemistry, Mechanical Drawing, Plane Surveying, and Shop Work. To these fundamental subjects are added courses in Mineral Industry, Crystallography and Blowpipe Analysis, and Determinative Mineralogy.

In the last two years, the student takes up the technical studies distinctive of the course pursued. This leads to considerable variation in the work of the different departments, as is indicated in the outline of courses. Statics and Dynamics, Strength of Materials, Hydraulics, and Electrical Machinery are required, however, in all of them.

At least two months employment in industrial lines closely allied to the course pursued, is a prerequisite to entrance upon the senior year.

The work in the School of Mines is so broad in nature that it should equip a student for general engineering operations of many

kinds, but particular emphasis is placed, naturally, upon preparation for those fields of activity that are concerned with the discovery, mining or quarrying, and preparation for market, of the mineral wealth with which the Northwest is so richly endowed.

Equipment. The new Mines building provides spacious and well-lighted offices, laboratories, and lecture rooms for the work of this department.

The Assaying and Metallurgical laboratory is a cement-floored room 30 feet wide and 60 feet long on the first floor of the building and extends across the entire east end. It is amply lighted by windows on one side and both ends. At the south end of the room are the most modern type of oil and gasoline furnaces for fusion and other fire work. Conveniently arranged nearby are suitable lockers and work tables with the necessary tools, fluxes, etc. The north end of the room is adequately equipped with sinks, ventilating hoods, gas burners, electric hot plates, and other apparatus for carrying in the various operations involved in parting buttons, assaying solutions, making cyanide tests, etc. One corner of the laboratory is partitioned off for a balance room and provided with the most delicate balances obtainable for weighing the gold beads. Balances of both the Keller and Ainsworth makes are available. These are mounted on a specially constructed table not connected with the floor, in order to avoid vibration.

The Crushing and Sampling laboratory in the basement is 25 feet by 30 feet. It contains a power-driven sample crusher of the latest design and one of the recently modeled disk grinders, for properly pulverizing samples for assay or other purposes. The usual bucking-board and muller and other hand-grinding devices are also available for student use, together with a Jones sampler and other appliances used in preparing samples. All such work is done in this room, to avoid dust in the other laboratories.

The Ore-Testing laboratory is a room 25 by 30 feet on the first floor of the building. It is equipped with appliances for studying the behavior of ores when subjected to the various operations of jigging, vanner, table, and magnetic concentration.

The Mining Draughting room is furnished with convenient desks and tables and all necessary equipment for the use of mining students.

REQUIREMENTS FOR GRADUATION IN SCHOOL OF MINES

For graduation in the School of Mines a total of 136 college credits must be completed. It is expected that the suggested schedule as listed elsewhere for this School will be closely followed. Before graduation a student must complete credits as indicated in the following groups:

General group at least	3 credits
Science group at least	56 credits
Mining group at least	40 credits
Mathematics group at least	21 credits
Shop-work group at least	2 credits
Gymnasium at least	2 credits
Military Science at least	2 credits
Military Drill at least	6 credits
Restricted Electives at least	4 credits

MINING ENGINEERING

HENRY MARTIN PARKS, Professor.
WILLIAM HAWES COGHILL, Professor
GEORGE ELWIN STOWELL, Instructor.

The course in Mining Engineering is designed to give the student a thorough training in the fundamentals of the science of mining and metallurgy. It is of such a comprehensive character that a graduate finds it of aid in varied employments. He may expect that after having acquired the necessary maturity he will be able to hold a position as an assayer or chemist; a land or deputy mineral surveyor; a draughtsman and designer in an engineering establishment; on the geologic staffs of railroads, mining, or exploration companies; in the land classification work of the Government Forest Service; in the Government Geologic or Coast and Geodetic Surveys; on state geological surveys or in any one of many branches of actual mining, milling, and smelting operations.

DEGREE COURSE IN MINING ENGINEERING

	Semester 1st	2nd
Freshman Year.		
Trigonometry, College Algebra (Math. 11, 21)	5	
Elementary Analysis (Math. 31)		5
General Chemistry (Chem. 105, 106)	5	5
Mechanical Drawing (C. E. 107)	3	
The Mineral Industry (Min. 209)	1	
Descriptive Geometry (M. E. 152)		3
Mod. Eng. Prose (Eng. 91, 92)	2	1
Blacksmithing (Ind. Arts 152)		2
Drill (Military 1, 2)	1	1
Gymnasium (Phys. Ed. 15, 16)	½	½
	17½	17½
Sophomore Year		
Differential and Integral Calculus (Math. 51, 52)	4	4
Engineering Physics (Phys. 101, 102)	4	4
Quantitative Analysis (Chem. 401)	5	
Methods in Gas Analysis (Chem. 417)		1
Crystallography and Blowpipe Analysis (Geol. 111)	3	
Determinative Mineralogy (Geol. 112)		3
Plane Surveying (C. E. 232)		4
Drill (Military 3, 4)	1	1
Gymnasium (Phys. Ed. 17, 18)	½	½
	17½	17½
Junior Year		
Statics and Dynamics (M. E. 251)	5	
Strength of Materials (M. E. 252)		3
Hydraulics (I. E. 102)		3
Electrical Machinery (E. E. 401)	3	
Fuels and Metallurgy of Iron and Steel (Chem. E. 410)		2½
General Geology (Geol. 135)	2	
Petrology (Geol. 137)		3
Fire Assaying (Chem. E. 401)	4	
Mine Surveying and Mining Land Law (Min. 212)		3
Drill (Military 5, 6)	1	1
Military Science (Theo. Inst. 1, 2)	1	1
	16	16½

Senior Year	Semester 1st	2nd
Metallurgical Laboratory (Chem. E. 423)	2	
Cyanidation of Ores (Chem. E. 421)	2	
Metallurgy of Lead, Copper (Chem. E. 412)		2
Mining and Power Equipment (Min. 231)	3	
Mining Methods (Min. 224)		3
Mine Economics (Min. 222)		3
Ore Dressing (Min. 251)	3	
Flotation (Min. 252)		3
Economic Geology (Geol. 182)	3	
Mining Geology (Geol. 181)		3
General Engineering Laboratory (Exp. E. 210)		2
Technical English (Eng. 141)	3	
	16	16

The following courses are offered:

209. **The Mineral Industry.** An introductory course designed to give to the School of Mines student a general idea of the main features of his profession. Elementary geology occupies the first two months of the semester and is a brief discussion of the subject, the aim being to summarize the various phases that are taken up in detailed courses later. Several lectures on the ceramic industry are given and several devoted to the essentials of mining and metallurgy. This course covers the whole field of the mineral industry. A certain amount of time is spent in the study of the mineral resources of Oregon.

Freshman year; first semester; 1 credit; 2 lectures. Required of students in the School of Mines but elective to any one interested.

212. **Mine Surveying and Mining Land Law.** Supplementary to Plane Surveying, taken in the freshman year. Methods used in underground surveying and mine mapping, in locating and patenting claims, and in such geodetic and topographic surveying as a mining engineer is often called upon to do, are studied; facility in the practical application of these methods is imparted by actual work in the field. Considerable attention is given to the solution of the many problems involving surveying which arise in mining operations; and some time is devoted to the study of the laws regulating the location, possession, and operation of mineral deposits in the United States.

Prerequisite: C. E. 201. Text-book: Trumbull: "Underground Surveying."

Junior year; second semester; 3 credits; 2 recitations; 2 laboratory periods.

Deposit: $2.00.

222. Mine Economics A detail study of the cost of extracting from mines, under varying conditions, gold, silver, copper, iron, and other metal ores, as well as coal.

Prerequisite: Completion of freshman, sophomore, and junior work in Mining Engineering.

Senior year; second semester; 3 credits; 4 recitations.

224. Mining Methods. A study of the various methods used in securing the mineral products. The subject includes methods of timbering, methods of mining, pumping, ventilation, transportation, hoisting, mine sampling and reporting, installation of machinery, and surface improvements. Presented largely through lectures and directed reference work.

Prerequisite: Completion of freshman, sophomore, and junior work in Mining Engineering.

Senior year; second semester; 3 credits; 4 recitations.

231. Mining and Power Equipment. A study of types of haulage systems, hoists, compressors, drills, pumps, explosives, etc. It also involves a discussion of the sources of power, water, hydro-electric, steam, gas, and compressed air, together with their practical application to mining operations. The subject is presented by means of lectures supplemented by use of trade catalogues, text books, and lantern slides.

Senior year; first semester; 3 credits; 4 recitations.

251. Ore Dressing. A study of the principles and the various methods of ore concentration and the mechanical preparation of ores for metallurgical treatment. This includes crushing machinery, screens, stamp mills, classifiers, jigs, vanners, and tables. Processes such as amalgamation, magnetic separation, electrostatic concentration, etc., are also discussed.

Prerequisite: Geol. 112.

Junior year; first semester; 3 credits; 3 recitations; 1 laboratory period.

252. Flotation. A continuation of the course in Ore Dressing. The physical and chemical principles involved in flotation

are studied in the class room and the adaptability of the various oils and types of machines are investigated in the laboratory.

Prerequisite: Min. 251.

Senior year; second semester; 3 credits; 2 recitations; 1 laboratory period.

299. Practical Work in Mining. Students in the School of Mines are required, before the senior year, to do at least two months practical work in mines, smelters, on geological surveys, in cement mills, clay works, or other industrial plants, closely related to the course being pursued. Evidence of the nature, quality, and sufficiency of the work will be passed upon by the proper department before credit is given. While the minimum requirement is two months, it is urged that the freshman, sophomore, and junior vacations be entirely devoted to industrial occupations along the student's chosen line. Insight into the technical subjects studied later, also an appreciation of their application to the conditions met in practice on a commercial scale, are thus gained.

GEOLOGY

GEORGE EDWARD GOODSPEED, Assistant Professor
GEORGE ELWIN STOWELL, Instructor.

Most of the courses in geology are designed to meet the demands of the departments in the School of Mines. Courses are also offered which are suited to the needs of students in Forestry and Agriculture. Although no degree is offered, those who desire more advanced work or are inclined toward the geologic side of mining are given the opportunity to take advanced electives in geology.

Equipment. The laboratories for geology are situated on the third floor of the Mines building and comprise a Geologic and Mining Museum, a Mineralogic laboratory and a Petrologic laboratory.

In the Museum are conveniently arranged collections of ores, minerals and rocks from every important mining camp in the State. There are also framed photographs from the various mining regions and a large scale relief map of the State. Besides the collections, there are many specimens of minerals, rocks, and fossils from numerous American localities. Geologic products are shown, such as samples of all the different grades of clay wares

and cement goods. The above collections are attractively displayed in twelve glass-top cases and sixty feet of wall case.

The Mineralogic laboratory possesses the following collections:

No. 1, the Mineral Type Collection, consisting of about 1500 characteristic and labeled specimens used by the students for the purpose of study and comparison.

No. 2, an Exhibit Collection of minerals, consisting of large and attractive specimens.

No. 3, a Working Collection of minerals, consisting of about 7000 unlabeled specimens similar to those in the Type Collection.

No. 4, a Crystal Collection, containing about 1000 natural crystal forms.

No. 5, a Crystal Model Collection, consisting of 48 large glass crystal models and about 750 smaller wooden models used by the students in the study of crystallography.

No. 6, a Blowpipe Collection, containing minerals and metals used in blowpiping.

The Petrologic laboratory contains the following collections:

No. 1, the Rock Type Collection, consisting of about 500 characteristic labeled specimens used by the student for the purpose of study.

No. 2, the Working Collection of Rocks, containing about 2000 unlabeled specimens for the use of the students in the work of petrology.

The Petrologic laboratory is also equipped with a polarizing microscope and the following collections for use in the study of petrography.

No. 1. Thirty-six mineral sections for use in petrography.

No. 2. A loaned petrographic collection of over 1200 rock specimens and their respective thin sections.

(For outline of courses containing Geology see the degree course in Mining Engineering.)

The following courses are offered:

111. **Crystallography and Blowpipe Analysis.** A preparation for the work in Determinative Mineralogy, only those features being emphasized which are essential for the proper understanding and determination of minerals. Instruction is imparted by lectures, textbooks, laboratory work, and individual oral quizzes. In the laboratory a student is required to become thoroughly familiar with the crystal models; later he determines the forms on several

hundred natural crystals by means of a pocket lens and contact goniometer. Blowpipe Analysis is a rapid and useful method of ascertaining all, or a part, of the elements present in minerals. The course includes practice in the use of the blowpipe and the operations ordinarily included under the term Blowpipe Analysis, experimental work upon known minerals, until facility in the application of the various tests is attained, and the analysis of a score or more of unknown substances.

Prerequisites: Chem. 100 and 101.

Sophomore year, first semester; 3 credits; 2 recitations; 3 laboratory periods.

Text: H. B. Patton: Crystallography. Butler: Handbook of Blowpipe Analysis.

Fee: $3.00.

112. **Determinative Mineralogy.** About one hundred and sixty important mineral species, and many varieties of these, are studied. Emphasis is placed upon methods of classification of minerals that involve a knowledge of physical characteristics such as can be gained by visual examination and by the use of the hand lens and pocketknife. Chemical and blowpipe methods are employed only to corroborate the inferences drawn from such observations. The chief end sought is the ready recognition, in the field, of those minerals likely to be encountered in mining operations. Instruction is given by means of lectures, text-book, and laboratory work, and individual oral quizzes. Each student is expected to determine approximately two thousand specimens.

Prerequisite: Geol. 111.

Sophomore year; second semester; 3 credits; 2 recitations; 3 laboratory periods.

Text: Butler: Hand-book of Minerals.

Fee: $3.00.

135. **General Geology.** A study of the composition, structure, and history of the earth and of the forces instrumental in producing or changing the surface configuration and the crustal formation. Emphasis is given to the chief processes by which the accessible rocks of the earth have been formed and evolved into their present condition. Although designed as a preparation for more special courses, the student will, however, become familiar with the more common rocks and with many of the physical laws

that govern the formation of mineral deposits for School of Mines students.

Junior year; first semester; 2 credits; 2 lectures; 1 laboratory period.

Elective in any other course; 3 credits; 2 lectures; 2 laboratory periods.

Fee: $1.00.

137. **Petrology.** A general discussion of the character, mode of occurrence, and origin of rocks. Special emphasis is laid upon those phases which are of importance in mining. The course is intended to familiarize the student with the characteristics of the commoner rocks so that he may identify them with reasonable accuracy in the field.

Prerequisites: Geol. 112 and 135.

Junior year; second semester; 3 credits; 2 recitations and 2 laboratory periods.

Text: Pirsson: Rocks and Rock Minerals.

Fee: $1.00.

139. **Petrography.** An advanced course in Petrology. The optical properties of the rock-forming minerals and the characteristics of the principal rock types are studied with the aid of thin sections and the polarizing microscope. Type collections with their corresponding rock sections are available, and the student has the opportunity to supplement field determinations with the exact knowledge gained through the use of the microscope. An elective course designed for those who are inclined toward the geologic side of mining and offered only to graduate and advanced students.

Prerequisite: Geol. 137.

Elective; first semester; 4 credits; 2 lectures; 3 laboratory periods.

Text: Luquer: Minerals in Rock Section.

154. **Dynamic and Structural Geology.** A detailed study of the geologic forces and agents and their effects. Structural features likely to be encountered in mining operations and the laws governing them are emphasized. Designed for students specializing in the geological side of mining engineering. The lectures are supplemented by numerous problems of a practical nature, special attention being given to the interpretation of geologic maps.

Prerequisites: Geol. 135 and 137.

Elective; second semester; 3 credits; 3 recitations.

155. Historical Geology. Lectures on the origin and history of the earth and the plants and animals that have inhabited it. An outline of invertebrate paleontology is presented, and the student is familiarized with the principles on which is based the determination of the age of fossiliferous rocks by means of "faunal groups," and by the recognition of characteristic species. A part of the scheduled recitation periods is utilized for laboratory work.

Prerequisites: Geol. 135 and 137.

Elective; first semester; 2 credits; 3 recitations.

156. Geology of the Igneous Rocks. A course designed for graduate or advanced students dealing with the origin of igneous rock bodies. Such subjects as magmatic differentiation, the mechanism of intrusive and extrusive action are discussed in detail and special attention given to those subjects that have an important technical bearing, contact metamorphism, magmatic waters, gaseous emanations, etc.

Prerequisite: Geol. 139.

Elective; second semester; 4 credits; 4 recitations.

Text: R. A. Daly: Igneous Rocks and Their Origin. Harker: The Natural History of Igneous Rocks.

161. Forest Geology. The characteristics of the commoner minerals, rocks, and ores. The more important structural features occurring in earth materials and the criteria for recognizing the various types of ore deposits are studied.

Prerequisites: Chem. 100 and 101.

Required in Forestry course; optional in all others; sophomore year; first semester; 3 credits; 2 recitations; 2 laboratory periods.

Fee: $1.00.

171. Agricultural Geology. The geologic origin and nature of soils. A study is made of the commoner rocks and their alteration by weathering and decay. Lectures are given on the geology of ground waters, and on rock structures which may influence agricultural operations.

Prerequisites: Chem. 100 and 101.

Elective in the Agricultural course; junior or senior year; first semester; 3 credits; 2 lectures; 2 laboratory periods.

Fee: $1.00.

181. Mining Geology. The principles of ore deposition. Given in the second semester of the senior year in order that all of the student's previous knowledge of geologic subjects may be

brought into use in the study of ore deposits, one of the important phases of the education of the prospective mining engineer. Mode of occurrence, origin, geologic relations, and classification of ore deposits are studied. The various type deposits as known in important mining camps are discussed. The student is required to write abstracts from the literature bearing on the subject. Considerable importance is attached to the accompanying laboratory work, which consists of mineralogic and petrologic study of rocks and ores from type deposits. A certain amount of time is devoted to a discussion of field methods, mine examination, etc.

Prerequisites: Geol. 135, 137, and 182.

Senior year; second semester; 3 credits; 3 recitations; 1 laboratory period.

Text: Lindgren: Ore Deposits.

182. **Economic Geology of the Non-Metallics.** A course intended to give to the student a knowledge of the economically important non-metallic substances such as coal, clay, building stone, etc. Geologic occurrence and origin are carefully studied, particularly those characteristics affecting economic value. The student is required to prepare many abstracts from current literature. Considerable time is devoted to individual industries, such as the manufacture of clay products and of Portland cement. Special attention is given to market conditions and the factors affecting them.

Prerequisites: Geol. 135, 137.

Senior year; first semester; 3 credits; 3 recitations; 1 laboratory period.

190. **Field Work in Geology and Mining.** Two weeks of field work given just before the end of the second semester. A not-too-distant mining district is chosen and students are afforded opportunity to do geologic mapping, mine surveying, and to secure some actual mining practice.

Prerequisite: The completed work of the junior year.

199. **Practical Geology.** Students in the School of Mines are required, before the senior year, to do at least two months practical work in mines, smelters, on geological surveys, in cement mills, clay works, or other industrial plants, closely related to the course being pursued. Evidence of the nature, quality, and sufficiency of this work will be passed upon by the proper department before credit is given. While the minimum requirement is two months,

it is urged that the freshman, sophomore, and junior vacations be entirely devoted to industrial occupations along the student's chosen line. Insight into the technical subjects studied later, also an appreciation of their application to the conditions met in practice on a commercial scale, are thus gained.

CERAMIC ENGINEERING

IRA ABRAHAM WILLIAMS, Professor

The course of instruction in Ceramic Engineering is designed to prepare young men to make intelligent search for suitable raw materials, to test them properly, and to aid in their economic exploitation and development. At the outset, therefore, ceramic students are required to take substantial courses in the basic sciences, chemistry, mathematics, physics, geology, and the preliminary engineering subjects required of other students in the School of Mines.

Work in the subjects distinctive of the course is confined to the last two years, and includes lectures and laboratory instruction and practice in the processes and methods of manufacture of ceramic wares, including, besides the commoner clay products, pottery and porcelain, and the compounding and application of glazes, enamels, cements, etc. Both the materials used and the finished articles will be studied and tested. The physical and chemical principles on which the production and value of ceramic porducts are based are presented thoroughly, and the student is shown that successful manufacture depends upon a full knowledge and constant application of these principles.

Equipment. The Ceramic Engineering laboratory occupies a room about 30 by 60 feet in the basement of the Mines building. There are also store and supply rooms contiguous to this laboratory. The equipment for the ceramic engineering work consists of a laboratory for ceramic chemistry and apparatus for making physical tests of clays and other ceramic materials; a complete mechanical outfit for the preparation of clays for the manufacture of brick, tile, terra-cotta, etc., and equipment for the compounding of bodies, glazes and enamels for stone- and ironware, and all of the higher grade of pottery and of porcelain products. This outfit includes a combination dry-wet-pan, pug mill, blunger, filter press, ball mills and other grinding machines, rolls, screens, potter's

wheel, and an auger machine provided with dies for side- and end-cut brick, hollow block, drain tile, and roofing tile; a hand-power screw press with dies for dry press brick and flat tile; and an electric furnace for high temperature work.

In the ceramic engineering laboratory are two kilns, a down-draft burning crude petroleum, and a Caulkins muffle pottery kiln; a steam dryer in which drying conditions can be accurately controlled; an electric and a radiation pyrometer; Seger volumeter; balances and other necessary apparatus.

A ceramic library which contains the best works in both English and foreign languages and a ceramic museum are also important features of the working equipment of the department.

DEGREE COURSES IN CERAMIC ENGINEERING

The freshman and sophomore years are identical with the first two years of the Degree Course in Mining Engineering.

Junior Year	Semester 1st	2nd
Statics and Dynamics (M. E. 251)	5	
Strength of Materials (M. E. 252)		3
Hydraulics (I. E. 102)		3
Electrical Machinery (E. E. 402)		4
General Metallurgy (Chem. E. 411)	2½	
General Geology (Geol. 135)	1½	
Petrology (Geol. 131)		2
Ceramic Chemistry (Cer. E. 301)	3	
Ceramic Raw Materials (Cer. E. 303)	3	
Raw Materials Testing (Cer. E. 310)		2
Ceramic Calculations (Cer. E. 312)		1
Drill (Military 5, 6)	1	1
Military Science (Theo. Inst. 1, 2)	1	1
	17	17

Senior Year	Semester 1st	2nd
Technical English (Eng. 141)	3	
Power Equipment (Min. E. 231)		3
General Engineering Laboratory (Exp. E. 210)	2	
Economic Geology (Geol. 182)	3	
Manufacture of Clay Products (Cer. E. 321)	4	
Clay Products Laboratory (Cer. E. 322)		3
Limes and Cements (Cer. E. 326)		3
Glasses, Glazes, and Enamels (Cer. E. 323)	4	
Ceramic Engineering Laboratory (Cer. E. 324)		2
Field Work and Report (Cer. E. 328)		1
Thesis (Cer. E. 330)		4
	16	16

The following courses are offered:

301. **Ceramic Chemistry.** Analysis of clays, glasses, glazes, and silicate minerals. Chemical study of fire gases.

Prerequisites: Chemistry 301, 401.

Junior year; first semester; 3 credits; 3 laboratory periods.

Deposit: $5.00.

303. **Ceramic Raw Materials.** The occurrence, properties, identification, and winning of clays and other ceramic materials.

Prerequisite: Completed work of the freshman and sophomore years.

Junior year; first semester; 3 credits; 3 recitations; 3 laboratory periods.

310. **Raw Materials Testing.** Continuation of the laboratory work of Cer. E. 303. Lectures at intervals as required.

Prerequisites: Cer. E. 303 and Chem. Eng. 471.

Junior year; second semester; 2 credits; 2 laboratory periods.

312. **Ceramic Calculations.** Calculations involved in the blending of raw materials for pottery bodies, glazes, cements, etc. Practical ceramic problems.

Prerequisites: Cer. E. 303; Chem. Eng. 471.

Junior year; second semester; 1 credit; 1 recitation.

321. **Manufacture of Clay Products.** Principles of the manufacture of clay wares, and the equipment used in drying and burning.

Prerequisite: Completion of the first three years of the Ceramic Engineering course.

Senior year; first semester; 4 credits; 3 recitations; 2 laboratory periods.

322. **Clay Products Laboratory.** Continuation of the laboratory work of Ceramic Engineering 321. Lectures at intervals as required.

Prerequisite: Cer. E. 321.

Senior year; second semester; 3 credits; 3 laboratory periods.

323. **Glasses, Glazes, and Enamels.** Classification, production, properties, and defects. Methods of application to ceramic wares.

Prerequisites: Cer. E. 303 and 312; Chem. Eng. 471.

Senior year; first semester; 4 credits; 3 recitations; 2 laboratory periods.

Deposit: $2.00.

324. **Ceramic Laboratory.** Continuation of the laboratory work of Ceramic Engineering 323. Lectures at intervals as required.

Prerequisite: Cer. E. 323.

Senior year; second semester; 2 credits; 2 laboratory periods.

Deposit: $5.00.

326. **Limes and Cements.** Lime, cement, plaster and other cementing materials, and sand-lime products. Production, properties, and uses.

Prerequisites: Chem. 301 and 401.

Senior year; second semester; 3 credits; 3 recitations.

328. **Field Work and Report.** Visits to cement, clay, and other related industrial plants; carefully written reports.

Prerequisites: Cer. E. 322 and 326.

Senior year; second semester; 1 credit; 1 laboratory period.

330. **Thesis.** A careful study of some special ceramic problem.

Prerequisite: Completion of all ceramic courses offered before the second semester of the senior year.

Senior year; second semester; 4 credits; 4 laboratory periods.

Deposit: $5.00.

399. **Practical Work in Ceramics.** For a description of this course, see Min. 299.

With the consent of the heads of the department interested, students may be admitted to the ceramic courses from the other departments in the School of Mines, from the School of Engineering, and the department of Art and Architecture.

CHEMICAL ENGINEERING

WILLIAM HAWES COGHILL, Professor
JOHN FULTON, Professor of General and Analytical Chemistry

The work in Chemical Engineering is given jointly in the School of Mines and Department of Chemistry. The course is intended to provide the instruction and training required by young men who desire to engage in the manufacture of those substances involving chemical processes and manipulations in their production.

Industries of this nature are so numerous and various that it is impossible to familiarize a student with all of them. The course is accordingly so presented as to give in the first half a thorough knowledge of all the fundamental engineering subjects and chemical processes, while the latter half is largely elective. This enables a student to specialize along chosen branches of chemical activity.

Throughout the work in this department, special attention is given to those industries that already exist in Oregon, or that must be put into operation if the resources of the State are to be properly developed.

DEGREE COURSES IN CHEMICAL ENGINEERING

Freshman and sophomore years are identical with the freshman and sophomore years of the Degree Course in Mining Engineering.

Junior Year.	Semester 1st	2nd
Statics and Dynamics (M. E. 251)	5	
Strength of Materials (M. E. 252)		3
Hydraulics (I. E. 102)		3
Electrical Machinery (E. E. 402)		4
Physical Chemistry (Chem. 410)	3	
Organic Chemistry (Chem. 201)	4	3
Thermochemistry (Chem. E. 452)		3
Chemical and Metallurgical Processes (Chem. E. 431)	3	
Drill (Military 5, 6)	1	1
Military Science (Theo. Inst. 1, 2)	1	1
	17	18

Senior Year.	Semester 1st	2nd
Chemical Technology (Chem. E. 461, 462)	4	4
Electro-chemistry (Chem. 406)	3	
Electro-metallurgy (Chem. E. 442)		2
*Approved Electives	9	9
	16	16

401. **Fire Assaying.** The crushing and sampling or ores and their assay for gold, silver, and lead; also the assay of various metallurgical products such as bullion, matte, etc. Special attention is given to the principles of the subject, which is treated from a scientific and rational point of view, rather than by "rule of thumb." Each student is required to make a large number of assays upon previously sampled and assayed pulps, and to learn to check these within very close limits.

Prerequisites: Chem. 301, 401; Geol. 112.

Junior year of Mining Engineering course; first semester; 4 credits; 2 recitations; 2 half days in the laboratory.

Text: Fulton: Manual of Fire Assaying.

Fee: $7.50.

410. **Fuels, Metallurgy of Iron and Steel.** The metallurgical principles and processes involved in the preparation and use of fuels and refractory materials. The art and science of the smelting of iron ore and the manufacture and properties of steel are studied by lectures and use of an approved textbook.

Prerequisites: Chem. 301 and 401; Physics 101 and 102.

Junior year; second semester; 2½ credits; 4 recitations.

412. **Metallurgy of Lead and Copper.** A detailed study of the furnaces, appliances, operations, and materials used in the extraction of these metals from their ores, and in refining them. Particular attention is given to the important principles underlying these processes.

Prerequisite: Chem. Eng. 411.

Senior year of Mining Engineering course; second semester; 2 credits; 3 recitations.

* Elective courses may be chosen in the departments of Physics and Chemistry, and the Schools of Engineering, Forestry, and Mines, upon the approval of the Dean of the School of Mines and the heads of the other departments or schools concerned.

421. Cyanidation of Ores. The cyanide process of extracting gold and silver from ores. The chemical principles involved in solution and precipitation are first mastered; then the operations and many mechanical devices in use are studied. Catalogues of leading manufacturers are freely used to illustrate the latest appliances.

Prerequisites: Chem. 301; Chem. Eng. 401.

Senior year of Mining Engineering course; first s mester; 2 credits; 3 recitations.

423. Metallurgical Laboratory. Each student determines by laboratory tests the fitness of a given ore for cyanide treatment; ascertains the percentage of extraction by various methods; and finally, studies costs and selects the process that should give the greatest net returns.

Prerequisite: Must be taken in conjunction with, or after the completion of, Chem. Eng. 421.

Senior year of Mining Engineering course; first semester; 2 credits; 2 laboratory periods.

Deposit: $5.00.

431. Chemical and Metallurgical Processes. Lectures supplemented by laboratory study of the general operations common to many industries, such as crushing, grinding, lixivation, filtration, evaporation, distillation, crystallization, etc., as well as the details of the various types of apparatus used for carrying on these processes.

Prerequisites: Chem. 301, 401.

Junior year; first semester; 3 credits; 4 recitations; 1 laboratory period.

442. Electro-Metallurgy. A laboratory and lecture course in which are studied the principles and processes involved in those industries which require the use of the electric current in producing and refining metals.

Prerequisite: Chem. 406.

Senior year; second semester; 3 credits; 1 recitation; 2 laboratory periods.

452. Thermo-Chemistry. A continuation of Physical Chemistry in which the influence of temperature upon chemical reaction is studied more specifically than in the earlier course.

Prerequisite: Chem. 410.

Junior year; second semester; 4 recitations; 1 laboratory period.

461. Chemical Technology. A lecture and laboratory course in which the more important chemical industries are studied in detail. Various problems connected with such industries are worked out by the student in the laboratory.

Prerequisite: Chem. Eng. 431.

Senior year; first semester; 4 credits; 4 recitations; 2 laboratory periods.

462. Chemical Technology. A continuation of Chem. Eng. 461.

Prerequisite: Chem. Eng. 461.

Senior year; second semester; 4 credits; 4 recitations; 2 laboratory periods.

499. Practical Work in Chemical Engineering. For a description of this course, see Min. 299.

PHARMACY

ADOLPH ZIEFLE, Professor
IRWIN LEONARD BETZEL, Instructor

Success in Pharmacy depends to a great extent on what preparation one makes for his work in the formation of correct habits of economy coupled with industry. The importance of a scientific training in pharmacy cannot be overestimated. This is true both as regards the pharmacist and the public, for the dispenser of medicines must be held responsible for the purity and strength of his preparations. The necessary education for conducting a modern pharmacy cannot be secured in a drug store alone, however valuable the experience gained therein may be. It is clearly evident that suitable preparation for the life-work of the practical pharmacist can only be given to one who has the necessary practical experience, as well as the proper educational training.

State boards of pharmacy, recognizing the importance of scientific pharmaceutical training, are requiring it in addition to a definite amount of practical drug-store experience as a prerequisite for registration.

Of late years the demand for educated pharmacists has been more urgent than ever before, on account of the enactment of State and National Pure Food and Drug Laws, as well as other laws that regulate the sale of medicinal substances. For these reasons, it is necessary that pharmacists adjust thmeselves to public sentiment, which expects pure drugs and medicines and competent persons to manufacture and dispense them. These requirements can only be attained through pharmaceutical education.

The necessary knowledge of the sciences on which the art of pharmacy is based and the technical skill required to practice that art, are best acquired in a well-equipped school of pharmacy. From the fact that very little teaching is done in drug stores, it becomes necessary for the successful pharmacist to have college training in order accurately to prepare medicines and dispense prescriptions. Aside from this, it often becomes necessary to identify drugs, detect accidental poisoning and to determine whether drugs are fit to be used in prescription work.

It is this kind of training that the Department of Pharmacy at the Oregon Agricultural College is prepared to give. The depart-

ment is conveniently located in Science Hall and the eight rooms that are used for instruction in the strictly pharmacy subjects are very well equipped to give the proper instruction. The courses in pharmaceutical chemistry are given by the department of Chemistry which is also located in Science Hall.

One of the main objects of all young pharmacists is to pass a creditable examination before the State Board of Pharmacy. Preparation for such examinations is a special feature of the work of the department and its graduates have been most successful. Aside from enabling students to pass the pharmacy examination, however, the aim of the department is to afford an opportunity to obtain a thorough technical training that will equip the student for a life of efficient service in the profession of pharmacy from the practical point of view.

The courses of study meet the highest requirements of pharmaceutical instruction. The facilities for work are such that students who are interested can become most proficient in the manufacture and dispensing of drugs. The time spent in scientific pharmaceutical training will result beneficially for the people and to the profession of medicine in which pharmacy occupies a separate and distinct field.

Since the pharmacy curriculum requires more chemistry than any other course in the College, it is possible for students in pharmacy and special students to major in chemistry by electing the course in preparation for any position they have in mind. Graduates are constantly being sought by retail pharmacists as prescription dispensers, by manufacturing and wholesale druggists, by departments executing Federal and State Pure Food and Drug Laws, where they serve as chemists and inspectors.

Oregon is especially adapted to the cultivation of medicinal plants and it is only a question of time when the growing of drugs will prove to be a commercial enterprise for the State. The department of Pharmacy is especially fortunate in being able to give instruction along the line of drug cultivation. This is one of the features of the course in Pharmacognosy, a course in which students are taught to identify, cultivate, preserve, and understand all vegetable drugs.

A two-years course leading to the degree of Graduate in Pharmacy (Ph. G.) is offered, comprising the more professional studies of the curriculum. It prepares directly for drug-store and dispensing practice and provides a groundwork in analytical chem-

istry necessary for the drug business and the various phases of pharmaceutical manufacturing.

A four-years course is academic and professional, leading to the degree of Bachelor of Science (B. S.) This is the most satisfactory course to elect, because it gives a broad collegiate training supplemented with the professional work of the two-years course. This course also includes thorough work in Bacteriology, Zoology, Botany, Food and Drug Chemistry, and Physiological Chemistry. Many students who have completed the work of this degree have continued their study in schools of medicine. The entrance requirements for the above courses are the same as for other degree courses of the College.

In addition to the above courses there is offered, for the benefit of students who are not graduates of a four-years high school, a vocational course in pharmacy. This course contains but few strictly cultural subjects, but deals with all phases of Chemistry, Materia Medica, Prescription dispensing, and Chemistry. The aim of the course is to give the student the greatest amount of practical training, in the short time allowed, in order to fit him for the examinations of the State Board of Pharmacy, and at the same time assist him in becoming a more expert and efficient pharmacist. The requirements for this course are two years of high school training or its equivalent. This course extends over two years of nine months each. Upon completion of the prescribed work, the student will receive a certificate.

Students not candidates for a degree may enter this department as special students. The admission of special students is permitted after consultation with and upon recommendation of the Registrar or the professor in charge.

Students preparing to study Chemistry, Dentistry or allied subjects will find the course in Pharmacy especially well adapted for entrance to professional schools. Arrangements can be made whereby the student may elect such courses from the curriculum as are necessary to meet certain requirements.

Admission of advanced students: Students entering from collegiate departments of other colleges and universities must bring a certificate of honorable dismissal. Upon presentation of the proper credentials they will receive advanced credit for courses taken in institutions whose entrance requirements and character of work are equivalent to those of this department.

Equipment. The department's lecture rooms and laboratories are in Science Hall, a building which conveniently meets the needs for space, light, and ventilation.

The laboratories and lecture rooms are well equipped with all requirements necessary for practical instruction in pharmaceutical manipulation. Each laboratory is thoroughly equipped for a definite kind of work and the stock of the department is so complete that students have every opportunity to do efficient work. Students have individual desks supplied with a complete set of apparatus. Nearly all stock used by students is found on side shelves directly in the laboratory. All drugs not found on side shelves are obtained from the stock which is in charge of an assistant at all times during laboratory periods. This system for the distribution of drugs and apparatus to students works for the highest efficiency. Much of the student's time is saved thereby.

In addition to the usual permanent fixtures and apparatus for individual students, the department is supplied with a number of pieces of special apparatus for common use, such as pharmaceutical stills, tablet and pill machines, suppository machines, filter presses, and all of the apparatus that is necessary for thorough instruction in pharmacy. The prescription room is really a model drug store, containing accurate balances, capsule fillers, conceal molds and such other apparatus as is necessary. The room for commercial pharmacy is equipped for sign-card painting and window dressing. Special tables for frames have been built for the work and each desk is supplied with compressed air for work with the air brush. The pharmacognosy room contains many cabinets filled with crude drugs, active principles, and many preparations. There is also the Eli Lilly & Co. exhibit of authentic crude drugs and preparations.

The pharmacy library contains the leading pharmaceutical journals, which are kept on file and are accessible to students. Students also have access, with certain restrictions, to all standard reference books on materia medica, chemistry, and pharmacy.

TWO-YEARS COURSE IN PHARMACY*

First Year.	Semester 1st	2nd
General Chemistry (Chem. 105, 106)	5	2
Qualitative Analysis (Chem. 300)		3
Pharmaceutical Latin (Phar. 104)	2	
Inorganic Pharmacy (Phar. 121)	3	
Pharmacognosy (Phar. 130, 131)	3	2
Theoretical Pharmacy (Phar. 116)	3	
Practical Pharmacy (Phar. 117)		3
Pharmaceutical Preparations (Phar. 118)		2
Pharmaceutical Calculations (Phar. 123)		2
Drill (Military 1, 2)	1	1
Gymnasium (Phys. Ed. 15, 16)	½	½
Elective		2
	17½	17½

Second Year.		
Organic Chemistry (Chem. 200, 201)	3	3
Materia Medica and Toxicology (Phar. 140, 141)	3	3
Pharmacopoeia and National Formulary (Phar. 114, 115)	3	3
Prescription Lectures (Phar. 150)	3	
Prescription Incompatibilities (Phar. 151)		3
Prescription Compounding (Phar. 152)		2
Manufacturing Pharmacy (Phar. 170)	2	
Alkaloidal Testing (Chem. 404)	2	
Drill (Military 3, 4)	1	1
Electives		2
	17	17

* This course leads to the degree of Graduate in Pharmacy. Students entering the course must have completed the full four-years high school training.

VOCATIONAL COURSE IN PHARMACY*

First Year.	Semester 1st	2nd
General Chemistry (Chem. 10, 11)	3	3
General Pharmacy (Phar. C)	4	
Inorganic Drugs (Phar. G)	4	
Elementary Pharmacognosy (Phar. K)	4	
General Pharmacy (Phar. D)		4
Pharmaceutical Arithmetic (Phar. I)		3
Pharmacognosy (Phar. L)		3
Galenical Pharmacy (Phar. E.)		2
Drill (Military 1, 2)	1	1
Gymnasium (Phys. Ed. 15, 16)	½	½
	16½	16½

Second Year.		
Organic Chemistry (Chem. 200)	4	
Pharmacopoeia and National Formulary (Phar. A, B)	4	3
Therapeutics and Toxicology (Phar. M, N)	3	3
Prescription Reading and Dispensing (Phar. O)	3	
Advanced Galenical Preparations (Phar. F)	2	
Prescription Incompatibilities (Phar. Q)		3
Commercial Pharmacy (Phar. 160)		3
Dispensing Pharmacy (Phar. S)		2
Gymnasium (Phys. Ed. 17, 18)	½	½
Drill (Military 3, 4)	1	1
Electives		2
	17½	17½

* Entrance to this course requires two years of high-school preparation.

DEGREE COURSE IN PHARMACY

Freshman Year.	Semester 1st	2nd
Modern English Prose (Eng. 81, 82)	3	3
General Chemistry (Chem. 105, 106)	5	2
Qualitative Analysis (Chem. 300)		3
General Zoology (Zool. 101, 102)	3	3
Pharmaceutical Botany (Bot. 70, 71)	3	4
Elementary Pharmacy (Phar. 102, 103)	1	1
Drill (Military 1, 2)	1	1
Gymnasium (Phys. Ed. 15, 16)	½	½
Library Practice (Libr. 1)	½	
Hygiene (Phys. Ed. 10)	½	
	17½	17½
Sophomore Year.		
Organic Chemistry (Chem. 200, 201)	3	3
Quantitative Analysis (Chem. 400)	4	
Zoology (Zool. 201, 202)	3	3
Pharmaceutical Latin (Phar. 104)	2	
Modern Language (French, German or Spanish)	3	3
Principles of Economics (Com. 210)		3
Commercial Law (Com. 306)		3
Drill (Military 3, 4)	1	1
Gymnasium (Phys. Ed. 17, 18)	½	½
	16½	16½
Junior Year.		
Theoretical Pharmacy (Phar. 116)	3	
Bacteriology (Bact. 201, 202)	3	3
Modern Language	3	3
Practical Pharmacy (Phar. 117)		3
Pharmaceutical Preparations (Phar. 118)		2
Pharmacognosy (Phar. 130, 131)	3	2
Inorganic Pharmacy (Phar. 121)	3	
Alkaloidal Testing, Drug Assaying (Chem. 401, 405)	2	2
Pharmaceutical Calculations (Phar. 123)		2
Drill (Military 5, 6)	1	1
	18	18

Senior Year.	Semester 1st	2nd
Composition of Addresses (Eng. 103, 104)	2	2
Materia Medica and Toxicology (Phar. 140, 141)	3	3
Pharmacopoeia and National Formulary (Phar. 114, 115)	3	3
Food and Drug Analysis (Chem. 304)	3	
Prescription Lectures (Phar. 150)	3	
Prescription Incompatibilities (Phar. 151)		3
Prescription Compounding (Phar. 152)		2
Manufacturing Pharmacy (Phar. 170)	2	
Physiological Chemistry (Chem. 409)		3
	16	16

The following descriptions are for the strictly pharmacy subjects, all courses in pharmaceutical chemistry are outlined in the chemistry schedule.

The following courses are offered:

102. **Elementary Pharmacy.** This course deals with: history of pharmacy and its development, standard pharmaceutical literature, demonstration of apparatus, and all other elementary phases of pharmacy. The aim of the course is to give new students an idea of the subject by showing the relation of the various scientific courses in the pharmacy curriculum to each other.

Freshman year; first semester; 1 credit; 1 lecture.

Text: Stevens: Pharmacy.

103. **Elementary Pharmacy.** A continuation of course 102 but deals with more advanced subjects in preparation for the courses in Pharmaceutical Latin and Theoretrical Pharmacy.

Prerequisite: Phar. 102.

Freshman year; second semester; 1 credit; 1 lecture.

Text: Stevens: Pharmacy.

104. **Pharmaceutical Latin.** Latin is the language of science and all properly trained pharmacists need some knowledge of the principles of Latin etymology and construction in order to understand the use and terminology of pharmacy and medicine. The following subjects are made the basis of systematic study in this course: Latin abbreviations as used by physicians, Latin endings of drugs and medicines, prescription Latin, and English translation of all Latin terms used in pharmacy.

Sophomore year; first semester; 2 credits; 2 recitations.

Text: Strumer's: Pharmaceutical Latin.

114. **United States Pharmacopoeia and National Formulary.** The object of this course is to apply the principles of all fundamental scientific courses such as, chemistry, materia medica, pharmacognosy, etc., to the subject of pharmacy. The Pharmacopoeias, Dispensatories and National Formulary are the text books used, and students are required to become very well informed as to the composition, uses, and methods of preparation of all official and unofficial remedies, as well as those newer remedies that are used most frequently. All strictly pharmacy courses are reviewed in preparation for the State Board of Pharmacy examination. Several intermediate examinations will be held, and the instructors will thus be enabled, by returning proper suggestions and directions, to aid students materially in equipping themselves for any pharmacy examination. Typical representative State Board questions will be used as a guide in preparing for the examination. There will be frequent reviews in identification of drugs and their preparations, as well as the careful systematization of all pharmacy subjects to permit of frequent reviews.

Prerequisites: Phar. 117, 118, Chem. 300, 200, 201.

Senior year; first semester; 3 credits; 3 recitations.

Texts: U. S. Pharmacopoeia and National Formulary.

115. **United States Pharmacopoeia and National Formulary.** This is a continuation of course 114. As a special feature of the work, however, all scientific journals and state bulletins are reviewed, in order to familiarize students with the trend of State and National Pure Food and Drug work, as well as the various laws regarding the sale of drugs. The newer remedies are studied from the point of view of their composition, use, and incompatibilities. Other subjects of equal importance are discussed, the aim of the work being to prepare students for the actual needs in pharmacy.

Prerequisite: Phar. 114.

Senior year; second semester; 3 credits; 3 recitations.

Texts: U. S. Pharmacopoeia and National Formulary.

116. **Theoretical Pharmacy.** This course will begin with lectures defining pharmacy and allied sciences, and will embrace a study of the nomenclature of Pharmacopoeias and their importance as standard for drugs. Then will follow in order, lectures and demonstrations dealing with the principal processes employed in operative pharmacy; viz., weights and measures, heat, distillation,

sublimation, extraction in its various forms, and other methods used in the manufacture of galenical preparations.

Prerequisites: Registration in Chem. 105 and Phar. 130.

Junior year; first semester; 3 credits; 3 recitations.

Text: Caspari: Treatise on Pharmacy.

117. **Practical Pharmacy.** The natural products used in pharmacy are carefully defined and demonstrated. Then follows a study of the various classes of preparations such as: waters, syrups, tinctures, extracts, etc. Each class is defined and the various methods used in their preparation are illustrated and discussed. All preparations of the U. S. Pharmacopoeia are studied, particular attention being given to their constituents, percentage strength, method of preparation and reasons for each step, equations and synonyms.

Prerequisites: Phar. 116, Chem. 105.

Junior year; second semester; 3 credits; 3 recitations.

Texts: Caspari: Treatise on Pharmacy and Ruddiman's Why's in Pharmacy.

118. **Pharmaceutical Preparations.** The object of this course is to teach students to put into practice the principles of Theoretrical Pharmacy. While the student's work is individual, constant supervision of the instructor prevents inaccuracies and error in conception, and in this way wrong methods can be corrected. The work will embrace the determination of specific gravities by various methods, comparison of weights and measures, standardization of graduates and the tying and wrapping of carefully weighed packages. The main feature of the course, however, is accurately to prepare small amounts of the simpler preparations such as: waters, liquors, emulsions, pills, suppositories, etc.

The galenicals made are carefully inspected and at definite times identification examinations are held, at which time students are required to identify all preparations made and all ingredients used in their manufacture.

Prerequisites: Registration in Phar. 117 and Chem. 105.

Junior year; second semester; 2 credits; 2 three-hour laboratory periods.

Text: U. S. Pharmacopoeia.

Fee: $6.00. Deposit: $1.00.

121. **Inorganic Pharmacy.** This course deals with a study of official and unofficial inorganic drugs. The lecture work consists

of a study of the elements and their compounds that are used in medicine. Their source, method of preparation, formulae, synonyms, physical and chemical characteristics are made the basis of systematic study. In the laboratory representative samples of each type of chemical will be made and samples of all official inorganic drugs will be supplied to each student for identification study.

Prerequisites: Registration in Phar. 116 and Chem. 105.

Junior year; first semester; 3 credits; two lectures and two two-hour laboratory periods.

Text: Caspari: Treatise on Pharmacy.

Fee: $3.00.

123. **Pharmaceutical Calculations.** The various forms of calculations that are common to pharmacy are made the subject of systematic study; viz., Equivalents of each system of weights and measures, calculation of proportionate parts of a formula, percentage solutions, specific gravity, alligation, and such chemical calculations as are met with in pharmacy.

Prerequisites: Phar. 116, Chem. 105.

Junior year; second semester; 2 credits; 2 recitations.

Text: Stevens: Pharmaceutical Arithmetic.

130. **Pharmacognosy.** This course deals with the macroscopical examination and study of official and unofficial animal and vegetable drugs. All drugs are properly classified in respect to their habitat, botanical order, constituent, synonyms, medicinal uses, and preservation. Frequent identification examinations are given so that students must become thoroughly familiar with the physical characters of drugs as well as their use.

Prerequisites: Registration in Phar. 104, 121, 116.

Junior year; first semester; 3 credits; 3 recitations.

Texts: Culbreth: Materia Medica; Schlotterbeck: Syllabus; Lilly: Organic Drugs.

Fee: $1.00.

131. **Pharmacognosy.** A continuation of course 130 and the use of typical State Board of Pharmacy questions to supplement the work in preparing to become registered pharmacists. A special feature of the work of this course is the instruction of growing drugs on a commercial scale. Lectures and demonstrations will be given on preparation of soil, planting of seed, the care of drug plants, collection and preparation for market.

Prerequisite: Phar. 130.

Junior year; second semester; 2 credits; 2 recitations.

Texts: Culbreth: Materia Medica; Schlotterbeck: Syllabus; Lilly: Organic Drugs.

Fee: $1.00.

140. Materia Medica and Toxicology. Lectures and recitations on the properties, physiological actions, uses, and doses of all chemical, animal, and vegetable drugs, and their preparations. The different types of drugs are studied in groups according to their physiological action. The peculiar terms used to classify drugs according to their action and uses are carefully defined. The subject of toxicology receives especial attention from the point of view of absorption, elimination, and cumulative action of poisonous substances. The signs and symptoms are studied in each case, and the antidote and medicinal treatment receive attention.

Prerequisites: Phar. 117, 118 and Chem. 200, 201.

Senior year; first semester; 3 credits; 3 recitations.

Texts: Tyrode: Pharmacology; Stearns: Dose Book.

Fee: $1.00.

141. Materia Medica and Toxicology. A continuation of course 140. After the entire subject has been covered, preparation for the State Board of Pharmacy examination and the practical use of the subject follows. Each student will be required to familiarize himself with State pharmacy and drug laws, as well as other laws that regulate the manufacture and sale of drugs. The latter part of the course consists of lectures and laboratory work on First Aid to the Injured. Pharmaceutical jurisprudence is considered from the point of view of the trend of recent legislation affecting pharmacists, legal limits of pharmacy, liability of the seller of drugs, expert witness and all other phases of this subject.

Prerequisite: Phar. 140.

Senior year; second semester; 3 credits; 3 recitations.

Texts: Tyrode: Pharmacology; Stearns: Dose Book.

Fee: $1.00.

150. **Prescription Lectures.** This course deals with the technical study of all phases of the prescription. It embraces particularly the very important subject of pharmaceutical, chemical, and therapeutical incompatibilities. The aim of the course is to give

such theoretical instruction as will enable the student to devise the best method of compounding prescriptions in order that the mixture will be safe and represent what the physician wants. Each class of prescription is studied, particular attention being given to the art of preparing elegant remedies. Ambiguous prescriptions are read in class, and the question of overdose of such drugs that might prove to be poisonous is also studied.

Prerequisites: Phar. 117, 118; Chem. 300, 200, 201.

Senior year; first semester; 3 credits; 3 recitations.

Text: Scoville: Art of Compounding.

151. **Prescription Incompatibilities.** This is a continuation of course 150, the chief subject being that of incompatibilities. Several hundred different prescriptions are studied from the point of view of compounding the various ingredients of remedies in the best sequence. The literature is carefully abstracted in order that students may become familiar with the manner of compounding the newer remedies that are not found in Pharmacopoeias. The aim of the work of this course is to teach students to detect dangerous prescriptions and to overcome incompatibilities.

Prerequiste: Phar. 150.

Senior year; second semester; 3 credits; 3 recitations.

Text: Ruddiman's Incompatibilities in Prescriptions.

Fee: $6.00. Deposit: $1.00.

152. **Prescription Compounding.** In this course students are expected to apply the principles of Prescription Lectures to the actual compounding of prescriptions. Many difficult and obscure prescriptions are submitted to students, who are called upon to deal with them as they deem best. In this way their ability as well as their knowledge is tested and if not accurate is corrected at once. The work of this course also deals with all the details of managing the prescription counter. The latter part of the course deals with perfecting of formulas for toilet preparations. Instruction is also given in the repair and making of mirrors, repair of apparatus, and other necessary operations common to a pharmacy.

Prerequisites: Phar. 150, 151; Chem. 200, 201, 300.

Senior year; second semester; 2 credits; 2 three-hour laboratory periods.

Text: Scoville: Art of Compounding.

160. **Commercial Pharmacy.** The aim of this course is to give students an idea of the requirements of an efficient manager of a pharmacy. Regular topics relating to the commercial phase of pharmacy are discussed, such as planning and arrangement of a pharmacy, keeping up stock, salesmanship, window trimming, etc. A special feature of the course is the work in sign-card painting including extensive work with the air brush. For students not registered in the department the work is exclusively sign-card painting.

Elective; first semester; 3 credits; 1 recitation and two laboratory periods.

Fee: $3.50.

161. **Commercial Pharmacy.** A continuation of course 160 with the added feature of taking of inventory, price lists, study of druggists sundries, side lines and air brush work. At definite times during the course successful business men will deliver lectures on the commercial side of pharmacy.

Elective; second semester; 3 credits; 1 recitation; 2 laboratory periods.

Fee: $3.50.

170. **Manufacturing Pharmacy.** This course is a continuation of the course on Pharmaceutical Preparations and deals with the manufacture of the more difficult pharmaceuticals that involve chemical reactions. The work is most exacting and requires a thorough knowledge of chemistry. As examples of the kind of preparations made, the following are mentioned; viz., spirits of nitrous ether, iodoform, ferrous iodide preparations, etc.

Prerequisites: Phar. 117, 118.

Senior year; first semester; 2 credits; 2 three-hour laboratory periods.

Text: U. S. Pharmacopoeia.

Fee: $6.00. Deposit: $1.00.

VOCATIONAL COURSES

A. Pharmacopeia and National Formulary. The object of this course is carefully to study all official drugs and preparations as found in the U. S. Pharmacopoeia. Particular attention is given to their source, method of preparation, composition, percentage strength, etc. The same plan will be followed in the study of the more important preparations of the National Formulary. All

work of this course is a review of the application of the principles of pharmacy and chemistry to all important official and unofficial drugs.

Prerequisites: Phar. D, E, and Chem. 11.

Second year; first semester; 4 credits; 4 lectures and recitations.

Texts: U. S. Pharmacoepoeia; National Formulary.

B. Pharmacopoeia and National Formulary. A continuation of course 214. As a special feature of this course store management will be made the subject of systematic study. This will include arrangement, location, advertisement, inventory, financing, etc.

Prerequisite: Phar. A.

Second year; second semester; 3 credits; 3 recitations.

Texts: U. S. Pharmacopoeia; National Formulary.

C. General Pharmacy. This beginning course in pharmacy includes a study of the theoretical phases of the subject. The work will commence with lectures defining Pharmacy and all sciences which contribute information relative to drugs. Then follows a discussion of metrology, heat, comminution, extraction, etc., the object being to give students a thorough training, by lecture and demonstration, of all processes and apparatus used in drug preparation.

Prerequisites: Registration in Phar. G, K, and in Chem. 10.

First year; first semester; 4 credits; 4 lectures and recitations.

Text: Caspari: Treatise on Pharmacy.

D. General Pharmacy. This course deals with extemporaneous pharmacy or the application of the theory of pharmacy in preparing the various types of galenicals. The first part of the course deals with a study of the natural products used in pharmacy, then follows a study of each class of preparations, particular attention being given to the modes of preparation, preservation, and classification. The latter part of the course is devoted to the study of the official preparations found in the U. S. Pharmacopoeia.

Prerequisites: Phar. C; Chem. 10.

First year; second semester; 4 credits; 4 lectures and recitations.

Texts: Caspari: Treatise on Pharmacy; Ruddiman: Why's in Pharmacy.

E. Galenical Preparations. The object in view in this course is to teach students to put into practice in the laboratory the

principles of pharmaceutical manipulation taught in the lecture room. The course begins with a practice in the use and comparison of the various systems of weights and measures, specific gravity determinations, etc. Then follows the preparation of the simpler official and unofficial preparations. In this course students reach the point where each is competent to prepare such pharmaceutical preparations as are in common use.

Prerequisites: Phar. C, G and Chem. 10.

Second year; second semester; 2 credits; 2 laboratory periods.

Texts: U. S. Pharmacopoeia; National Formulary; Laboratory Notes.

Fee: $6.00. Deposit: $1.00.

F. Advanced Galenical Pharmacy. This is a continuation of the course in galenical preparations and deals with the preparation of the more complicated pharmaceuticals, especially those involving chemical reactions. As a special feature of the work frequent identification examinations will be held on over 1000 different drugs and preparations. This is a decided advantage to the student because he becomes quite familiar with the physical characters of drugs and preparations, especially those of a poisonous nature.

Prerequisites: Phar. E, G and Chem. 11 and 200.

Second year; first semester; 2 credits; 2 laboratory periods.

Texts: U. S. Pharmacopoeia; National Formulary; Laboratory Notes.

Fee: $6.00. Deposit: $1.00.

G. Inorganic Drugs. Lectures and demonstrations on the manufacture, composition, purity rubric, preservation, and identification of all inorganic drugs. In the laboratory representative samples of each compound will be prepared and tested according to the U. S. P. requirements. Each student will be given a sample of each of the more important inorganic salts for identification purposes.

Prerequisites: Registration in Phar. C and in Chem. 10.

First semester; 4 credits; 3 lectures; 2 two-hour laboratory periods.

Texts: Caspari: Pharmacy and Laboratory Notes.

Fee: $3.00.

I. Pharmaceutical Arithmetic. The various forms of calculations common to pharmacy and chemistry are made the subject of systematic study. Upon completion of this course students are

capable of solving all mathematical problems common to a pharmacy.

Prerequisites: Phar. C and Chem. 10.

First year; second semester; 3 credits; 3 lectures.

Text: Stevens: Pharmaceutical Arithmetic.

K. Elementary Pharmacognosy. Crude vegetable and animal drugs are studied from the point of view of their official definition, constituents, habitat, synonyms, means of identification, etc. The student has access to the crude drug laboratories at all times, where typical specimens of all drugs and preparations are on display. This is an important feature of the work, because the best pharmacist is the one who can recognize the characteristics of crude drugs and preparations and thereby avoid serious error in compounding.

Prerequisites: Registration in Phar. C, G and in Chem. 10.

First year; first semester; 4 credits; 4 lectures.

Texts: Lilly: Organic Drugs; Schlotterbeck: Syllabus.

Fee: $1.00.

L. Pharmacognosy. A continuation of course 230. During the latter part of the course typical State Board of Pharmacy questions will be used in preparation for the State examination in this subject.

Prerequisite: Phar. 230.

First year; second semester; 3 credits; 3 lectures.

Texts: Lilly: Organic Drugs; Schlotterbeck: Syllabus.

Fee: $1.00.

M. Therapeutics and Toxicology. A study of the action of chemicals, drugs, and their preparations on the human organism in health and disease, also the physiological action of the various poisons, their antidotes and emergency treatment in cases of poisoning. The peculiar terms used in medicine will be carefully defined.

Prerequisites: Phar. D, E and Chem. 11.

Second year; first semester; 3 credits; 3 lectures and recitations.

Texts: Tyrode: Pharmacology; Stearns: Dose Book.

Fee: $1.00.

N. Therapeutics and Toxicology. A continuation of course 240 and as a special feature of the course the subject of First Aid to the Injured will be taught by elective and actual practice. Typi-

cal State Board of Pharmacy questions will also be reviewed in preparation for the State examination in this subject.

Prerequisite: Phar. M.

Second year; second semester; 3 credits; 3 lectures and recitations.

Texts: Tyrode: Pharmacology; Stearns: Dose Book; Lecture Notes.

Fee: $1.00.

O. Prescription Reading and Dispensing. This course involves a technical study of all phases of the prescription, practical exercise at sight reading and in the art of extemporaneous compounding. The nomenclature of the prescription and prescription Latin will receive especial attention.

Prerequisitse: Phar. D, E and registration in Chem. 200.

Second year; second semester; 3 credits; 3 lectures and recitations.

Text: Scoville: Art of Compounding.

Q. Prescription Incompatibilities. Lectures and recitations on the many forms of incompatibilities with the view of detecting them and thus avoiding incompatibility by scientific combination of the ingredients. Over 500 different kinds of incompatibilities will be discussed, as well as those of the newer synthetic remedies.

Prerequisites: Phar. O and Chem. 200.

Second year; second semester; 3 credits; 3 lectures.

Text: Ruddiman: Incompatibilities in Prescriptions.

Fee: $6.00. Deposit: $1.00.

S. Dispensing Pharmacy. This course embraces the methods of compounding the various types of prescriptions in the laboratory. The habit of neatness, accurate checking, correct pricing, and, above all, of precision acquired by students in this work, is of direct and immediate advantage to them in their life work as pharmacists.

Prerequisites: Phar. O, F and Chem. 200.

Second year; second semester; 2 credits; 2 laboratory periods.

Text: Scoville: Art of Compounding.

ART AND ARCHITECTURE

FARLEY DOTY McLOUTH, Professor
LAWRENCE EUGENE ROBINSON, Instructor in Rural Architecture
EDNA MAY FLARIDA, Instructor
EDITH FREEMAN SHERMAN, Instructor

The department of art offers no regular courses in art with the idea of instruction in the fine arts in view, but only as art education relates to highest ideals in everyday life, and to meet the requirements of art in the industries. Courses in drawing, composition, light and shade and color are planned and given for the purpose of facilitating instruction in the applied arts courses—design, metal work, clay modeling, and the ceramic art; and in the work of such other departments as Agriculture, Domestic Art, and Industrial Arts.

The art courses offered not only develop utilitarian ideas, but they also cultivate an appreciation and love of the beautiful in nature and art.

Equipment. The department occupies three commodious, well-lighted studios on the fourth floor of Agricultural Hall, one draughting room on the second floor of the same building, a metal-working laboratory in Waldo Hall and a clay-modelling and pottery studio in the Mines building. The rooms have north light, are well heated and ventilated and are equipped with suitable studio furniture and accessories, such as casts, still life, and prints. The department is also well supplied with wall drawings, pictures, and port-folios illustrating the different phases of the work.

The College Library has a well-selected and growing reserve in art and architecture, covering all branches of the subjects.

102. Free-Hand Drawing. This course covers in representation; still life in line and dark and light; free-hand perspective of circles and linear perspective; some of the principles of composition and design; Egyptian ornament; the handling of pencil and charcoal.

The degree courses in Home Economics; freshman year; first semester; 2 credits; 2 studio periods of two hours each, and one recitation.

Fee: $0.50.

103. Beginning Composition. The study of design principles applied to concrete problems of dress or home decoration; brush

and ink, charcoal, and pencil are used as media. Greek design is studied.

Prerequisite: Drawing 102.

The degree courses in Home Economics; freshman year, second semester; 2 credits; 2 studio periods of two hours each and one recitation.

Fee: $0.50.

204. **The Theory and Harmony of Color.** This course covers the study of the so-called primary colors, the development of the prismatic colors with their complements, color quality, color values and the various harmonies. Problems in monochromatic, complementary, analogous and dominant harmonies are to be rendered. These problems will be an application of harmonious color schemes as applied to articles of household use, dress, and home interiors.

Prerequisites: Art. 102, 103.

Degree course in Home Economics; sophomore year; first semester; 2 credits; 3 studio periods of two hours each.

Fee: $0.50.

205. **Water Color.** The courses in water color are offered as elective cultural subjects and are open to any student who has completed courses 102, 103, and 104, or their equivalent. The work of the first semester will include simple flat washes of geometric casts, and flat color washes of still life subjects of broad area.

First semester; 2 credits; 3 studio periods of two hours each.

Fee: $0.50.

206. **Water Color.** A continuation of course 205, leaving flat washes and taking up more complex still-life studies, posters, and landscapes.

Prerequisite: Art 205.

Second semester; 2 credits; 3 studio periods of two hours each.

Fee: $0.50.

305. **Advanced Design.** An elective offered to give a broader working knowledge of design principles which shall serve as a guide to selection, adaptation, and composition, both structural and decorative, for practical application in interior decoration, costume design, and for articles of personal and household use.

First semester; 2 credits; 3 studio periods of two hours each.

Prerequisites: Art 102, 103, and 104.

Fee: $0.50.

306. Advanced Design. A continuation of course 305.

Prerequisites: Art 102, 103, 204, and 305.

Second semester; 2 credits; 3 studio periods of two hours each.

Fee: $0.50.

411. **Industrial Arts Drawing.** Free-hand perspective and working sketches of wood joints, furniture, and machine parts; and drawing form written descriptions.

The degree course in Industrial Arts; freshman year; second semester; 2 credits; 3 studio periods of two hours.

M. E. Vocational course; first year; second semester; 1 credit; 3 studio periods of one hour each.

Fee: $0.50.

412. **Industrial Arts Design.** A course in the principles of design suited to the Industrial Arts course. Original design plates of door and cabinet paneling, metal parts, hinges, escutcheons, draw pulls, etc., and furniture, will be required.

The degree course in Industrial Arts; sophomore year; first semester; 1 credit; 3 studio periods of one hour.

Fee: $0.50.

413. **Clay Modeling and Pottery.** The study of the modeling and making of pottery occupies most of the time. Different ways of making and decorating vases will be studied, using the hand work and the potter's wheel. Modeling from nature, tile building, mold and cast making in plaster, firing and glazing.

Prerequisites: Art 102 and 103.

Elective; the degree courses in Home Economics; senior year; first semester; 2 credits; 3 studio periods of two hours each.

Fee: $1.00.

414. **Clay Modeling and Pottery.** A continuation of course 413 with more advanced work and more time given to clay modeling.

Prerequisites: Art 102, 103, or their equivalents, and 413.

Elective; the degree course in Home Economics; senior year; second semester; 2 credits; 3 studio periods of two hours each.

Fee: $1.00.

505. **Water Color Rendering.** The purpose of this course in water color rendering is to give a knowledge of the handling and use of the brush and color in the expression of architectural subjects, detail, and decoration.

Fee: $0.50.

506. Water Color Rendering. A continuation of course 505, followed by full color drawings of buildings and their surroundings. Later in the semester opportunity is given for out-of door sketching in color.

Landscape Gardening; elective; sophomore year; second semester; 2 credits; 2 studio periods of three hours each.

The following courses are open to students who have had courses 102 and 103 or their equivalents and to Industrial students having courses 411 and 412 or their equivalents.

Fee: $0.50.

600. Jewelry Making. The first semester will be given to work in jewelry-making, using copper and silver, and covering the processes of sawing, hard and soft soldering, stone setting, etching, repousse, and cuttle-bone casting.

Prerequisites: Art 102, 103, or their equivalent.

Elective; the degree course in Home Economics; or any student having the desired prerequisites; 2 credits; 6 studio periods.

Fee: $1.00. Deposit: $2.00.

601. Jewelry Making. A continuation of course 600, with the addition of work in hammered metal.

Prerequisites: Art 102, 103, and 600.

Elective; the degree course in Home Economics; or any student having the desired prerequisites; second semester; 2 credits; 6 studio periods.

Fee: $1.00. Deposit: $2.00.

602. Art Metal Work. The work of the first semester will cover the processes of piercing, etching, sinking, sawing, riveting, straight bending and repousse, in the making of such articles as desk sets, book ends, trays, ladles, bag tops, plates, hinges, corners, etc.

Industrial Arts students; 2 credits; 3 two-hour periods.

Fee: $1.00. Deposit: $2.00.

603. Art Metal Work. The second semester work will be largely the problems of raising, hard and soft soldering, and soft enameling, in the making of pitchers, vases, etc.

Industrial Arts students; 2 credits; 3 two-hour periods.

Fee: $1.00. Deposit: $2.00.

RURAL ARCHITECTURE

The courses in architecture are offered first to students in agriculture who may major in rural architecture or elect subjects pertaining to farm structures; to students in industrial arts who take house planning; to students in landscape gardening who take subjects in landscape architecture; to students in home economics who take house construction and decoration, and to all others who are interested in rural and domestic architecture and are prepared to take the subjects.

The work is especially adapted to meet the utilitarian requirements of the other departments of the College and to serve these departments in an able manner. The courses consist of problems in design and construction and a consideration of building materials.

For students of agriculture the course amounts to agricultural engineering. It is important for men who contemplate this work in agricultural colleges, who intend to develop farm establishments, who favor structural work or who themselves have buildings to erect.

The following courses are offered:

501. **Architectural Drawing.** In this course the student is taught the use of the drawing board, T-square, triangle, and instruments. One plate each week will be prepared for the purpose of practice in lettering, line drawing, and scale. Much attention will be given to neatness and to correct presentation.

Freshman year; first semester; 3 credits; 3 draughting room periods of three hours each.

Fee: $0.75. Text: Bourne Von Holst-Brown: Architectural Drawing and Lettering.

502. **Orders of Architecture.** This is a continuation of course 501, in which the proportions of the Classic orders of architecture are studied. Diluted ink drawings rendered in water color on Whatman hot pressed paper will be presented.

Freshman year; second semester; 3 credits; 3 draughting room periods of three hours each.

The textbook will be the American Viguola, Part 1.

Fee: $0.75.

507. **Wood Construction.** This course is carried on in conjunction with course 510 and has one recitation each week. Scale drawings, showing the construction of wooden buildings, de-

signed by the student will be presented periodically. The properties of wood, methods of construction, and use of building materials will be carefully studied.

Sophomore year; first semester; 2 credits; 1 recitation; 1 draughting room period.

Fee: $0.50. Text: Kidder: Building Construction, Part II, Carpentry.

508. **Masonry Construction.** This course will be studied similarly to course 507 and in conjunction with course 511.

Fee: $0.50. Text: Kidder: Building Construction, Part I, Masonry.

509. **Shades and Shadows.** Although shades and shadows are studied in connection with the Orders, advanced work is given using as a textbook McGoodwin's Shades and Shadows.

Sophomore year; first semester; 1 credit; 1 draughting room period.

Fee: $0.50.

510. **Rural Architecture.** In this course original work in design is first offered. Problems such as bungalows, houses, and schools will be given the student for solution. Only frame buildings will be studied, and the drawings will be presented as sketches, except the structural drawings for course 507, which will be practical working drawings.

Sophomore year; first semester; 3 credits; 3 draughting room periods.

Fee: $0.75.

511. **Rural Architecture.** A continuation of course 510 in which buildings of masonry are studied. Drawings will be presented formally, the design and construction being original.

Sophomore year; second semester; 3 credits; 3 draughting room periods.

Fee: $0.75.

512. **Eight Hour Problems.** On one Saturday in each month, a problem in design will be assigned to the student to be worked out during the day.

Junior year; first semester; 1 credit.

Fee: $0.50.

513. **Eight Hour Problems.** A continuation of course 512.

Junior year; second semester; 1 credit.

514. **History of Architecture.** Hamlin's History of Architecture will be thoroughly studied in this course, presenting the development of styles since prehistoric times.

Elective; first semester; 1 credit; 1 recitation period.

515. **History of Architecture.** A continuation of course 514.

Elective; second semester; 1 credit; 1 recitation period.

516. **Domestic Planning.** This course takes up house planning from the practical standpoint. The drawings will be literal and comprehensive. The site, cost, use, and everything that goes into such a building will receive due consideration.

Elective; first semester; 2 credits; 2 draughting room periods.

Fee: $0.75.

517. **Domestic Planning.** A continuation of course 516.

Elective; second semester; 2 credits; 2 draughting room periods.

Fee: $0.75.

518. **Perspective Drawing.** A study of mechanical perspective.

Agriculture; sophomore year; second semester; 1 credit; 1 draughting room period.

533. **Agricultural Building Design.** This course is for students of agriculture. Design and construction of buildings for the farm are studied. The work is individual; thus each student may elect the particular kind of buildings in which he is especially interested.

Agriculture; elective; first semester; 2 credits; 2 draughting room periods of three hours each.

Fee: $0.50.

535. **Advanced Agricultural Building Design.** A continuation of course 533.

Agriculture; elective; second semester; 2 credits; 2 draughting room periods.

Fee: $0.50.

536. **Farm Plan Drawing.** The work of this course is prescribed for students studying farm management. The conventional methods of indicating lines, roads, fields, etc., will be carefully presented. Howe's Agricultural Drafting will be used.

Agriculture; elective; first semester; 1 credit; 1 draughting room period.

Fee: $0.50.

537. **Farm Structures.** Advanced drawing of concrete and frame structures. Details of construction, sanitation, and economics principles as advanced by other departments will receive strict attention. This course is for students who wish to specialize in agricultural engineering or rural architecture.

Prerequisites: Arch. 533 and 535.

Agriculture; elective; first semester; 4 credits; 4 draughting room periods.

Fee: $1.00.

538. **Farm Structures.** A continuation of course 537.

Agriculture; elective; second semester; 4 credits; 4 draughting room periods.

Fee: $1.00.

601. **Elementary Landscape Architectural Drawing.** This course takes up lettering and line drawing at the beginning and develops into the study of the presentation of garden plans. The relation of architecture to the garden will be observed in all drawings and various architectural styles will be noted. Only pen and ink drawings will be presented.

Landscape Gardening; freshman year; first semester; 3 credits; 3 draughting room periods.

Fee: $0.75.

602. **Advanced Landscape Architectural Drawing.** A continuation of course 601, in which drawings will be made using water colors.

Landscape Gardening; freshman year; second semester; 3 credits; 3 draughting room periods.

Fee: $0.75.

603. **Landscape Architectural Design.** Problems in the design of gardens and grounds presented not as working drawings but as rendered sketch drawings showing geometry of plan, color scheme and perspective.

Prerequisites: Arch. 601, 602 and 518.

Landscape Gardening; junior year; first semester; 3 credits; 3 draughting room periods.

Fee: $1.00.

604. **Landscape Architectural Design.** A continuation of course 603.

Landscape Gardening; junior year; second semester; 3 credits; 3 draughting room periods.

Fee: $0.75.

701. **Elementary House Planning.** This course consists of practical problems in planning and construction. All drawings will be working-drawings presented on detail paper. The work is prescribed for Industrial Arts students.

I. A.; junior year; first semester; 3 credits; 3 draughting room periods.

Fee: $0.75.

702. **Advanced House Planning.** A continuation of course 701.

I. A.; junior year; second semester; 3 credits; 3 draughting room periods.

Fee: $0.75.

D. A. 501. House Construction and Decoration. (See page 306, School of Home Economics.)

Fee: $0.50.

D. A. 502. Advanced House Construction. A continuation of D. A. 501.

D. A.; elective; second semester; 2 credits; 2 draughting room periods of two hours each.

CHEMISTRY

JOHN FULTON, Professor.
HERMAN VANCE TARTAR, Associate Professor*
RENTON KIRKWOOD BRODIE, Associate Professor.
MILO REASON DAUGHTERS, Assistant Professor.
RAYMOND ADAMS DUTCHER, Instructor.
MILTON JOHN SEELEY, Instructor.
ROBERT ANDREW DUNCAN, Instructor.
RALPH FINNEY BEARD, Instructor.
SYLVESTER BOYER, Instructor.

The beginner's courses, Chemistry 100, 101, and 102, consist essentially of the proof of some of the well-known chemical laws, such as the law of conservation of matter, the law of definite proportions and of multiple proportions, the Law of Boyle, and the Law of Charles. The student attains skill in the manipulation of apparatus, and in the management of equipment in general. From this elementary work he proceeds to qualitative analysis, in the study of which he is taught to separate and identify the different elements composing the mass, and, in the case of metals, to learn of their properties, their use, the different methods of obtaining them from their ores, and the combinations in which they occur in nature.

If he has shown suitable proficiency, he advances to quantitative analysis, which is the determination of the amounts of the ingredients. He is taught both methods of analysis, volumetric, or the method by solution, and the gravimetric, or the method by precipitation and weighing. On completing these courses, the student is fairly well prepared to take up advanced chemistry, which treats of the analysis of soils, manures, cattle foods, dairy products, etc., or he can take up the subject from the inorganic side in the analysis of minerals, fuels, oils, gas, etc., or he can view it from the pharmacist's standpoint, in analyzing drugs.

The following courses are offered:

Equipment. The department of Chemistry occupies nearly the whole of Science Hall, except the fourth floor, which is occupied by the department of Pharmacy, and a few rooms on the third floor that are at present used by the School of Forestry. The Chemical department of the Experiment Station has four rooms on the second floor.

The largest room in the building is the main general laboratory, which will accommodate 550 students in four sections. Adjacent to this laboratory is the general stock room, that in itself is a

* On leave of absence 1916-17.

division of the department. It is well stocked with all the necessary apparatus and chemicals required for all the courses given in the department. One of the greatest improvements in the Chemical department is the new gas machine; this, when working at its full capacity, can supply gas for 800 burners.

The new organic laboratory has been increased in size until it now contains room for 240 students. The equipment is of the best.

The new qualitative analysis room now has accommodations for 96 students in four sections. Its equipment of hot and cold water, gas, pressure pumps, etc., makes it as good as the best.

The qualitative analysis room can accommodate 50 students in three sections. Great pains have been taken to make this oom as nearly an actual chemical work room as possible.

In the balance room there are 23 analytical balances, most of which are used by the students in agricultural chemistry, and in food chemistry.

The main lecture room which is situated on the third floor, has a seating capacity of 150. It is provided with lecture tables that are supplied with gas, electricity, and water. Adjoining the lecture room is a small preparation room, in which is kept all special apparatus used for lecture demonstration, as well as supplies for the agricultural laboratory. This room is equipped with all the necessary apparatus for the proper elucidation of the principles of this branch of chemistry.

For the work in Agricultural Chemistry, an entire room is set aside. This room is fitted with gas, water, and electricity; condensers for distilled water; batteries; extraction apparatus for fats; nitrometers; Kjeldahl apparatus; hot water filtering apparatus; grinders for fodders, steam and air baths, calorimeter, polariscope, Westphal and analytical balances; coarse balance for rough work, hot-plates, and minor apparatus. This is one of the strongest divisions in the department and is lacking in nothing that makes a fully equipped agricultural chemical laboratory.

A. Elementary Chemistry. Fundamental laws of chemistry; general properties of matter; non-metallic elements and their compounds; special attention to oxidation and reduction.

Vocational students in Mechanic Arts; second year; first semester; 3 credits; 2 recitations; 2 laboratory periods.

Text: Stansbie: Introduction to Chemistry for Technical Students.

Fee: $3.00. Deposit: $2.00.

B. Elementary Chemistry. Metals; their compounds; alloys; special attention to chemical behavior of metals under shop conditions.

Prerequisite: Chemistry A.

Vocational Students in Mechanic Arts; second year; second semester; 3 credits; 2 recitations; 2 laboratory periods.

Fee: $3.00. Deposit: $2.00.

10. General Chemistry. Fundamental principles of the science; non-metallic elements and their compounds.

Prerequisites: Mathematics A and B.

Required of all students who have not had elementary chemistry in high school except those registered in the degree courses in Pharmacy, Mining, Commerce (Elective), and Landscape Gardening.

Freshman year; first semester; 3 credits; 1 lecture; 2 recitations; 2 laboratory periods.

Text: Smith: General Chemistry for College (Revised.)

Fee: $3.00. Deposit: $2.00.

11. General Chemistry. Non-metallic and metallic elements and their compounds. Conceptions of chemical equilibrium and the modern theory of solutions frequently applied.

Prerequisite: Chemistry 10 or its equivalent.

Freshman year; second semester; 3 credits; 1 lecture; 2 recitations; 2 laboratory periods.

Fee: $3.00. Deposit: $2.00.

12. Elementary Household Chemistry. A course arranged for women who do not care to take the full chemical courses leading to the degree in Home Economics. As its name implies, it is a fragmentary elementary course in the application of chemistry to daily life, rather than an exposition of chemical principles.

It treats of such subjects as the relation of combustion to heat, lights and illuminants; commercial soaps; special soaps and scouring powders; general composition of foods; functions of food; textile fibres; bleaching and bluing, etc.

First semester; 3 credits; 2 recitations; 2 laboratory periods of 2 hours each.

Text: Snell: Elementary Household Chemistry.

13. A continuation of 12.

Freshman year; second semester; 3 credits; 2 recitations; 2 laboratory periods of 2 hours each.

Courses 12 and 13 will not be accepted as substitutes for courses 100 and 101.

100. **General Chemistry.** Fundamental principles; non-metallic elements and their compounds.

Prerequisite: Elementary High School chemistry.

Required of all students having had chemistry in the high school (see note below) registered in the degree courses, except Pharmacy, Mining, Commerce (Elective), and Landscape Gardening.

Freshman year; first semester; 3 credits; 2 recitations or lectures; 2 laboratory periods.

Text: Smith: General Chemistry for Colleges.

Fee: $3.00. Deposit: $2.00.

101. **General Chemistry.** Non-metallic and metallic elemnts and their compounds. Conceptions of chemical equilibrium and the modern theory of solutions are frequently applied.

Prerequisite: Chemistry 100 or its equivalent.

Freshman year; second semester; 3 credits; 2 recitations or lectures; 2 laboratory periods.

Text same as for Chemistry 100.

Fee: $3.00. Deposit: $2.00.

104. **Chemical Calculations.** Calorimetric; specific gravity; gas calculations; calculations of atomic weights and formulas; gravimetric analysis; volumetric analysis.

Prerequisite: Quantitative analysis.

Elective; junior or senior year; first or second semester; 2 credits; 2 recitations. (Note: A minimum of 5 students required)

Text: Ashley: Chemical Calculations.

Fee: $2.00. Deposit: $2.00.

105. **General Chemistry** for Mining, Chemistry, and Pharmacy students especially, but also open to others who desire to complete General Chemistry, and Qualitative Analysis during the first year.

Freshman year; first semester; 5 credits; 3 recitations; 2 laboratory periods of three hours each.

Fee: $5.00. Deposit: $2.00.

NOTE—Students who have had one year of chemistry in a standard high school may be permitted to take an examination for credit in Chemistry 10 and 11 provided their high school credits are not used as entrance units. This examination will be held one week after the opening of the first semester. Laboratory note books must be presented.

106. A **continuation of 105**, but with this difference, that Qualitative Analysis succeeds the laboratory manual used in the first semester. This course is open to any one having completed 101, or its equivalent.

The general chemistry text is used as the basis of the recitations in this course which is really descriptive chemistry.

Freshman year; second semester; 5 credits; 2 recitations; 3 laboratory periods of three hours each.

Text: Noyes: Qualitative Analysis.

Fee: $5.00. Deposit: $2.00.

200. **Elementary Organic Chemistry.** A study of fundamental principles and more important compounds; petroleum and its products, alcohols, ethers, aldehydes, fatty acids, oils, soaps.

Prerequisite: Chemistry 11 or 101.

Course in Home Economics, and Vocational Pharmacy; sophomore year; first semester; 4 credits; 2 recitations; 3 laboratory periods.

Text: Norris: Organic Chemistry.

Fee: $4.00. Deposit: $2.00.

201. **Organic Chemistry.** Aliphatic compounds; hydrocarbons, alcohols, ethers, esters, aldehydes, acids, fats, ketones, amines, carbohydrates, alkaloids. Preparation and identification of typical and simple compounds.

Prerequisite: Chemistry 11 or 101.

Course in Pharmacy; sopohomore year; and Chemical Engineering; junior year; first semester; 3 credits; 2 recitations; 2 laboratory periods.

Text: Norris: Organic Chemistry.

Fee: $3.00. Deposit: $2.00.

202. **Organic Chemistry.** Aromatic compounds; cyclic hydrocarbons, nitro derivatives, amines, diazo compounds, phenols, dyes, proteins.

Prerequisite: Chemistry 201.

Course in Pharmacy, sophomore year, and Chemical Engineering, junior year; second semester; 3 credits; 2 recitations; 2 laboratory periods.

Text: Norris: Organic Chemistry.

Fee: $3.00. Deposit: $2.00.

300. **Qualitative Analysis.** This course consists largely of laboratory practice in the ordinary process of separating and

identifying ions. It is given in conjunction with 106, and in fact constitutes the laboratory part of the above course.

Freshman year; first semester; 3 credits; 3 laboratory periods of three hours each.

Texts: Smith: Chemistry; Noyes: Qualitative Analysis.

301. Qualitative Analysis. A course provided for Mining students who have completed 101, or equivalent.

Freshman year; first semester; 5 credits; 2 recitations and three laboratory periods of 3 hours each.

Texts: Smith: Chemistry; Noyes: Qualitative Analysis.

Fee: $3.00. Deposit: $2.00.

302. Qualitative Analysis. Students in Highway Engineering.

Three credits; 1 recitation; 3 laboratory periods of two hours each.

Fee: $3.00. Deposit: $2.00.

303. Organic Qualitative Analysis. A course for Pharmacy students.

Elective; second semester; 3 credits; 2 recitations; 2 laboratory periods of 3 hours each.

Fee: $3.00. Deposit: $2.00.

304. Food and Drug Analysis. This course affords suitable preparation for the students to hold positions in the Federal Food and Drug Laboratories.

The food and drug products on the market that are subject to the greatest adulteration will be analyzed for preservatives and other added materials.

Prerequisites: Organic Chemistry and Botany.

Senior year; 3 credits; 3 laboratory periods.

400. Quantitative Analysis. A course designed for students in Pharmacy, and consists of instruction in both gravimetric and volumetric analysis of pharmaceutical products.

Sophomore year; first semester; 4 credits.

Fee: $3.00. Deposit: $2.00.

401. Quantitative Analysis. This is a course in analysis for Mining students, and consists of gravimetric analysis of limestones, iron, lead, zinc, arsenic, and antimony ores, coal, and as much other work as time will permit.

The course in Mining Engineering; sophomore year; first semester; 5 credits; 1 recitation; 4 laboratory periods.

Text: Frank and Clemens. Fee: $5.00. Deposit $2.00.

402. **Chemistry of Foods.** A qualitative and quantitative examination of sugars, fats, proteins, leavening agents. Adulteration of foods, with simple methods of detection; food legislation.

Prerequisite: Chem. 200.

Required of all students in Home Economics; sophomore year; second semester; 4 credits; 2 recitations; 3 laboratory periods.

Texts: Leach: Food Inspection and Analysis; Olsen: Pure Foods; Sherman: Food Products; Sherman: Organic Analysis; and U. S. Bul. 107 (revised.)

Fee: $4.00. Deposit: $2.00.

403. **Chemistry of Water.** This course is especially for the students in Highway Engineering, and consists of the examination of waters for potability, and for adaptability for industrial purposes. This course is divided into two parts; first, Sanitary Water Analysis, which investigates the methods of analysis applied to water and sewage, as outlined by the American Public Health Association; second, Chemical Studies of Industrial Waters, which includes the examination of various waters with reference to their adaptability to industrial processes such as heating plants, laundries, paper mills, etc.

Junior year; second semester; 2 credits; 2 laboratory periods.

Text: Standard Methods of Water Analysis. A. P. H. A.

Fee: $2.00. Deposit: $2.00.

404. **Alkaloidal Testing.** A study of the alkaloids of the drug plants as regards their structure and synthesis. The means of their identification by the various alkaloidal tests will be studied in the laboratory as well as the means of identifying those organic compounds that enter pharmaceutical preparations. This course will also include the means of detection of the common poisons in the animal body.

Prerequisites: Chemistry 100, 101, 300, and 201.

First semester; 2 credits; 2 laboratory periods.

Fee: $2.00. Deposit: $2.00.

405. **Drug Assaying.** The quantitative estimation of the active principles of crude drugs and their preparations, such as solid and fluid extracts, tinctures, pills, etc. The assay of a number of inorganic pharmaceutical preparations will be included in this course.

Methods for the physiological standardization of drugs and drug preparations will be discussed by the instructor.

Prerequisites: Chemistry 100, 101, 300, 201, and 404.

Second semester; 2 credits; 2 laboratory periods.

Fee: $2.00. Deposit: $2.00.

406. Chemistry of Highway Materials. The course is designed for students in Highway Engineering, and consists of the study of such materials as cement, asphalt, bitumen, mineral oils, tar, and tar products.

The course in Highway Engineering; junior year; second semester; 2 credits; 2 laboratory periods.

407. Applied Electro-Chemistry. Applications of the electric current to analytical operations; electroplating; electrolytic oxidation and reduction; storage batteries; the electric furnace, etc.

Prerequisites: Chemistry 401 or its equivalent and Chemistry 410 and 411 or their equivalent.

Chemical Engineering; senior year; first semester; 3 credits; 1 conference; 6 to 8 hours per week in laboratory.

Text: Thompson: Applied Electro-Chemistry; Laboratory Outline of Electro-Analysis.

Fee: $3.00. Deposit: $2.00.

408. Chemistry for Engineers. This course is particularly for students in Mechanical and Electrical Engineering. It consists of the analysis of coal, oil, gas, and of their calorific powers; also the technical analysis of flue gases.

Elective; junior or senior year; second semester; 2 credits; 2 laboratory periods.

410. Elementary Physical Chemistry. Molecular weight determinations; properties of liquids; dilute solutions; solubilities; conductivity of solutions; chemical equilibrium; velocity of reactions.

Prerequisites: Mathematics 31 and Chemistry 401 or their equivalent.

Chemical Engineering and Agricultural Chemistry; junior or senior year; 3 credits; 2 lectures and recitations; 1 laboratory period of 4 hours.

Text: Senter: Outlines of Physical Chemistry; Findlay: Practical Physical Chemistry.

Fee: $3.00. Deposit: $2.00.

411. Principles of Thermo-Chemistry and Electro-Chemistry. Thermochemical measurements; relation of chemical affinity to heat of reaction; conductivity of solutions; electromotive force.

Prerequisite: Chemistry 410.

Chemical Engineering and Agricultural Chemistry; junior or senior year; second semester; 3 credits; 1 conference; 6 to 8 hours per week in laboratory.

Texts: Ostwald-Luther: Physico-Chemical Messungen; Findlay: Practical Physical Chemistry; Thomsen: Thermo-chemistry; Leblanc: Electro-chemistry; Senter: Outlines of Physical Chemistry.

Fee: $3.00. Deposit: $2.00.

412. **Metallurgical Analysis.** This consists of the analysis of Metallurgical and Engineering materials, such as limestone, cement, coal, iron ore, copper matte, brass, bronze, steel, babbit metal, water, oil, etc.

The course in Chemical and Mining Engineering; sophomore year; second semester; 3 credits; 3 laboratory periods.

Text: Sidener: Quantitative Metallurgical Analysis.

Fee: $3.00. Deposit: $2.00.

413. **Chemical Technology.** A course of lectures in the principles of Organic, Analytical, and Technical Chemistry as applied to those industries depending upon chemistry as a basis for their processes.

The course in Chemical Engineering; senior year; first semester; 2 credits. A continuous course; credit will not be awarded until the second semester's work has been completed.

Fee: $2.00. Deposit: $2.00.

414. **Chemical Technology.** A continuation of course 413.

The course in Chemical Engineering; senior year; second semester; 2 credits.

Text: Thorpe: Industrial Chemistry.

Fee: $2.00. Deposit: $2.00.

415. **Methods of Teaching Chemistry.** A course designed for those who expect to teach chemistry in secondary schools. Lectures, reports, discussions. A critical study will be made of laboratory experiments, equipment, sources of materials, modern text books, and manuals.

Prerequisites: Chem. 100, 101, 200, and 402.

416. **Food Industries.** A critical study of cereals, breakfast foods, beverages, animal foods, milk products, spices and condiments. Lantern slides.

Prerequisite: Chemistry 402.

Elective; junior or senior year; second semester; 2 credits; 2 recitations.

Text: Vulte and Vanderbilt: Food Industries.

Fee: $2.00. Deposit: $2.00.

417. **Methods in Gas Analysis.** Required of all Mining students.

Prerequisite: Chem. 401.

Sophomore year; second semester; 1 credit; 1 laboratory period of three hours.

500. **Agricultural Chemistry.** A general course consisting of lectures, recitations, and laboratory work, dealing with the more important phases of Chemistry in its relation to Agriculture.

Prerequisite: Chemistry 101.

The course in Agriculture; sophomore year; first semester; 3 credits; 2 recitations; 2 laboratory periods of two hours each.

Text: Tartar & Dutcher: Lecture Notes on Chemistry in its Relation to Agriculture; Lincoln & Walton: Quantitative Chemical Analysis.

Fee: $3.00. Deposit: $2.00.

501. **Agricultural Chemistry.** A continuation of course 500.

The course in Agriculture; sophomore year; second semester; 3 credits; 2 recitations; 2 laboratory periods of 2 hours each.

Fee: $3.00. Deposit: $2.00.

502. **Dairy Chemistry.** A course consisting of lectures, recitations, and laboratory work dealing with the chemistry of milk, milk powders, condensed milk, butter, oleomargarine, cheese and other dairy products.

Prerequisites: Chemistry 500 and 501.

Required of students majoring in Dairy Manufacturing; junior year; second semester; 3 credits; 3 laboratory periods of three hours each.

Text: Bulletin 107, U. S. Bureau of Chemistry; Lincoln & Walton: Quantitative Chemical Analysis; assigned reading.

Fee: $3.00. Deposit: $2.00.

503. **Soil Chemistry.** This is a lecture and laboratory course dealing with the constitution and properties of the chemical constituents of soils; the methods of qualitative and quantitative chemical soil analysis; the chemical changes taking place in soils; the soil solution; and chemical soil deficiencies.

Prerequisite: Chemistry 501.

Junior year; first semester; 2 to 4 credits; 2 to 4 laboratory periods of three hours each.

Fee: $1.00 per credit. Deposit: $2.00.

504. **Soil Chemistry.** A continuation of course 503.

Junior year; second semester; 2 to 4 credits; 2 to 4 laboratory periods of three hours each.

Fee: $1.00 per credit. Deposit: $2.00.

505. **Agricultural Analysis.** A course in analytical methods applied to agricultural materials, including cereals, fertilizers, soil, water, vinegar, insecticides, fruit juices, feeding stuffs, etc.

Prerequisites: Chemistry 500 and 501.

First semester; 2 to 4 credits; 2 to 4 laboratory periods.

Fee: $1.00 per credit. Deposit: $2.00.

506. **Agricultural Analysis.** A continuation of course 505.

Second semester; 2 to 4 credits; 2 to 4 laboratory periods.

Fee: $1.00 per credit. Deposit: $2.00.

507. **Advanced Agricultural Analysis.** This course is especially thesis work in the Experiment Station laboratory, or work of the same general description.

Senior year; first semester; 3 to 4 credits; 3 to 4 laboratory periods.

Fee: $1.00 per credit. Deposit: $2.00.

508. **Advanced Agricultural Analysis.** A continuation of course 507.

Senior year; second semester; 3 to 4 credits; 3 to 4 laboratory periods.

Fee: $1.00 per credit. Deposit: $2.00.

509. **Animal Chemistry.** A study of the composition of the animal body and products of the animal body, such as milk, wool, etc. Special emphasis is placed on the chemistry of the fats, proteins, and carbo-hydrates. Enzyme action, digestion of foodstuffs, their absorption and distribution, fate of the foodstuffs in metabolism, metabolic products and their excretion, will be considered. Recent publications bearing on animal nutrition will be read and discussed.

Prerequisite: Chem. 501 or its equivalent.

Junior year; first semester; 2 credits; 2 lectures.

Fee: $2.00. Deposit: $2.00.

510. **Plant Chemistry.** Designed for students desiring a fuller consideration of the growth and composition of plants; proper-

ties, nature, and classification of plant constituents; chemical analysis; chemical synthesis; enzymes; chemistry of the manufacture of plant products, etc.

Prerequisite: Chemistry 501 or its equivalent.

Second semester; 2 credits; 2 lectures.

Text: Haas and Hill: Chemistry of Plant and Plant Products; assigned reading.

Fee: $2.00. Deposit: $2.00.

511. Seminar. The work will consist of reports and reviews of articles appearing in scientific journals, and experiment station literature. These papers will be prepared under the supervision of the department, although considerable latitude will be allowed in the selection of subjects and manner of presentation. Required of all senior students majoring in Agricultural Chemistry.

Junior or senior year; first semester; 1 credit.

Fee: $1.00. Deposit: $2.00.

512. Seminar. A continuation of course 511.

Second semester; 1 credit.

Fee: $1.00. Deposit: $2.00.

ENGLISH LANGUAGE AND LITERATURE

FREDERICK BERCHTOLD, Professor.
IDA BURNETT CALLAHAN, Assistant Professor.
SIGURD HARLAN PETERSON, Assistant Professor.
LOREN BURTON BALDWIN, Instructor.
GERTRUDE EWING McELFRESH, Instructor.
GRACE CHRISTINE ROSAAEN, Instructor.

It is the aim of this department to teach the student to express with clearness what he thinks with vigor. He is taught that the essential part of any composition, whether oral or written, is thought, well organized and well expressed; that to comprehend clearly and to feel strongly what he has to say are the indispensable conditions of making others comprehend and feel it.

What his textbook helps him to do consciously, familiarity with superior writers should help him to do unconsciously; for we may get good from a master of English by unconscious absorption, just as we acquire good manners by associating with gentlemen and ladies. No mind can fail to be stimulated by contact with greater minds, whether living or dead. Their pages feed the powers of thought and strengthen the power of expression. thus enabling the student to think, talk, and write to more purpose.

In all the collegiate courses in English the work is correlated with that offered in the other departments, to bring it into harmony with the trend or spirit of the institution, which is distinctly technical and industrial in character. Subjects are assigned for presentation and discussion which bear close relation to the work pursued by the students in the different schools, in anticipation of their probable needs and activities in later life. What is sought and insisted on is, earnest, logical, forceful presentation of facts that will compel attention and carry conviction.

The Oregon Agricultural College participates in a number of intercollegiate oratorical contests and debates; and the department offers elective courses in public speaking, designed to give preparation for these contests.

G. **Vocational English.** Review of English Grammar. The purpose of the work in English Grammar, as prescribed in Course A and in subsequent Vocational English courses, is such an intensive study of, and persistent drill in, the fundamentals of the subject as shall establish the student in relatively correct usage. The accomplishment of this end is sought by giving the work with such frequency and by such concrete methods as shall tend to create

in the student a liking for the subject of English Grammar. Identification and analysis of sentences. Punctuation. Written and oral exercises in spelling. The specific aim of written composition is the development of the sentence sense, the avoidance of the common grammatical errors in expression, and the production of a legible manuscript. Use is made of the letter as a medium for the solution of simple but actual business problems. Written reproduction of short articles. Short narrative themes. Oral composition comprehending the reproduction of articles, the explanation of processes and mechanisms, and the narration of incidents.

The course in written and oral expression is supplemented by a course of reading designed to enable the student, by helping him to acquire a command of language, the more effectively to discharge the duties of his vocation, to create pleasure for himself in reading good books, and to develop the practice of reading into a habit for life.

The vocational courses; first year; first semester; 3 credits; 3 recitations.

Texts: Boskervill & Sewell: English Grammar.

Books for reading: Fowler: Starting in Life: Choosing a Career; Richardson: The Girl Who Earns Her Own Living.

H. Vocational English. Special attention is given, in the study of Grammar, to the identification of the parts of speech, the classification and uses of clauses, and the conjugation of the verb. Punctuation, with drill primarily on the uses of the comma. The logical arrangement of thoughts as represented in the outline will be discussed and illustrated. In written composition, the content and mechanics of the letter are given particular consideration. Exposition of concrete obj cts. Narrative writing. Oral composition will treat current events and subjects listed for written composition.

Prerequisite: Eng. A.

Vocational courses; first year; second semester; 3 credits; 3 recitations.

Texts: Huntington: Elements of English Composition (Part I.)

Periodical: Current Events.

Books for reading: Hale: What Career? Rollins: What Can a Young Man Do? Alden: Women's Ways of Earning Money.

I. Advanced Vocational English. Study of the structure and functions of phrases; the correction of the common errors in ety-

mology and syntax. Punctuation. Writing reports on newspaper and magazine articles; writing advertisements; drafting simple specifications. Oral composition comprehending current events, sales talks, and informal debates.

Prerequisite: Eng. B.

Periodicals: Youth's Companion, Boy's Magazine, Popular Mechanics, World Magazine. (The student will subscribe for at least one periodical in the foregoing list.)

Books for reading: Shaw: The Outlook for the Average Man; Reid: Careers for the Coming Men; Abbot: Women and Industry.

Vocational courses; second year; first semester; 3 credits; 3 recitations.

Text: Huntington: Elements of English Composition. (Part II.)

J. **Advanced Vocational English.** Modifications of the verb; drill on the sequence of tenses; practice in the detection and the correction of the more elusive forms of false syntax. Review of Punctuation. The aim of the work in written composition is to improve diction, increase vocabulary, and develop greater variety, force, and directness of expression. Reports on articles in books, magazines, and newspapers. Reports on actual business experiences. Letter writing. Oral composition involving conversations on problems in business and actual life.

Prerequisite: Eng. C.

Books for reading: Kaufman: The Efficient Age; MacLean: Wage Earning Women.

Vocational courses; second year; second semester; 3 credits; 3 recitations.

Text: Gardiner, Kittredge & Arnold: Manual of Composition and Rhetoric.

E. **Junior Secondary English.** The object of offering this course is to afford students not having completed the English work of the third year of the secondary school an opportunity to take that work.

The course contemplates, in part, a survey of English literature, during the first and second semesters. A study is made of the characteristics of literary epochs, attention being especially directed to the shaping influence of contemporary civil events. Study of a typical masterpiece belonging to each epoch. Assigned readings, followed by oral and written reports.

The work in Rhetoric and Composition involves intensive study and practice in the four forms of discourse already studied in the first two years of the secondary school, the aim of such intensive study and practice being the establishment of the student in good usage.

No textbook is prescribed for Rhetoric and Composition; the principles of Rhetoric will be evolved from the written work prepared and presented by members of the class. The subjects of compositions, whether written or oral, will be chosen, as a rule, from the epochs surveyed, the writers studied, and the books read. Those planning to pursue the course are requested to secure, in order to have at hand a convenient reference, Brooks' two-book course in English Composition, used in the high schools of Oregon.

Prerequisite: Course D or its equivalent.

The vocational course; first semester; 3 credits; 3 recitations.

Textbook: Long: English Literature.

F. Continuation of E. The work in written Composition requires several Expository and several Argumentative themes of such length and of such literary quality as shall thoroughly test the student's ability for sustained, consistent thinking, clear expression, and a just literary appreciation. Oral composition supplementing written, will be a feature of each week's class work. A student's standing in written composition will be determined, in part, by the form and rhetorical effectiveness of the class themes and examination papers that he writes in other departments.

The Vocational course; second semester; 3 credits; 3 recitations.

Prerequisite: Eng. E. or its equivalent.

Courses in Home Economics and Industrial Arts; freshman year; first semester; 3 credits; 3 recitations.

Text: Canby et al: Composition in Theory and Practice.

M. Elementary Business English. Besides giving a thorough training in the various forms of commercial correspondence, the course aims to ground the student in the vocabulary, forms, and usages peculiar to business and administrative pursuits. There is constant and persistent practice in spelling and punctuation, in composition and letter writing, with a view to imparting to the student's English strength and virility, and to enable him to achieve results.

Two-years Business course; second year; first semester; 3 credits; 3 recitations.

N. Elementary Business English. A continuation of course M. Advanced composition and letter writing; business forms, incidental writing; summaries; advertising; preparation of copy and proof-reading. Good, clear, effective English is at all times insisted upon.

Prerequisite: Eng. M.

Two-years Business course; second year; second semester; 3 credits; 3 recitations.

Textbook: Lewis: Business English.

31. College Rhetoric. A rapid survey comprehending the work done by the high school in literature, rhetoric, and composition, and involving the preparation of several short essays, with a view to ascertaining the extent of the student's literary appreciation and command of rhetorical principles. Lectures, assignments, and recitations upon the methods of effective discourse. Studies in the expository and argumentative methods of writing, with analysis of specimens. The paragraph considered as a distinct stage in expository composition; practice writing to exemplify the various methods of developing the topic statement. Plotting of simple briefs, and writing of easy forensics. At every stage of study selections from standard and contemporary authors will be read and discussed, in order that the student may acquire ability to master content, differentiate literary types, and appreciate standards of excellence. Subjects of composition will be those suggested by the student's personal, school, literary, community, and vocational interests, oral composition supplementing written.

Compositions required : five expository and three argumentative short themes; one expository long theme requiring research and accompanied by outline and bibliography; one resume and one criticism; one argumentative long theme, accompanied by brief. A student's standing in written composition will be determined, in part, by the form and rhetorical effectiveness of the class themes and examination papers that he writes in other departments.

Courses in Home Economics and Industrial Arts; freshman year; first semester; 3 credits; 3 recitations.

32. Advanced College Rhetoric. Study of the elements and principles involved in effective discourse, continued. Lectures on the characteristics of the literature of feeling, with rendering of

selections for illustration. Discussion of the narrative and descriptive methods of writing. Expository and emotional description differentiated. Examination of the narrative principle in epic forms, in ballad literature, in the incidents occurring in the drama, in the news letter, and in anecdote. Studies and practice writing in the narrative paragraph and in dialogue. Analysis of two or three of the briefer and less complex short stories of standard authors, for the purpose of gaining an appreciation of the form and function of the short story type.

Written composition, confined, for the most part, to the descriptive and narrative types of discourse, will be similar in character to that of the first semester. Frequent oral delivery.

Prerequisite: Eng. 31.

Course in Home Economics; freshman year; second semester; 3 credits; 3 recitations.

Text: Moore: English Composition for College Women.

51. **The English Essay and Novel.** Study of structure of novel and essay.. Study of essay and novel as expressions of national life and thought. Emphasizing the growth of the economic, critical, historical, and personal essay, and the larger categories of fiction, the novel of manners, of character, the problem novel, and the romantic novel. Class and individual assignments, lectures, and reports.

Prerequisite: Eng. 32.

Course in Home Economics; sophomore year; first semester; 3 credits; 3 recitations.

Text: Fulton: Essays for Use in College Courses.

52. **The English Drama.** Study of the Elizabethan and the Stuart drama; the modern drama. A survey of the rise and development of the tragedy, comedy, and historical play. Study of setting, plot, structure, and characters. Reading of plays in class; reports on assigned readings.

Prerequisite: Eng. 51.

Courses in Home Economics; sophomore year; second semester; 3 credits; 3 recitations.

Text: Brooke: The English Drama.

61. **The History of English Literature.** A general outline course of the history of English literature. This includes a survey of the principal forms of literature as exemplified by the masters

in each field. The aim is to cultivate an appreciation of what is excellent in quality and form. Masterpieces representing the best thought and form are studied in class or assigned to students for careful reading and reports. Chief attention given to Chaucer, Spenser, Shakespeare, Milton, Swift, Pope, Johnson, Burke, Goldsmith, and Burns.

Elective in all courses; first semester; 3 credits; 3 recitations.

Text: Crawshaw: History of English Literature.

62. **The History of English Literature.** A continuation of course 61. A study of the master minds of the nineteenth century. Wordsworth, Scott, Shelley, Keats, Macaulay, Dickens, Thackeray, George Eliot, Matthew Arnold, Carlyle, Ruskin, Stevenson, Tennyson, and Browning. Lectures, readings, and discussions; critical reports on assigned topics required from all the students.

Elective in all courses; second semester; 3 credits; 3 recitations.

71. **American Literature.** A study of the growth and development of literature in our country. Particular emphasis is placed on the study of writers of the nineteenth century, including such authors as Irving, Cooper, Bryant, Poe, Hawthorne, Longfellow, Holmes, and Lowell, as well as to prominent writers of the present day.

Lectures; class study; class reading; reports on assigned topics; essays.

Elective in all courses; senior year; first semester; 3 credits; 3 recitations.

72. **American Literature.** A continuation of course 71. The metropolitan writers; literature in the South; literature in the West; present schools and tendencies; periodical literature. Lectures; class room work; reports; essays.

Elective in all courses; senior year; second semester; 3 credits; 3 recitations.

Text: Wendell & Greenough: Study of Literature in America.

81. **Modern English Prose.** A study of representative modern prose writers, with special reference to prose as found in such present-day standard periodicals as The Literary Digest, The Independent, and The Outlook. Study of the newspaper paragraph. Practice in reporting lectures. Exercises in the elaboration of field notes. Drills looking to the popularization of technical matters

and the results of experiments. Drafting of resolutions; writing of syllabuses; reduction of the article to a single short paragraph and to a single sentence; analytical outlines of expository articles; finding in a disputation article the proposition upheld and its supporting points; interpretation of advertisements. Writing of papers and reports. Theme writing. Oral composition.

Prerequisite: Completion of a four-years high school course.

The courses in Agriculture, Forestry, Logging Engineering, Mechanical Engineering, Highway and Irrigation Engineering, Commerce, Industrial Arts, and Pharmacy.

Freshman year; first semester; 3 credits; 3 recitations.

Text: The Independent; The Outlook; The Nation; The Literary Digest. Woolley: Handbook of Composition.

82. **Modern English Prose.** A continuation of course 81.

The courses in Agriculture, Forestry, Logging Engineering, Mechanical Engineering, Highway and Irrigation Engineering, Commerce, Industrial Arts, and Pharmacy.

Freshman year; second semester; 3 credits; 3 recitations.

Prerequisite: Eng. 81.

91. **Modern English Prose.** A course designed especially for Mining Engineering students.

Freshman year; first semester; 2 credits; 2 recitations.

92. **Modern English Prose.** Course in Mining Engineering.

Prerequisite: Eng. 91.

Freshman year; second semester; 1 credit; 1 recitation.

101. **Special Composition.** If a student, in his work in any department, submits papers notably deficient in English, he may be required, at any time, to take course 101. It consists wholly of theme work and consultations, and is continued in each case as long as the needs of the student require.

All courses; first and second semesters; 2 recitations.

103. **Composition of Addresses.** This course deals with the composition of the most important kinds of addresses, including the argument, the eulogy, the commemorative address, and various forms of non-forensics. The work consists of lectures, a study of textbooks, analysis of masterpieces, practice in the composition of the various forms, and frequent class room exercises.

Elective in all courses; junior year; first semester; 2 credits; 2 recitations.

Text: Baker: Forms of Public Address.

104. Extempore Speaking. Practice in the presentation of the various forms of addresses. Speeches are prepared on topics of special interest to the students and delivered with the view to making them most effective as means in the advancement of a particular cause. Extensive criticism is offered as to methods of selection, organization and presentation.

Elective in all the courses; junior year; second semester; 2 credits; 2 recitations.

Text: Baker: Forms of Public Address.

105. Practical Public Speaking. Practice in the presentation of the various forms of public addresses, voice training, study of gesture, bearing, and the elements of ease, grace, and force in presentation. Practice in the rapid preparation and in the impromptu delivery of speeches on topics of current interest. Designed for those who wish some general training in public speaking. Drill in parliamentary procedure.

Prerequisite: 104.

Elective; first semester; 3 credits; 3 recitations.

Text: Robinson: Effective Public Speaking.

106. Practical Public Speaking. Continuation of course 105.

Prerequisite: Eng. 105.

Elective; second semester; 3 credits; 3 recitations.

Text: Robinson: Effective Public Speaking.

107. Argumentation. Practical work in brief-drawing, the collection and handling of evidence, and debating. Each student will prepare several debates under the direction of the instructor; construct briefs and participate in class room debates. Personal consultation with the instructor on thought, composition, and delivery. This course is a critical and practical study of argumentation. The class is limited in number, and the course can be taken only with the consent of the instructor.

Elective; second semester; 2 credits; 2 recitations.

Text: Foster: Argumentation and Debate.

108. Oratory. This course is intended as special preparation for those who wish to enter oratorical work. The work consists of lectures on the theory of oratory, the preparation of original orations, class room exercises, and personal conferences and criticism. The course can be taken only with the consent of the instructor.

Elective; first semester; 1 credit; 1 recitation.

Text: Shurter: The Rhetoric of Oratory.

141. Technical English. The writing which the engineer has to do is almost wholly of the nature of exposition. Indeed, it is only in so far as it is expositional that it offers any problems different from those which arise in general composition. In technical English, then, in the engineering courses, attention is centered on exposition of the various types which the engineer has to use, in description, in narration, in directions, in criticism, and in argumentation.

At all times it will be insisted on that whatever facts the student expresses, shall be expressed accurately; that the treatment of the subject shall be complete for the purpose in hand; that the form of presentation shall be logical; and that the expression shall be economical for the reader.

Required in the course in Mining; elective in all other courses; senior year; first semester; 3 credits; 3 recitations.

Text: Earle's Theory and Practice of Technical English for Engineers.

142. Technical Business English. Study of advanced technical composition. Special attention is given to letters of application, letters of inquiry and information, circular letters, letters of complaint, sales letters, follow-up letters, and collection letters. The ability to write a clear, forceful, effective letter has become a first requisite, not only for business success, but for intellectual and social recognition.

Prerequisites: Eng. M, N.

The course in Commerce; freshman year; first semester; 3 credits; 3 recitations.

Text: Lewis: Business English.

191. Story-Telling. The study of children's literature, and the analysis and reproduction of short stories suitable for the primary grades, the kindergarten, and the nursery.

Elective in the course in Home Economics; senior year; first semester; 1 credit; 1 recitation.

192. Story-Telling. A continuation of course 191.

Elective in the course in Home Economics; senior year; second semester; 1 credit; 1 recitation.

206. Expression. Literary interpretation, including analysis, memorizing, and rendering of selected masterpieces of prose and poetry. The aim of this course is to enable the student not only to understand and appreciate the thought and spirit of literature, but to render it naturally and effectively; to correct erroneous habits of speech, and to give freedom, purity, and strength of tone to cultivate the power of expression through imagination; to eliminate artificiality, affection, and self-consciousness.

Elective; first semester; 2 credits; 2 recitations.

207. Expression. Continuation of course 206.

Elective; second semester; 2 credits; 2 recitations.

208. Dramatic Interpretation. Advanced literary interpretation. Training in delivery of masterpieces of prose and poetry. Interpretative study of Shakespeare and the modern drama; presentation of scenes from plays; bodily expression; impersonation.

Prerequisites: Course 206 and 207.

Elective; first semester; 2 credits; 2 recitations.

209. Dramatic Interpretation. Continuation of course 208.

Elective; second semester; 2 credits; 2 recitations.

301. Elementary News-Writing. Instruction and training in judging news values, gathering and writing news, and in newspaper correspondence. Writing news technical to Agriculture, Home Economics, Engineering, Commerce, Forestry, etc. Open to students of junior rank and others especially recommended by the Professor of English. Recommended to all students majoring in Home Economics or in Education. Required as a condition of eligibility for leading positions on student publication staffs.

Elective in all courses; junior year; first and second semester; 2 credits; lecture and laboratory period.

302. Advanced News-Writing. A continuation of course 301, dealing with special technical and feature writing, reporting, copy reading, editorial writing, proof-reading, make-up, and head-writing, with field work in writing specials to various publications.

Prerequisite: English 301 or its equivalent.

Elective in all courses; junior or senior year; first and second semester; one credit; one lecture.

315. Seminar. Study and review of the recognized masterpieces of European Continental literature in approved translations.

Elective in all courses; first semester; 2 credits; 2 recitations.

316. Seminar. A continuation of course 315.

Elective all courses; second semester; 2 credits; 2 recitations.

HISTORY

JOHN B. HORNER, Professor.

The study of history is fundamental to leadership, there being no line of human investigation that does not depend upon historic knowledge. History is required in Commerce and is offered as an elective in all other schools of the Oregon Agricultural College.

The instruction is largely given by lectures illustrated with lantern views. In the more advanced classes, each student is required to prepare at least one lecture. Although text-books are required, the work in the various courses in history is done in connection with the college library, which is accessible to students on all week days. The courses given at present are as follows:

D. United States History. With special attention to the colonial, political, and industrial aspects. A brief course that covers the leading events of our history. Particularly important in Oregon since the introduction of direct legislation and equal suffrage.

Two-years Business course; first year; second semester; 3 credits; 3 recitations.

Text: Muzzey: American History.

30. European History. Course 30 includes the study of Europe at the time of Louis XIV; reconstruction of Europe at Utrecht; Russia and Prussia become European powers; Wars of Frederick the Great; Struggle between France and England for India; Rivalry of France and England in North America; The Old Regime in Europe; The Spirit of Reform; Enlightened Despots of the Eighteenth Century; The French Revolution; The First French Republic; Europe and Napoleon; The Reconstruction of Europe at the Congress of Vienna.

Elective; first semester; 3 credits; 3 recitations.

Text: Robinson & Beard: The Development of Modern Europe, Vol. I.

40. Modern Europe. This course comprises a study of the following subjects: Europe after the Congress of Vienna; The Industrial Revolution; Revolution of 1848; Unification of Italy; Formation of the German Empire and the Austro-Hungarian Union; The German Empire; France under the Third Republic;

Social and Political Reforms in England; British Empire in the Nineteenth Century; Russian Empire in the Nineteenth Century; Turkey and the Eastern Question; The Expansion of Europe in the Nineteenth Century; Some of the great problems of today.

The course in Commerce; sophomore year; second semester; 3 credits; 3 recitations.

Text: Robinson & Beard: The Development of Modern Europe, Vol. II.

52. History of the British Empire. A coherent view of the larger factors influencing national development from the earliest times to the British Empire of today. Social, economic, artistic, and intellectual growth is broadly surveyed, and is made to reveal a picture of the changing conditions of the people rather than that of the king and nobility. Legal and constitutional development is also emphasized by tracing the origin and development of English common law and by discussing the nature and importance of the great statutes. Particular attention is given to such subjects as the Industrial Revolution, Growth of the Power of the House of Commons, the Extension of the Franchise, Remedial Legislation, and Colonial and Imperial Development.

Elective; senior year; first semester; 3 credits; 3 recitations.

Text: Cross: History of England and Greater Britain.

62. Contemporary American History. The history of the United States from the Discovery of America to the present time. Collateral with the text-books such matters as the negro question, the industrial revolution, capitalism and socialism, free silver, direct government, woman suffrage, the growth of judicial review, the new nationalism, imperialism, the labor movement, the progressive movement, the Panama-Colombia question, present status of the Monroe Doctrine, and our relation with the Latin-American republics, are discussed from the standpoint of history.

Prerequisite: History D or its equivalent.

The course in Commerce; freshman year; second semester; 3 credits; 3 recitations.

Text: Elson: History of the United States.

70. History of Oregon. Early explorations. Lewis and Clark expedition. Minor expeditions. Fur trade. Rivalry between companies. Era of immigration. Oregon organized under Hudson Bay Company. Agitation in Congress for military occupation of the Columbia. The Nez Perce Indians ask for the Bible. Response by

Methodists and Congregationalists. Doctor Whitman and the Oregon movement. Struggle for the Willamette. Struggle for the Columbia. First transcontinental wagon road. Provisional government. Progress of immigration and missions. Gold excitement. Subdivision of Oregon into territories. Indian wars. Home building. Disposition made of the Indians. Oregon becomes a state. Introduction of improved fruit, grains, and stock. Ships and railways. Select schools, public schools, and higher education. Oregon literature. Industrial training, and introduction of scientific methods. Irrigation; conservation of forests. "The Oregon System" of direct legislation.

The course in Commerce; sophomore year; first semester; elective second semester; 3 credits; 3 recitations.

Text: Clarke: Pioneer Days of Oregon History.

80. **American Diplomatic History.** This course deals with the history of the chief events in American foreign affairs from the beginning of the government to the present time. Its purpose is to show the policies of our government on the same subject at different times, the causes for the changed policies, and the methods employed to work out the policies. An attempt is made to show the changed attitude of governments in their dealings with each other in the course of our national history. Throughout the course considerable attention will be given to character studies of the men leading in our diplomatic work. The ultimate aim is the application of our experience to present problems.

Elective; senior year; second semester; 3 credits; 3 recitations.

100. **American Biography.** A study in the public careers of typical American statesmen and other men of affairs. It is intended to cover the entire field of American history. The object is to emphasize the personal element in our national development and to become more familiar with the leaders of our economic progress. Students desiring to place especial stress upon any feature of the study may elect not to exceed 20 per cent of their allotment of biographical research. (Lectures, assigned reading, and discussion.)

Elective; junior or senior year; first semester; 3 credits; 3 recitations.

110. **History of South America.** This course includes the history of South America, Central America, and Mexico; hence com-

prises the discovery, colonization and growth of Latin America. Although the dramatic story of our southern neighbors reads like a romance, the course is designed primarily to meet the requirements of Americans who desire to cultivate deeper interest in our sister republics through a broader knowledge of their political and economic development.

Elective; 3 credits; 3 recitations.

INDUSTRIAL EDUCATION

EDWIN DEVORE RESSLER, Professor
HELEN BRYCE BROOKS, Professor of Domestic Art
AVA BERTHA MILAM, Professor of Domestic Science
————————, Professor of Agricultural Education
FRANK HENRY SHEPHERD, Assistant Professor
BERT WALTER HARRIS, Assistant Professor of Stenography*
————————, Assistant Professor

The department of Industrial Education offers courses for the preparation of teachers in the subjects of Agriculture, Home Economics, Commerce, and Manual Training. The importance of providing special instruction in the industries for the pupils of the public schools is fully recognized in this country. The material equipment in the way of laboratories, workshops, experimental fields, etc., is easily secured. Specially trained teachers cannot be prepared overnight. There is a real danger that the public will underestimate the scientific and educational significance of the new education. The industrial branches cannot be taught from textbooks nor by teachers without technical training.

There must also be special supervisors in each of the industrial branches for the larger schools, where instruction is given to a large number of pupils under both trained and untrained teachers. Supervisors, who will do some regular teaching, are also required where a number of small town and country districts are grouped for industrial instruction. In time, we may expect the grade teachers to have secured through the high and normal schools the technical training that will enable them to teach the industrial branches under direction. Until that time, most of the teaching must be done by the special instructor.

The department of Industrial Education gives the professional training and advises with the students and deans of the various schools in the selection of the technical courses. In conjunction with the other departments concerned, tentative courses of study are prepared in each of the industrial branches, adapted to the age of the pupils and the social demands on the school. This department undertakes to assist teachers in the work of instruction, by general and special suggestions through college and other publications, and by correspondence and visitation. Detailed lists of

* On leave of absence.

equipment and apparatus, with cost, suitable for small and large schools, will be furnished on request.

Students electing this course will be registered in the school in which their distinctive subject is given. Thus those who desire to prepare to teach and supervise Agriculture in the high school and grammar grades will be registered in the School of Agriculture and will receive their degrees in Agriculture on completion of the requirements.

In the same way students desiring to prepare to teach Home Economics and Commerce will be registered in the schools of Home Economics and Commerce. A special degree course in Industrial Arts, described under that heading, has been organized for the preparation of teachers of Manual Training.

Students are advised to consider carefully the selection of teaching as a vocation. Good scholarship, and the ability to speak, spell and write the mother tongue correctly are fundamental essentials. Personality, altruism, enthusiasm, professional aptitude, and, above all, moral character, are demanded of the teacher. Positions cannot be guaranteed and none but capable candidates will be recommended.

The Oregon School Law grants a high school teaching certificate to graduates who have taken 15 credits in education. These courses should be taken during the junior and senior years. Students should note the prerequisites as shown below.

The following courses will be offered during 1916-17:

101. **General Psychology.** A study of general psychology by lectures, recitations, and reports; a description of the facts and laws of mental activities with applications to the ordinary affairs of life; demonstrations and experiments showing the relation of mental life to the nervous system; the significance of habit in conduct and character.

Required of all students preparing to teach.

Junior year; first or second semester; 3 credits; 2 recitations; 1 laboratory period.

102. **Educational Psychology.** The application of the facts and principles of psychology to teaching; a study of the growth of the child mind and the relations of the various periods of educational organization; adaptation of courses of instruction, methods of teaching, discipline, and general school activities to the stages

of the pupil's development; lectures, recitations, reports, and simple investigations.

Prerequisite: Ind. Ed. 101. Required of all students preparing to teach.

Junior year, second semester; or senior year, first semester; 2 credits; 1 recitation; 1 laboratory period.

120. **History of Education.** A general review of the growth and development of education and its relation to the civilization of the times; particular attention given to the rise of industrial education in Europe and America, and its place in the social and political life of the country.

Sophomore or junior year; first or second semester; 3 credits; 3 recitations.

125. **History and Theory of Vocational Education.** Arranged to meet the needs of those preparing to teach any phase of vocational education. Emphasis placed on the present day literature of the subject. History of vocational education; its function in a system of education; development in the United States; present status; attitude of organized labor; demands of manufacturers; rights of society; legislation in different states. Lectures, assigned readings, oral and written reports.

Election in junior or senior year; first semester; 2 credits; 2 recitations.

132. **Principles of Education.** An introduction to the study of education, including a discussion of the meaning of education, its significance in the development of the race, its aims, its method, its functions; brief description of present foreign systems and a fuller account of our own; organization of the school, relations and duties of pupils, teachers, supervisors and school boards; problems of school management; conduct of classes and general method; all with particular reference to the special, industrial teacher.

Required of all students preparing to teach; junior year; first semester; also given second semester; 3 credits; 3 recitations.

135. **Vocational Guidance.** An investigation of the means and methods of assisting the pupils of the upper grammar grades and high school in studying the problem of their future vocations. Factors of individual aptitude, heredity and other personal characteristics; means of discovering these factors through school and other agencies; studies of occupations with essential qualifications for success in leading types; value of "life career" motive in education; survey of state and local resources as guides to choice, etc.

Lectures, reports on the extensive literature of vocational guidance and some practical experience with pupils, under the careful supervision of the instructor.

Elective for juniors and seniors; second semester; 2 credits; 2 recitations.

Junior or senior year; first or second semester; 3 credits; 3 recitations; 1 laboratory period (2 in H. E. section.)

152. **Special Method in Agriculture.** A careful, detailed study of the public school course in Agriculture, in its various relations, including the other subjects in the curriculum, preparation for college, farming, community life, etc. Model courses for both elementary and secondary grades are constructed with plans for all desired equipment for laboratory, library, field work, including cost. Lesson plans on typical subjects, observation and model lessons, practice teaching, and extension work with school children and adults, provide additional opportunities to enable the students to reduce theory to practice.

Prerequisites: Ind. Ed. 101, 132.

Required of seniors majoring in Agriculture for teachers.

Junior year, second semester; or senior year, first semester; 2 credits; 2 recitations.

153. **Special Method in Agriculture.** Continuation of course 152.

Prerequisites: Ind. Ed. 101, 132, 152.

Required of seniors majoring in Agriculture for Teachers; senior year; first or second semester; 2 credits; 1 recitation; 1 laboratory period.

160. **Special Method in Home Economics.** Same as course 152 applied to the public school course in Home Economics.

Prerequisites: Ind. Ed. 101, 132.

Required of Home Economics students preparing to teach.

Junior year, second semester; or senior year, first semester; 3 credits; 2 recitations; 2 laboratory periods.

164. **Special Method in Domestic Art.** Continuation of 160, applied to the public school course in Domestic Art.

Prerequisites: Ind. Ed. 101, 132, 160.

Required of students preparing to teach Domestic Art.

Senior year; first or second semester; 2 credits; 2 recitations; 1 laboratory period.

Fee: $0.50.

165. **Special Method in Domestic Science.** Continuation of course 160, applied to public school course in Domestic Science.

Prerequisites: Ind. Ed. 101, 132, 160.

Required of students preparing to teach Domestic Science; senior year; first or second semester; 2 credits; 2 recitations; 1 laboratory period.

Fee: $1.50.

172. **Special Method in Manual Training.** Same as course 152, applied to the public school course in Manual Training.

Prerequisites: Ind. Ed. 101, 132.

Industrial Arts; junior year, second semester; or senior year, first semester; 2 credits; 2 recitations.

173. **Special Method in Manual Training.** Continuation of course 172.

Prerequisites: Ind. Ed. 101, 132, 172.

Industrial Arts; senior year; first or second semester; 2 credits; 1 recitation; 1 laboratory period.

174. **Theory and Practice of Elementary Manual Arts.** A course for supervisors who must arrange courses and supervise Industrial Arts in the lower grades. Investigation of the present trend of the manual arts movement; arrangement of a suggestive course of study; plan of equipment; ordering of supplies; etc; sand table projects, rug weaving, paper folding, thin wood work, and other forms of construction work for the first six grades of the elementary school. Lectures, assigned reading, reports and practical shop work.

Required in Industrial Arts; elective in other courses; junior or senior year; first or second semester; 2 credits; 1 recitation; 1 laboratory period.

180. **Special Method in Commerce.** Same as course 152, applied to the public school course in Commerce.

Prerequisites: Commerce 102, 402, 412; Ind. Ed. 101, 132.

Senior year; first semester; 2 credits; 2 recitations.

Required of students preparing to teach Commercial branches.

181. **Special Method in Commerce.** Continuation of course 180.

Prerequisites: Commerce 102, 402, 412; Ind. Ed. 101, 132, 180.

Senior year; second semester; 2 credits; 1 recitation; 1 laboratory period.

190. School Administration. A discussion and analysis of the American system of education, with an interpretation of the purpose and spirit of each division; problems of administration and teaching in the public schools; the correlation of the industrial branches with the other subjects in the curriculum. Lectures, reading, reports, and studies on the Oregon schools.

Elective for advanced or graduate students; second semester; 2 credits; 2 recitations.

191. School Hygiene. A course in the health provisions requisite for the hygienic conduct of education. This includes a discussion of ventilation, heating, light, seating, physical exercise in the school room and on the playground, games, medical inspection, tests for physical defects, disinfection, quarantine, and other similar topics. Oregon laws relating to these matters will be studied, and the regulations of the State Board of Health and other State and local health authorities will be explained in detail. Advanced investigations in other states will also be presented and comparative studies made. Lectures, reports, and first-hand investigations on town and country school conditions, so far as practicable.

Elective for advanced or graduate students; first semester; 2 credits; 2 recitations.

192. Child Study. This includes the physical and mental characteristics of children and youth as contrasted with those of mature men and women. The relation of physical growth and development to the unfolding of mental powers; the instincts and their relation to the development, of individuality, sense of responsibility to others, moral development, etc.; abnormalities; study and treatment of children as individuals and in class groups; and discussion of the social and economic implications as well as the psychological. (Lectures, reports, and simple tests and records made by visitation of schools.)

Elective for advanced or graduate students; second semester; 2 credits; 2 recitations.

Prerequisites: Ind. Ed. 101, 102, 132.

200. Research. Advanced or graduate students who are qualified by previous training or experience, may register for extended investigation of some specific problem in industrial education. The studies may be historical, either European or American; administrative; or in the field of method. General government and state reports; publications by special commissions; reports of committees of educational organizations; contributions by departments

of colleges and universities; educational and other periodicals; and original investigations into Oregon conditions, compose the material to be used. These studies will be assigned and outlined by the instructor and stated reports made from time to time by the student. Regular hours will be assigned the individual students and credit given according to the amount of work done.

Elective for advanced or graduate students; first semester; 2 credits.

201. **Research.** Continuation of course 200.

Prerequisites: Ind. Ed. 101, 132, 200.

Elective for advanced or graduate students; second semester; 2 credits.

202. **Research.** As outlined in course 200.

Prerequisites: Ind. Ed. 101, 132.

Elective for advanced or graduate students; first semester; 4 credits.

203. **Research.** Continuation of course 202.

Prerequisites: Ind. Ed. 101, 132, 202.

Elective for advanced or graduate students; second semester; 4 credits.

LIBRARY

IDA ANGELINE KIDDER, Librarian
LUCY MAY LEWIS, Library Cataloguer
LILLIAN MABEL GEORGE, Library Cataloguer
RACHEL WEBB HAIGHT, Assistant
LILA GRACE DOBELL, Assistant
BLANCHE MARIE CLAUSMEYER, Assistant

Equipment. The Library occupies the second floor of the Administration building and one room on the first floor. The reading and general reference room is large, well lighted, and extends entirely across the building. It is supplied with about five hundred leading magazines and newspapers. Through the courtesy of the editors, a large number of farm, orchard, stock, and home journals, and country newspapers of Oregon are received regularly at the reading room. The book stacks, occupying adjacent rooms, contain 27,000 volumes of standard works of history, biography, engineering, agriculture, natural science, general literature and reference, and about 3000 reports and other publications from the Agricultural Colleges and Experiment Stations of all the states, with 30,000 bulletins and pamphlets. The library is a designated depository of United States Government publications, of which it has about 7,000 volumes. Over 2,000 of these were received as a gift from the library of the late United States Senator Dolph.

Practical use of the books has led to the establishment of small laboratory collections kept in the rooms of the following departments: General Chemistry, Agricultural Chemistry, Animal Husbandry, Agronomy, Horticulture, Botany, Forestry, Bacteriology, Zoology, Pharmacy, Commerce, and Civil, Mechanical, Electrical, and Mining Engineering. Each department library is in charge of the head of that department, to whom application must be made for the use of the books.

All books are classified and catalogued according to the Dewey decimal system. Books may be drawn for home use by all officers and students of the College. Books may be kept by the students for two weeks with the privilege of a renewal, and by officers for any reasonable time. All students have free access to the shelves of the library.

The reference library in the reading room consists of encyclopedias, dictionaries, standard reference books in the different de-

partments of study together with books designated by professors for collateral reading in the various courses of instruction. A small collection of books for cultural reading is also kept in the reading room. In the same room, and accessible to all readers, is the card catalogue of the general library, including the books of the department libraries. The catalogue includes both authors and subjects under one alphabet on the dictionary plan; there is also a card catalogue of the publications of the U. S. Department of Agriculture, and a card index to the publications of the State Experiment Stations.

1. **Library Practice.** This course teaches, by means of lectures and practical problems, the use of catalogues, indexes, and reference books, such as dictionaries, encyclopedias, atlases, handbooks of general information, handbooks of history, statistics, quotations, etc.

All degree courses; freshman year; one semester; ½ credit; 1 lecture; 1 recitation; 1 laboratory period each alternate week.

MATHEMATICS

CHARLES LESLIE JOHNSON, Professor
EDWARD BENJAMIN BEATY, Associate Professor
NICHOLAS TARTAR, Assistant Professor
HARRY LYNDEN BEARD, Instructor

A. Algebra. The work of the course includes a drill in the fundamental operations, use of parentheses, special rules of multiplication and division, factoring, highest common factor, lowest common multiple, and fractions.

The Mechanic Arts course; first year; first semester; 5 credits; 5 recitations.

Text: Hawkes-Luby-Touton: First course in Algebra.

B. Algebra. The topics studied are solution of fractional and literal equations, problems involving linear equations, simultaneous linear equations, involving two or more unknown numbers, problems involving simultaneous linear equations, graphical representation, inequalities, involution, evolution, theory of exponents, radical expression, and imaginary numbers.

The Mechanic Arts course; first year; second semester; 5 credits; 5 recitations.

Text: Hawkes-Luby-Touton: First course in Algebra.

C. Algebra. Required of freshmen who enter with but one year of Algebra.

Either semester; 3 credits; 3 recitations.

Text: Hawkes-Luby-Touton: First course in Algebra.

D. Plane Geometry. Course D includes the first two books of Plane Geometry. The constant aim is to develop in the student the power of logical reasoning, and of clearness and accuracy of expression. To this end, many original exercises are studied, and at all times demonstrations and proofs are freely discussed in the class room. Required of freshmen entering deficient in first semester of Plane Geometry.

First semester; 3 credits; 4 recitations.

Text: Wentworth & Smith: Plane Geometry.

E. Plane and Solid Geometry. A continuation of Course D, arranged for freshmen in Engineering who enter deficient in the second semester of Plane Geometry.

Second semester; 5 credits; 5 recitations.

Text: Wentworth & Smith: Plane and Solid Geometry.

F. Solid Geometry. Required of all Engineering freshmen who are deficient in Solid Geometry.

Freshman year; first semester; 2 credits; 3 recitations.

Text: Wentworth & Smith: Solid Geometry.

G. Plane Geometry. Courses G and H are arranged for freshmen who enter deficient in the second semester of Plane Geometry, and who desire to use both semesters to make up the condition. The two courses are equivalent to course K.

Freshman year; first semester; 1½ credits; 2 recitations.

Text: Wentworth & Smith: Plane Geometry.

H. Plane Geometry. A continuation of course G.

Freshman year; second semester; 1½ credits; 2 recitations.

Text: Wentworth & Smith: Plane Geometry.

K. Plane Geometry. A continuation of course D, covering the last three books of Plane Geometry. Many original exercises a e studied. Required of freshmen, except those in Engineering, who enter deficient in second semester of Plane Geometry.

Second semester; 3 credits; 4 recitations.

Text: Wentworth & Smith: Plane Geometry.

L. Plane Geometry. A course arranged to meet the needs of students in Mechanic Arts.

The course in Mechanic Arts; second year; second semester; 4 credits; 5 recitations.

Text: Wentworth & Smith: Plane Geometry.

M. Commercial Arithmetic. A review of all the essential operations. Special stress is laid on short methods; daily drills in rapid calculation; computation of estimates; partnership settlements, etc.

The two-years Business course; first year; first semester; 3 credits; 5 recitations.

Text: Van Tuyl: Essentials of Business Arithmetic.

N. Commercial Arithmetic. A continuation of course M.

The two-years Business course; first year; second semester; 3 credits; 5 recitations.

Text: Van Tuyl: Essentials of Business Arithmetic.

O. Shop Arithmetic. A thorough drill in the principles of arithmetic, with special application to shop problems of all sorts.

The course in Mechanic Arts; second year; first semester; 4 credits; 5 recitations.

Text: Bolton: Shop Mathematics.

R. Farm Arithmetic. An elective course for students in the vocational course in Agriculture who feel the need of a review of arithmetic. A practical text dealing with problems of the farm will be used.

The vocational course in Agriculture; second semester; 3 credits; 3 recitations.

Text: Burkett & Swartzel: Farm Arithmetic.

T. Geometry and Trigonometry.

The course in Mechanic Arts; third year; first semester; 4 credits; 5 recitations.

10. Advanced Arithmetic. An advanced course in commercial arithmetic, especially for students in the School of Commerce. To do successful work in this course, the student should have a thorough knowledge of all the fundamental operations of arithmetic, including the various phases of percentage and interest. Emphasis is laid on computations of the more difficult problems connected with partnership and corporation settlements, balance sheets and statements, equation of accounts, partial payments, savings bank accounts, compound interest, stocks and bonds, life insurance, and annuities, partly for the information obtained in the various subjects and partly for the drill afforded in the use of figures. Daily drills are given in short methods and rapid calculation.

The course in Commerce; freshman year; first semester; 3 credits; 3 recitations.

Text: Van Tuyl: Complete Business Arithmetic.

11. Plane Trigonometry. This course includes functions of acute angles, right angles, functions of any angle, relations between functions, inverse functions, trigonometric equations, and oblique triangles. Considerable time is devoted to the deduction of trigonometric formulae, study of trigonometric identities, and the solution of practical problems.

All Engineering courses; freshman year; last three-fifths first semester; 3 credits; 5 recitations.

12. Plane Trigonometry. The course in Industrial Arts, second semester; 3 credits; 4 recitations.

14. Trigonometry. A review of algebra, including logarithms, is followed by a course similar in character to 11, except that more time is given to the solution of practical problems.

The course in Forestry; freshman year; first semester; 3 credits; 4 recitations.

15. **Spherical Trigonometry.** The courses in Highway and Irrigation Engineering; freshman year; first semester; one credit; one recitation.

21. **College Algebra.** After a brief review of radical expressions, theory of indices, and quadratic equations, graphical representation and mathematical induction are studied.

All Engineering courses; freshman year; first two-fifths of first semester; 2 credits; 5 recitations.

Text: Hawke: Advanced Algebra.

22. **Algebra.** A course for freshmen in Engineering who show by poor work in courses 11 or 21 that they need further preparation in algebra before continuing their mathematics.

All Engineering courses; freshman year; second semester; 5 credits; 5 recitations.

Text: Hawkes-Luby-Touton: Second Course in Algebra.

31. **Elementary Analysis.** Under College Algebra are treated the binominal theorem, progressions, complex numbers, and the theory of equations. In analytical geometry the point, straight line, circle, conic sections, and some of the higher plane curves are studied. Considerable time is given to the plotting of curves in both rectangular and polar coordinates.

All Engineering courses; freshman year; second semester; 5 credits; 5 recitations.

34. **Elementary Analysis.** This course is similar to 31, but shorter. Particular emphasis is given to curve plotting in both rectangular and polar coordinates.

The course in Forestry; freshman year; second semester; 3 credits; 4 recitations.

Text: Granville & Smith: Elementary Analysis.

41. **Plane Analytic Geometry.** Course 41 is offered to students who enter the sophomore year deficient in Analytic Geometry. The topics studied are the point, the straight line, polar coordinates, transformation of coordinates, the circle, conic sections, tangents, diameter, poles and polars, discussions of general equations of the second degree, problems in loci, and higher plane curves.

All Engineering courses; sophomore year; first semester; 3 credits; 3 recitations.

51. **Differential Calculus.** Among the subjects presented are: differentiation and applications, evaluation of indeterminate forms, expansion of functions, Taylor's and Maclarin's theorems, maxima

and minima, points of inflection, curvature, change of independent variable, functions of two or more variables, asymptotes, curve tracing, etc.

All Engineering courses; sophomore year; first semester; 4 credits; 5 recitations.

Text: Granville: Differential and Integral Calculus.

52. **Integral Calculus.** Among the topics considered are: direct integration, definite integrals and applications; integration by parts, integration of trigonometric forms, etc.; applications to finding of lengths and areas of curves, surfaces, and volumes of solids of revolution, etc.; double and triple integration and applications. In this course, as in Course 51, great stress is laid upon practical applications, and a large number of practical problems are solved.

All Engineering courses; sophomore year; second semester; 4 credits; 5 recitations.

Text: Granville: Differential and Integral Calculus.

61. **Differential Equations.** A study of the solution of ordinary and partial differential equations which the Engineering student is likely to encounter.

Prerequisites: Courses 51, 52.

Elective; junior year; first semester; 3 credits; 3 recitations.

Text: Campbell: Differential Equations.

71. **Method of Least Squares.** Prerequisites: Courses 51, 52.

Elective; junior year; second semester; 2 credits; 2 recitations.

Text: Merriman: Method of Least Squares.

81. **Hyperbolic Functions.**

Prerequisites: Courses 51, 52, 61.

Elective; junior or senior years; second semester; 2 credits; 2 recitations.

Text: McMahon: Hyperbolic Functions.

MILITARY SCIENCE AND TACTICS

ULYSSES GRANT McALEXANDER, Major, Infantry, U. S. A., Commandant, Professor of Military Science and Tactics
CYRUS FRANKLIN DUGGER, Post Commissary Sergeant, U. S. A., Retired, Assistant
DENIS HAYES, Sergeant Major, U. S. A., Retired, Assistant

The Oregon Agricultural College was founded in pursuance of three lines of national legislation. The first of these was the Act of Congress known as the Congressional Land Grant Act, of July 2, 1862, and the Acts supplemental thereto, for the establishment of colleges "where the leading object shall be, without excluding other classical and scientific studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts."

The absolute dependence of the College upon the benefactions of the Nation and the State imposes a particular obligation on all who enjoy its privileges. The College, on its part, conforming to the spirit of law, has provided for an efficient system of military instruction, and the Corps of Cadets is entitled to the loyal, zealous, and true support of each and every student in the College. That it receives that support each year will be best evidenced by the standing which the corps attains among the military organizations of the higher universities and colleges.

The Congressional Land Grant Act of 1862 requiring military instruction, was passed during a critical period in the life of the Nation while it was engaged in a civil war. The best of evidence was then at hand showing the need of trained citizen soldiers prepared at all times for service in the cause of the Nation. The object of the law, therefore, was to provide well-trained citizen soldiers. This object has been successfully met. Students enrolled in the Military department may attain a high state of military proficiency, if the spirit, as well as the letter of the law, is followed out during the prescribed course, thereby fulfilling a duty to the Nation, the State, and the College.

The military body of this College consists of one regiment of infantry having three battalions of four companies each, a hospital corps and signal corps detachment, and a band of fifty instruments. The drill and administration are the same as in the Regular Army.

One of the objects of this instruction is to prepare the cadet so that upon graduation he will be thoroughly competent to hold a commission in the National Guard or volunteer army.

The greater part of the instruction is directed toward having cadets adopt a systematic rule of conduct inculcating accurate methods in everything they undertake. This not only places cadets in the condition to receive favorably all instruction in the military department, but facilitates study in the other departments, and becomes a valuable asset to a young man going out into the world in any profession.

Military drill improves the habits and manners of the student, develops him physically, and gives him that military knowledge which it is desirable every citizen should possess in order that he may render intelligent aid to his country or state in time of need. It cultivates a manly spirit, ready and implicit obedience, respect for authority, and self-restraint—all qualities of inestimable value to a young man in whatever calling he many select.

Instruction in the course is prescribed for all undergraduate male students. The instruction is both practical and theoretical.

The new armory contains a drill room 120x300 feet in extent, ample office room, and suitable rooms for storage of guns and other ordnance.

Eight hundred and forty U. S. magazine rifles (Krag-Jorgensen), with equipment and ammunition, are furnished by the U. S. government. Other necessary accoutrements and apparatus for the thorough equipment of the military department are furnished by the College.

Appointment and promotion of officers and non-commissioned officers, and their relative rank in each grade, are determined according to the military standing of the cadets, based upon a careful consideration of the following points: knowledge of drill and other duties, as determined by examination, practical application of this knowledge on the drill field, and recommendations of superior officers; zeal, soldierly bearing, and aptitude for command; character; military record; general standing in College.

Commissioned officers are selected from the senior class or from such students as have had three or more years of drill; non-commissioned officers, from the junior and sophomore classes; all reductions are to the grade of private. All appointments and pro-

motions are made by the Commandant, with the approval of the President of the College.

Work in military drill is required of all male students of the institution, including all regular degree students, and all vocational, special, and optional students, except short course Forestry students, four periods a week throughout their undergraduate course. Senior privates may, however, upon petition approved by the President of the College, be excused.

One credit a semester is allowed for military drill, and grades are reported at the end of each semester the same as in any other subject.

Students physically unable to participate in the regular military drill may be assigned by the Commandant to light duty in the department.

Persons transferring to the Oregon Agricultural College with advanced credits from other educational institutions of equal rank will not be exempt from the military requirements, but will be required to offer an equivalent of credits for the back military credits represented or accumulated.

Persons presenting credentials for military work taken at other educational institutions, or for service in the U. S. Army, may be given credit for such work in so far as it is deemed equivalent to the requirements of this institution.

If for any reason a student is relieved from the military requirements, except as specified above, other credits must be substituted therefor.

The practical course in infantry includes the School of the Soldier; School of the Squad; School of the Company; School of the Battalion; School of the Regiment; Ceremonies; Intrenchments; Guard Duty; and Combat. The practical course in the Field Service Regulations will include the Service of Information and the Service of Security. The practical work in Small-arms Firing will include instruction preliminary to gallery and range practice; gallery practice; and range practice. A gallery range with four targets has been built and an outdoor range with four targets can be used. The instruction also includes company administration, camp sanitation, and map reading.

Paragraph 24, General Orders No. 70, War Department, November 18, 1913, directs that, "Upon occasions of Military Cere-

mony, in the execution of drills, guard duty, and when students are receiving any other practical military instruction, they shall appear in the uniform prescribed by the institution. They shall be held strictly accountable for the arms and accoutrements issued to them."

The wearing of mixed civilian and uniform clothing is prohibited. The commandant has general charge of all matters pertaining to the uniform at all times. The uniform complete, including the regulation tan shoes, costs about $14.50, it is of the regulation olive-drab color adopted by the United States Army, and makes a very neat and serviceable suit. It consists of an olive-drab cap with ornament, an olive-drab blouse with collar ornaments, a pair of olive-drab breeches, an orange colored hat band, an orange colored breast cord, a pair of canvas puttee leggins of the new design, a pair of olive-drab gloves, a pair of marching shoes as adopted by the United States Army, and an olive-drab shirt. It is not advisable to purchase any of these articles before entering College, as the necessary uniformity in style, material, etc., makes it necessary to insist upon articles that conform to the standard set by the department. All of these articles can be purchased cheaper here than they can at other places on account of special arrangements made.

Students must come prepared to deposit the price of the uniform, for which they will be measured as soon as they learn the position of a soldier.

Proficiency in Military department is a requisite to graduation.

Military Drill 1. Freshman year; first semester; 1 credit; 1 hour of practical drill on each drill day.

Military Drill 2. Freshman year; second semester; 1 credit; 1 hour of practical drill on each drill day.

Military Drill 3. Sophomore year; first semester; 1 credit; 1 hour of practical drill on each drill day.

Military Drill 4. Sophomore year; second semester; 1 credit; 1 hour of practical drill on each drill day.

Military Drill 5. Junior year; first semester; 1 credit; 1 hour of practical drill on each drill day.

Military Drill 6. Junior year; second semester; 1 credit; 1 hour of practical drill on each drill day.

Military Drill 7. Senior year; first semester; 1 credit; 1 hour of practical drill on each drill day.

Military Drill 8. Senior year; second semester; 1 credit; 1 hour of practical drill on each drill day.

Military Drill 9. This is for students who may elect to drill and who are not required to drill by existing regulations. It is also for those students who may have received any credits in Military Drill 1 to 8, inclusive, who are still required to drill or who may elect to drill. First semester; 1 credit; 1 hour of practical drill on each drill day.

Military Drill 10. This is for students who may elect to drill and who are not required to drill by existing regulations. It is also for those students who may have received any credits in Military Drill 1 to 8, inclusive, who are still required to drill or who may elect to drill. Second semester; 1 credit; 1 hour of practical drill on each drill day.

Military Drill A. First semester; first year; Vocational Course; 1 credit; 1 hour of practical drill on each drill day.

Military Drill B. Second semester; first year; Vocational Course; 1 credit; 1 hour of practical drill on each drill day.

Military Drill C. First semester; second year; Vocational Course; 1 credit; 1 hour of practical drill on each drill day.

Military Drill D. Second semester; second year; Vocational Course; 1 credit; 1 hour of practical drill on each drill day.

Military Drill E. First semester; third year; Vocational Course; 1 credit; 1 hour of practical drill on each drill day.

Military Drill F. Second semester; third year; Vocational Course; 1 credit; 1 hour of practical drill on each drill day.

Special and optional students will be given credits in military drill as indicated above for undergraduate students. For their first semester's drill work they will be given credits in Military Drill 1. For their second semester's drill work they will be given credit in Military Drill 2. In the following years they will be given credits correspondingly.

1. **Theoretical Instruction.** This instruction consists of recitations in Infantry Drill Regulations, Field Service Regulations, Manual of Guard Duty, and Army Regulations; instruction in military correspondence and reports and returns; lectures on military subjects that pertain to the organization and administration of the United States military forces in peace and in war; and the Military Policy of the United States.

Military Science 1. Junior year; first semester; 1 credit; 1 recitation or lecture.

Military Science 2. Junior year; second semester; 1 credit; 1 recitation or lecture.

The McAlexander Banner, Brodie Banner, Sigmund Eisner Banner and the Henderson Ames Banner are beautifully decorated silken banners donated to the Military Department for the purpose of creating a friendly spirit of rivalry in the regiment.

The McAlexander Banner. This banner was presented by Major U. G. McAlexander, Infantry, U. S. Army, Commandant of Cadets 1907 to 1911 and since September 1, 1915, and is to be carried as a mark of merit by the battalion making the highest total number of credits in competitive drill each drill year.

The Brodie Banner. This banner was presented by Professor R. K. Brodie, O. A. C., and is to be carried as a mark of merit by the company of the regiment making the highest total credits in competitive drill each drill year.

The Sigmund Eisner Banner. This banner was presented by Sigmund Eisner, Red Bank, New Jersey, and is to be carried as a mark of merit by the company of the First Battalion making the highest total number of credits in competitive drill in that battalion each drill year.

The Henderson Ames Banner. This banner was presented by the Henderson Ames Company, Kalamazoo, Michigan, and is to be carried by the company of the Second Battalion making the highest total number of credits, in competitive drill, in that battalion each drill year.

MODERN LANGUAGES

LOUIS BACH, Professor
MELISSA MARGARET MARTIN, Instructor

The department of Modern Languages is prepared to offer courses of three years in French, German, and Spanish.

In harmony with all other courses of the College, the final aim of the instruction is practical use for the various spheres of activity and pursuits of life. While the disciplinary and cultural values of language study are duly recognized and emphasized, the predominant purpose, all the time and everywhere, is the development of personal power for social service.

The method of teaching suits the end in view. It is independent, to a great extent, of the text-books used, much time being spent on oral drill, and each new point of theory being illustrated by copious examples and conversational exercises. Ear, eye, and tongue are equally trained. The study of grammar, at the same time, is made to serve as a course in applied logic. Learning all about subject, predicate and object, together with their various modifiers, rendering a clear account of the relations that words bear to one another, when put together in sentences, the student necessarily brings order into his reasoning power, substituting definite, fundamental conceptions for vague and hazy fancies. Furthermore, by constantly comparing new words and modes of expression with similar ones in his own language, by applying familiar grammatical principles to a new field of effort, by abundant translating from one idiom into the other, the student is sure to gain a deeper and more comprehensive understanding of modern English than could be obtained in any other way. Appreciation comes through comparison.

A certain amount of specified work in a language is definitely required by some departments. In other departments, German, French, or Spanish may be taken as electives, and when so taken, the student receives full credit for one year's work.

Students who have had two years of high school German, French, or Spanish, are ready to enter the corresponding second year class in College, one year's work in College being equivalent to two years in the high school. With one year's work in the high school, the student is entitled to enter the second semester of the first year class.

FRENCH

101. **Elementary French.** Grammar, oral and written exercises; reading of easy prose.

First semester, 3 credits; 3 recitations.

102. **Elementary French.** A continuation of course 101.

Prerequisites: Mod. Lang. 101 or one year of high school French.

Second semester; 3 credits; 3 recitations.

103. **Intermediate French.** Advanced grammar, composition, reading of narrative, description and scientific prose; conversational exercise on all sorts of topics.

Prerequisites: Mod. Lang. 101 and 102, or two years high school French.

104. **Intermediate French.** Continued; the same plan of work as course 103.

Prerequisites: Mod. Lang. 101, 102, 103.

Second semester; 3 credits; 3 recitations.

107. **Advanced French.** Selections from the various classes of literature specially suited to the particular needs of the class. Composition and conversational exercises based on the texts in use.

Prerequisites: Mod. Lang. 101, 102, 103, 104.

First semester; 2 credits; 2 recitations.

108. **Advanced French.** Continued on the same plan as course 107.

Prerequisites: Mod. Lang. 101, 102, 103, 104, 107.

Second semester; 2 credits; 2 recitations.

GERMAN

201. **Elementary German.** Grammar, oral and written exercises, reading of easy prose.

First semester; 3 credits; 3 recitations.

202. **Elementary German.** A continuation of course 201.

Prerequisite: Mod. Lang. 201 or one year high school German.

Second semester; 3 credits; 3 recitations.

203. **Intermediate German.** Advanced grammar, composition, reading of narrative, descriptive and scientific prose; conversational exercises on all sorts of topics.

Prerequisites: Mod. Lang. 201, 202 or two years high school German.

First semester; 3 credits; 3 recitations.

204. Intermediate German. A continuation of course 203.

Prerequisites: Mod. Lang. 201, 202, 203.

Second semester; 3 credits; 3 recitations.

207. Advanced German. Reading of texts from the various classes of literature, composition and conversational exercises on the texts used.

Prerequisites: Mod. Lang. 201, 202, 203, 204.

First semester; 2 credits; 2 recitations.

208. Advanced German. A continuation of course 207.

Prerequisites: Mod. Lang. 201, 202, 203, 204, 207.

Second semester; 2 credits; 2 recitations.

SPANISH

301. Elementary Spanish. Grammar, oral and written exercises, reading of easy prose.

First semester; 3 credits; 3 recitations.

302. Elementary Spanish. A continuation of course 301.

Prerequisite: Mod. Lang. 301 or one year high school Spanish.

Second semester; 3 credits; 3 recitations.

303. Intermediate Spanish. Advanced grammar; composition; reading of narrative and descriptive texts; conversational exercises on all sorts of topics.

Prerequisites: Mod. Lang. 301, 302, or two years high school Spanish.

First semester; 3 credits; 3 recitations.

304. Intermediate Spanish. A continuation of course 303.

Prerequisites: Mod. Lang. 301, 302, 303.

Second semester; 3 credits; 3 recitations.

307. Advanced Spanish. Reading of texts from various classes of literature; composition and conversational exercises based on the texts in use.

Prerequisites: Mod. Lang. 301, 302, 303, 304.

First semester; 2 credits; 2 recitations.

308. Advanced Spanish. A continuation of course 307.

Prerequisites: Mod. Lang. 301, 302, 303, 304, 307.

Second semester; 2 credits; 2 recitations.

PHYSICAL EDUCATION

———————— Director, Professor of Physical Education

PHYSICAL EDUCATION FOR MEN

J. A. PIPAL, Professor of Physical Education for Men, Football Coach.
RALPH MADISON PAVEY, Instructor
JAMES GEORGE ARBUTHNOT, Instructor

Athletics. All College athletic contests are under the jurisdiction of the athletic board, composed of two members of the faculty, two members of the student body, and one alumnus.

Direct and active supervision comes from the athletic board, which supports representative teams in football, basketball, wrestling, track and baseball, and awards monogram "O's" to members of these teams. The most efficient coaches are furnished to all of these teams, while assistants teach the theory and practice of the various sports to freshmen and other teams.

The new gymnasium will furnish to the students at the Oregon Agricultural College the most modern and complete equipment for specializing in indoor sports, while the new athletic field includes a new quarter-mile track, football field, and baseball diamond.

The armory, one of the largest of its kind in the United States, provides fine facilities for winter training in football, track, baseball, and the various other outdoor sports. An indoor track, banked at the turns, which is but eight laps to the mile, furnishes facilities which are proving a great aid in shaping all of the teams into condition.

Gymnasium Work. Because physical health determines capacity for efficiently carrying out work which a student prepares for in college, the importance of Physical Education in the modern educational institution is being emphasized more and more every year. The functions of this department are: (1) to develop organic power, the basis of vitality, necessary to physical and mental efficiency; and (2) to secure and maintain a good posture, harmonious muscular control, and a reasonable degree of scientific training for expert gymnasium and field athletic work.

The new gymnasium for men, two units of which have been completed, is equipped with all of the modern gymnastic apparatus and facilities for properly carrying on the work in physical education and recreation. The floor, 90x150 feet in dimensions, furnishes ample space for the most efficient type of gymnasium work.

Features of the new gymnasium which will add to its attractiveness will be two regulation-sized handball courts; two squash courts; three basketball courts; regulation-sized, padded rooms for boxing and wrestling; bowling alleys; steel lockers to accommodate all the men students; modern hygienic showers, steaming rooms, hot rooms, etc., for scientific care of the body.

The treasurer's receipt for the $1.50 gymnasium fee entitles the holder to registration at the gymnasium office for full privileges of the gymnasium, including physical examination, chart of measurements, strength test, locker, free towels, etc.

On the basis of the physical examination, special work of such a nature as the student's physique demands will be assigned, and a careful plan outlined for the symmetrical development of the body.

Membership and regular practice on any of the varsity squads is accepted as an equivalent for gymnasium work during the active practice season, the attendance being reported weekly.

Fall Work. Instruction is given in both theory and practice of Physical Education. During the warm weather of the first semester the department emphasizes the desirability of outdoor work, furnishing a large and efficient corps of instructors in football, basketball, tennis, volley ball, soccer, field hockey, swimming, cross country, track athletics, etc.

Winter Work. The active gymnasium work starts with the beginning of the fall rains, about October 15, when outdoor work is no longer convenient. The work prescribed is intended to correct cases of scoliosis, flat-foot, flat chest, round shoulders, r any other deformity which is susceptible of improvement through corrective medical gymnastics.

Recreative games, such as basketball, handball, indoor baseball, wrestling, boxing, indoor tennis, volley ball, etc., are also conducted during the winter period.

Spring Work. In the spring, full advantage will be taken by the gymnasium instructors of the opportunity for cross-country runs, track and field work, and out-door games with the classes, during which occasions correct methods of breathing, form in running, and proper carriage of the body will be emphasized.

Equipment. The general equipment available for men includes the new men's Gymnasium, the Armory, the athletic field and the swimming pool in the Y. M. C. A. building. The men's gymnasium

is equipped with lockers and dressing rooms having accommodations for all of the men of the College. In the shower-bath room hot and cold water is available throughout the year, and free towels are furnished to the students. The main floor space provides for basketball and other indoor games. The equipment includes horizontal bars, parallel bars, vaulting horses and bucks, swinging rings, traveling rings and ladders, Swedish wands and stall bars, climbing ropes, mats, dumb-bells, Indian clubs, and chest weights. The athletic field adjoining the gymnasium on the south, has within its bounds a quarter-mile running track, football gridiron, and baseball diamond. Bleachers and a grandstand accommodate the spectators.

Normal Course. Many students expect to take up the profession of teaching after graduation from college. A general knowledge of the theories of physical education and methods of gymnastics and athletic instruction is often of material assistance in securing important teaching positions.

Students showing an especial aptitude and interest in physical education will be admitted to this course. The work will include lectures on the history and development of physical training, the general physiological principles of exercises, methods of teaching, and first aid to the injured. Calisthenics, gymnastic drills, apparatus work, games, and athletics will comprise the practical work of the course.

Elective; hours and credits subject to arrangement.

All sophomores, freshmen, and students of the Vocational courses, unless physically unable, are required to take physical training. The classes meet twice a week for sixty-minute periods.

One-half credit per semester is allowed for this work, and is a requirement toward graduation.

COURSES IN PHYSICAL EDUCATION FOR MEN

11. First year Vocational; first semester; 2 periods; ½ credit.

12. First year Vocational; second semester; 2 periods; ½ credit.

13. Second year Vocational; first semester; 2 periods; ½ credit.

14. Second year Vocational; second semester; 2 periods; ½ credit.

15. Freshman year; first semester; 2 periods; ½ credit.
16. Freshman year; second semester; 2 periods; ½ credit.
17. Sophomore year; first semester; 2 periods; ½ credit.
18. Sophomore year; second semester; 2 periods; ½ credit.

19. Hygiene. This course consists of a series of lectures on general hygienic subjects, covering such points as sleep, light for study, colds and catarrh, with a general consideration of social and personal hygienic topics.

Freshman year; first or second semester; ½ credit.

PHYSICAL EDUCATION FOR WOMEN

MIRIAM THAYER-SEELEY, Professor of Physical Education for Women
CHARLOTTE LEWIS-NELSON, Instructor
BERTHA GERALDINE BOWLES, Instructor
IRENE TELFORD, Instructor

Purpose. The aim of this department is to bring each student to her best possible physical condition, and by a careful system of gymnastic training to correct faulty posture, to aid in the formation of habits of hygienic living, to establish a normal condition in the circulatory and respiratory systems, to secure bodily vigor, and to attain a healthy and symmetrical development, rather than the greatest increase in mere muscular power.

Special Corrective and Medical Gymnastics. Students who are shown by their physical examinations to be unfit for the work of the regular classes in gymnastics and sports, or to have physical defects, will be assigned to corrective classes where the work is light and the emphasis is laid on correct breathing and posture, relaxation and rest; or, whenever necessary, students will be given private work in medical or corrective gymnastics according to their individual needs. Thus the physical condition of each student is carefully diagnosed and supervised. The instructors encourage conferences concerning matters of health, personal and sex hygiene, and as far as possible advise proper treatment for the student's temporary ailments. They also take care of the emergency and first aid work for the women of the College.

Requirements. Work in physical education is required of all women four periods a week in all full-year, special, optional, music and vocational courses, regardless of the student's course or classification. One credit a semester is granted for this work. After the satisfactory completion of two years' regular work, the courses will be made elective or optional for women who pass a satisfactory physical examination and have a correct posture and carriage.

Corrective gymnastics will be prescribed for all others, credit being allowed on the basis indicated above. At least four credits are required in Physical Education toward graduation.

Persons presenting credentials of work in physical education taken elsewhere may be given credit for such work in so far as it is equivalent to the requirements of this institution.

Costumes. In order that the gymnasium costumes be hygienic and uniform, a regulation suit and shoes are required of all students. The shoes, orthopedic, are sold by the local dealers, subject to the approval of the director; price $3.00. The suits should be ordered at the gymnasium office, immediately upon arrival at the College. Good second-hand uniforms of outgoing girls will be for sale at about $4.00, while the new uniforms cost $5.00.

The Women's Gymnasium is equipped with lockers and dressing rooms having accommodations for every College woman. A room for corrective gymnastics and a rest room, on the ground floor, are adequately equipped for their respective purposes. In the shower-bath room, hot and cold water is available throughout the year, and free towels are furnished to the students. The floor of the gymnasium is surrounded by a balcony running-track, and a capital playing space is provided for basketball and other indoor games.

The equipment includes horizontal bars, vaulting horses and bucks, parallel bars, swinging rings, traveling rings, Swedish box, stall bars, climbing ropes, ladders, dumb-bells, Indian clubs, and wands.

The girls' athletic field provides facilities for such games as baseball, cross ball, basketball, soccer, field hockey, and tennis.

FEES

PHYSICAL EDUCATION

All courses $1.50

(All women pay the fee of $1.50 per semester for which they are given use of all equipment, lockers, baths; are furnished with towels, medical supplies for injuries, and are given first aid, massage and physical examinations.)

The following courses are offered:

A. **Required Courses.** In the regular courses in Practical Gymnastics a variety of work is taught. Both the Swedish and

German systems of gymnastics are used, and the best in both is adapted to the needs of the classes. Much emphasis is laid on correct posture and breathing. During her first two years of college work each student, irrespective of classification, if not required to take corrective gymnastics, must be enrolled in courses 5, 6, 7 and 8, in which the practical work in Phys. Ed. is divided as follows:

Two periods a week in practical gymnastics.

Two periods a week in elective courses. (These may be chosen according to needs or desire of students, from the list of elective courses described below.)

5. Practical Gymnastics (and Electives.)

Required of all students; first semester; first year; four hours a week; 1 credit.

6. Practical Gymnastics; (and Electives.)

Required of all students; second semester; first year; four hours a week; 1 credit.

Prerequisite: Course 5.

7. Practical Gymnastics (and Electives.)

Required of all students; first semester; second year; four hours a week; 1 credit.

Prerequisites: Courses 5 and 6.

8. Practical Gymnastics (and Electives.)

Required of all students; second semester; second year; four hours a week; 1 credit.

Prerequisites: Courses 5, 6 and 7.

26. Corrective Gymnastics.

Required of all students who have need of remedial work.

Special attention is given to those having spinal curvature, round shoulders, narrow chests, forward heads, weak backs, pronated ankles, and other physical defects or weaknesses.

10. Hygiene.

Required of all Freshmen.

One lecture a week; ½ credit.

B. Elective Courses.

I. Practice

Credit in these elective courses is given according to the number of periods taken each week, ¼ credit being given for each period.

27. **Outdoor Sports.** Soccer, playground ball, cross ball, base crick, track athletics, etc. Open to all students.

28. **Basket Ball.** Open to all students physically qualified.

29. **Soccer.** Open to all students.

30. **Baseball.** Open to all students.

31. **Indoor Baseball.** Open to all students.

32. **Hockey.** Open to all students.

33. **Advanced Gymnastics (and Electives.)** Open to specials in Physical Education and, by permission, to such other students as are qualified.

Prerequisites: Courses 5, 6, 7, and 8. Four hours a week; 1 credit.

34. **Tennis.** Open to all students.

35. **Swimming.** Open to all students.

36. **Fencing.** Open to all students who have satisfactorily completed courses 5 and 6.

37. **Indian Clubs.** Open to all students.

38. **Aesthetic Dancing. (Elementary.)** Open to all students. The purpose of this course is to develop grace and freedom of movement. Greek dancing, now considered one of the most important phases of gymnastic exercise, is emphasized.

39. **Aesthetic Dancing. (Intermediate.)** Open to all students who have completed course 38.

40. **Folk Dancing.** Open to all students. In this course are taught a variety of peasant and national dances suitable for recreation or teaching.

44. **Archery.** Open to all students.

II. Theory

41, 42. **Theory of Gymnastics.** (Open to students who contemplate teaching gymnastics.) Lectures, recitation and practice teaching.

Two periods a week; 41 first semester, 42 second semester; 2 credits each semester.

43. Play and Playground Games. Open to all Summer School students.

Five periods a week for summer session; 2 credits.

This course is designed for public school teachers or students interested in playground work, or wishing to specialize in Physical Education. The psychology of play, adaptation of play to varying ages, necessity of supervision of play, simple equipment for school playgrounds, organization of games, will be given briefly. The greater part of the time, however, will be given to the practice of various playground games and simple folk dances.

47, 48. Massage. Theory and practice.

One lecture, one laboratory period; 1 credit each semester; 47 first semester, 48 second semester.

Prerequisites: Anatomy and Physiology.

49, 50. Physical Examination and Prescription of Exercises. Open to students specializing in Physical Education.

One lecture; one laboratory period; 1 credit each semester; 49 first semester, 50 second semester.

Prerequisites: Anatomy and Physiology.

51, 52. **Methods and Practice Teaching.** Open to students specializing in Physical Education.

Lectures, recitations, and teaching.

Prerequisites: Courses 41 and 42.

Two periods a week; 2 credits each semester; 51 first semester, 52 second semester.

53, 54. **Organization and Administration of Playgrounds.** Open to students desiring to teach Physical Education.

Two periods a week; 2 credits each semester; 53 first semester, 54 second semester.

SPECIAL WORK IN PHYSICAL EDUCATION

An arrangement of courses will be made for women desiring to specialize in Physical Education, either with the purpose of teaching it in connection with their Home Economics or other courses in the schools of the State; or with the desire of securing a thorough foundation for continuation of this line of study.

There are two distinct kinds of courses necessary for the special study of Physical Education: I. Theory; II. Practice.

I. Theory

High school preparation advised: Physiology, Physics, Chemistry, Latin, German.

College courses recommended: Zoology (101, 102), Physiology and Anatomy (201, 202), English (31, 32), Expression (206, 207), German (three years, or a knowledge sufficient to study scientific and medical works), Theory of Gymnastics (41, 42), Embryology and Histology (104, 105), Neuro-Physiology (209), General Psychology (101), Educational Psychology (102), Dramatic Interpretation (208, 209), Story Telling (191, 192), American Literature (71, 72), Home Nursing (511), Massage (47, 48), Physical Examination and Prescription (49, 50), Organization and Administration of Playgrounds (53, 54), Methods and Practice Teaching (Phys. Ed. 51, 52), Sociology (250), Education (131).

II. Practice

Practical Gymnastics (5, 6, 7, 8), Advanced Gymnastics (33), Corrective Gymnastics (26), Aesthetic and Folk Dancing (Elementary and Advanced), Fencing (Elementary and Advanced), Swimming (Elementary and Advanced), Sports of all kinds.

PHYSICS

WILLIAM BALLANTYNE ANDERSON, Professor
WILLIAM ALFRED BEVAN, Assistant Professor
GILBERT BRUCE BLAIR, Instructor
JOHN HARRISON BELKNAP, Instructor

An endeavor is made to adapt each course to the needs of those taking it. The Engineering students use a text which seems to be the best available for their needs; while the text used by the Agricultural students was written especially for such students. The "Physics of the Household" was likewise written especially for students of Home Economics.

In all courses the practical side of the subject is emphasized both in lecture and in laboratory work. At the same time the theory of the subject, is so far as it deals with the fundamental principles of Physics, receives the attention that its importance demands.

Since Physics and Chemistry are the two basic sciences, it would seem that every College graduate should have had at least a general course in each of these subjects. The department, accordingly, urges that at least all College students who have not had Physics in high school elect some work in Physics after consultation with the head of the Department of Physics. Those expecting to teach Physics in the high schools should by all means take several courses in College Physics.

Equipment. The physical laboratory has a good working equipment for the study of general physics, the apparatus being such as to allow a qualitative or quantitative verification of the most important laws of physics by the student in the laboratory, and by the instructor in the lecture room. In addition to the general laboratory, the department has two special laboratories, one equipped for electrical measurements and the other for photometry. A partial list of the apparatus found in these follows: standard cells, shunts, capacities and inductances; secohmeter; Leeds and Northrup potentiometer; Siemens and Halske standard ammeters, voltmeter, and portable testing set; Paul unipivot testing set; storage cells of large current capacity for ammeter and wattmeter calibrations; 10½-inch spark coil; Gaede pump; large Tesla coil; Leeds and Northrup photometer fitted with lamp rotator, rotating sector, Lummer-Brodhum screen, and Bechstein flicker photometer.

In the General Library will be found many recent Physics texts and allied works, as well as several Physics Periodicals, which are available to all.

The following courses are offered:

A. **Elementary Physics.** An elementary or high school course in physics.

The vocational course in Mechanic Arts; third year; first semester; 3 credits; 3 recitations; 1 laboratory period.

Fee: $2.00.

B. **Elementary Physics.** A continuation of course A.

Second semester; 3 credits; 3 recitations; 1 laboratory period.

Fee: $2.00.

1. **General Physics.** A course in general physics, descriptive rather than mathematical in character, covering the subjects of mechanics and heat.

Prerequisites: Elementary physics; geometry.

The courses in Agriculture and Electrical Engineering; freshman year; the courses in Forestry and in Industrial Arts, sophomore year; elective in the course in Commerce, freshman year; first semester; repeated second semester; 3 credits; 2 lectures; 1 recitation; 1 laboratory period.

Text: Anderson: Physics, Vol. I.

Fee: $2.00.

2. **General Physics.** A continuation of course 1 covering the subjects of sound, light, electricity, and magnetism.

Prerequisite: Physics 1.

Required as listed under course 1; second semester; 3 credits; 2 lectures; 1 recitation; 1 laboratory period.

Text: Anderson: Physics, Vol. II.

Fee: $2.00.

101. **Engineering Physics.** A course in mechanics and heat.

Prerequisite: Trigonometry.

The course in Highway Engineering, Irrigation Engineering, Logging Engineering, Mechanical Engineering, and Mining Engineering; sophomore year; first semester; 4 credits; 2 lectures; 2 recitations; 1 laboratory period.

Text: Reed & Guthe: Physics.

Fee: $2.00.

102. **Engineering Physics.** A continuation of course 101, covering the subjects of electricity and magnetism, sound and radiation.

Prerequisite: Physics 101.

Sophomore year; second semester; 4 credits; 2 lectures; 2 recitations; 1 laboratory period.

Text: Reed & Guthe: Physics.

Fee: $2.00.

105. **Electrical Physics.** An advanced course in general physics.

Prerequisites: Physics 1 and 2; trigonometry.

The course in Electrical Engineering; sophomore year; first semester; 3 credits; 1 lecture; 2 recitations; 1 laboratory period.

Fee: $2.00.

106. **Electrical Measurements.** A continuation of course 105, in which the study and use of electrical measurements is emphasized.

Prerequisite: Physics 105.

The course in Electrical Engineering; sophomore year; second semester; 3 credits; 1 lecture; 2 recitations; 1 laboratory period.

Fee: $2.00.

131. **Household Physics.** A brief descriptive course with such applications as are of greatest interest to students in Home Economics.

The course in Home Economics; sophomore year; first semester; 4 credits; 3 lectures; 2 recitations; 1 laboratory period.

Text: Lynde: Household Physics.

Fee: $2.00.

201. **Electrical and Magnetic Measurements.** A laboratory course in the exact determination of electrical and magnetic quantities, calibration of instruments, etc.

The course in Electrical Engineering; junior year; first semester; 2 credits; 1 three-hour laboratory period.

The course will be repeated during the second semester, as an elective, should a sufficient number of students apply.

Fee: $2.00.

202. **Electricity and Magnetism.** An advanced course, taking up the theory of electrical measuring instruments, etc., with suitable practice in the laboratory.

Elective; credit to depend on work done.

Fee: $2.00.

211. **Heat and Light.** An advanced course, taking up the phenomena of heat and light in detail, including recent discoveries.

Elective; credit to depend on work done.

Fee: $2.00.

220. **Descriptive Astronomy.** A brief elementary course in astronomy designed to acquaint the student with the most important facts relating to the heavenly bodies. The object of the course is to make the student an intelligent observer of the more common astronomical phenomena. Descriptive rather than mathematical in character.

Elective; second semester; 2 credits; 2 recitations or equivalent in lectures and observation work, depending upon weather conditions.

222. **Wireless Telegraphy.** A study of electric waves, their measurement, and their application to practical wireless telegraphy.

Prerequisites: Math. 51, 52; E. E. 101.

The course in Electrical Engineering; junior or senior year; elective; second semester; 3 credits.

Fee: $2.00.

SUMMER SESSION

The chief purpose of the Summer School is to afford an opportunity for study to those unable to attend during the academic year. The courses are arranged for elementary and secondary teachers interested in Agriculture, Commercial branches, Home Economics and Manual Training; for credit in regular college subjects, as well as for prospective students deficient in entrance credit; for those interested in music and art; and for those desiring practical instruction in agriculture, household economics, and woodwork.

Of special interest is the inclusion in the two-weeks calendar of courses for boys and girls of upper grammar grades and high school age. At this formative period, an opportunity to study in an interesting way the problems of the two great fundamental occupations should arouse new ideals of the beauty, importance, and significance of such callings. The romance, as well as the dignity of agricultural and home pursuits have their appeal to youthful imagination, but ordinary school education, both consciously and unconsciously, places the emphasis on the professions and occupations leading to a public career.

A large faculty, chiefly regular College instructors, supplemented by a number of specialists from Oregon public schools and from other states, the extensive equipment in class rooms, laboratories, libraries, shops, and experimental fields, are at the service of the students.

The state-wide interest in garden and household contests of the public school pupils has resulted in a demand for more knowledge of these industrial subjects on the part of the teachers. The summer courses will not only provide specific and detailed instructions for conducting these contests, but will show the teacher how to use the state-adopted text in elementary agriculture and supplement it with simple and interesting experiments both indoors and outdoors. In the same way, the direct and practical instruction in cooking and sewing will furnish the essentials for assisting the girl pupils. Any teacher who has had the advantage of six weeks' contact with expert instructors and practical demonstrations in the work in which he is to direct his pupils, will greatly multiply his efficiency and usefulness in his community.

The winter short course comes at a time best suited to the convenience of the farmer. Professional and business men find their slack season during the summer; so also do the youths who are attending school, and the women of the family. The summer school offers them the opportunity of some study of the problem nearest every town dweller's heart—the acquirement of a piece of land and its cultivation. From the standpoint also of the beautification and sanitation of the dooryard and home premises, the kitchen-garden, house decoration, hygienic and economic preparation of foods, and other indoor problems, the summer school makes its appeal. Young men and women who are through high school, and others undecided as to their life work, may find just the leadings in summer study which will determine their future vocation.

RAILROAD RATES

To those attending the summer school, the railroad companies grant a special rate of one and a third fare for the round trip, on the certificate plan. In order to receive the benefit of the reduction, the purchaser must pay full fare to Corvallis, **securing a receipt from the ticket agent** at the time of purchase. This receipt must be countersigned by the College secretary at Corvallis, and on presentation to the ticket agent at Corvallis will secure rate of one-third for the return. This special rate takes effect three or four days before the opening date of the summer session and remains in force until the same length of time after the closing date. Tickets on this plan may be secured at any time while the school is in session, and are also good for return at any time.

ADMISSION AND EXPENSES

There are no entrance examinations or other educational tests for admission. Students desiring College credit must do the required work and pass satisfactory examinations at the close of the session. The registration fee of five dollars entitles the student to admission to as many courses as he cares to attend during the entire session. Private, individual lessons in music will be given at the regular price charged during the school year; students taking music only, will not pay the College registration fee.

The College dormitories, Waldo for women and Cauthorn for men, will accommodate over two hundred students with board

and lodging. A charge of five dollars will be made to cover the cost of heat, light, use of laundry, etc. The rooms are provided with bed, mattress, table, and chairs. Each room has closet, hot and cold water, and electric light. Each student who desires to occupy one of these rooms must bring bed, pillows, pillow-cases, sheets, blankets or comfort, bed-spread, towels, napkins, and soap. The laundry room will be open for the use of students at Waldo Hall without extra charge.

Table board will be furnished at Waldo Hall at three and one-half dollars per week. Lists of private lodging and boarding places will also be provided and every assistance rendered in finding satisfactory accommodations. Furnished rooms for light housekeeping may also be had.

Allowing $26.00 for board and room, $5.00 registration fee, and 50c for drayage on baggage, $3.50 for laundry and incidentals, the minimum cost for the entire six weeks need not exceed $35.00, exclusive of railroad fare. Those who take courses requiring textbooks must make some additional allowance, and others for small laboratory fees, but it is safe to estimate the absolutely necessary expenses, textbooks and all, under $50.00.

SOCIAL AND OTHER FEATURES

The informal and recreation diversions from the class and study routine have not only a social but an educational value as well. These are so controlled and directed as to be inexpensive and unobtrusive. Opportunity for students to become acquainted with each other and with the instructors outside the class room may be had each evening at Waldo Hall, during the informal social hour and at the formal receptions and parties each week.

The College numbers among its faculty some of the best known popular lecturers in the State. Several will be heard in illustrated stereopticon addresses on interesting phases of Oregon's industrial development. At least once each week an evening will be given up to entertainment, either in the form of a lecture of general interest, or a musical concert.

The tennis courts, baseball field, golf course, gymnasium, and other recreation resources of the institution may be used by the students and instructors, free of charge. Boating on the Willamette and Mary's rivers, picnics and excursions to various points of

interest, including Mary's Peak, and week-end trips to the ocean at Newport, will also be available for those who desire to indulge in these recreations. The social features of the Summer School are given careful attention, so they may not come in conflict with the regular work, but at the same time be full of pleasure and interest.

SPECIAL ILLUSTRATED BULLETIN

Each spring, special circulars are issued, giving complete description of the various courses offered, statement in detail of living and other expenses, list of instructors, directions for registration, and other matters. These bulletins are illustrated with interesting views of the College campus. Copies may be obtained by addressing the Oregon Agricultural College, Corvallis, Oregon.

WINTER SHORT COURSES

For many years the Oregon Agricultural College has offered each winter one or more courses of lectures and demonstrations which have been known as Winter Short Courses. These courses have been so generally successful and have called forth so many expressions of approval from those in attendance, that the work has expanded until several courses are given in each of the following schools:

School of Agriculture.
School of Home Economics.
School of Forestry.
School of Engineering.
School of Commerce.

Each of these courses, except the one in Industrial Arts, which will consist entirely of practical work in the shops or in the draughting room, will consist of a series of lectures supplemented by demonstrations, and by practical exercises in the dairy, the orchard, and the various laboratories. The work is so arranged that each hour of the day, from 8 until 5, may be filled with lectures and laboratory or field demonstrations.

The work offered will be adapted to the various needs of farmers, fruit growers, dairymen, mechanics, or of women in the home. It is believed, also, that teachers who desire to prepare themselves to teach Elementary Agriculture, now required in our public schools, will find these courses decidedly helpful.

The various courses are so planned as to provide the largest amount of practical information in the short time available. The subjects to be discussed are those in which every farmer should be interested, and the aim will be to present them in the most practical manner possible. The laboratory and collections, the shops, the creamery, the orchards, the College farm, the cutting, fitting, and sewing rooms; the dining rooms and kitchens—all offer facilities for demonstration or for practical exercises by the students attending these courses. A pleasing and profitable feature of these courses will be a series of lectures by prominent men who are qualified by successful experience to speak upon some particular phase of Agriculture.

Special lessons in Music may be taken by short course students at the regular rates listed under the School of Music.

Students should report to the Registrar for registration and for assignment to the various classes. The inclusive dates of these short courses are as follows: Winter Short Courses, January 7 to February 1; Forestry Short Course, November 6 to April 13. A list of boarding and lodging places may be consulted at the office of the Y. M. C. A.

No entrance examination or other educational test will be required; but no one will be received who is less than sixteen years of age.

There will be no fees whatever for attending the exercises of Farmers' Week. Those who attend the other courses will be expected to pay a registration fee of $1.00. In addition, students who elect certain courses will be expected to pay small fees, to cover the cost of materials used.

Board and lodging may be had in Corvallis at $4.50 to $6.00 a week.

Railroad Rates. The railroad companies grant a rate of one and one-third fare for the round trip on the usual certificate plan.

A circular descriptive of all Short Course work will be issued about November 1, and may be obtained by addressing the Oregon Agricultural College, Corvallis, Oregon.

AGRICULTURE

The school of Agriculture offers to its Short Course students instruction in the following courses; viz., Farm Crops, Animal Husbandry, Dairy Husbandry, Poultry Husbandry, Horticulture, and Crop Pests. In addition to these courses, students are advised to take advantage of the courses in Rural Economics which are offered in the School of Commerce, as well as the course in Rural Highways, in the School of Engineering. For more detailed information regarding these courses, write for descriptive circular mentioned above.

COMMERCE

Commercial Lecture Course. To meet the demand for a short, practical business course, the work outlined below will be offered in a series of lectures under the same conditions and entrance requirements as other winter courses.

Bookkeeping. This course will embrace the fundamental principles of double entry bookkeeping. It will be made strictly practical and only sufficient theory will be introduced to give the

student a firm foundation for his work. The basis of the work will be a study of a model general store equipped with the latest labor-saving methods of bookkeeping and office practice. Eight lectures and demonstrations.

Commerce Law. The course in Commercial Law will begin with the thought that there are certain fundamental principles of commercial law with which everyone should be familiar, and will include the following important subjects: property, contracts, negotiable instruments, interest and usury, bailment, agency and partnership, and real estate. Eight lectures.

Business Forms and Letter Writing. The purpose of this course will be to familiarize the student with various forms used in general business practice. Exercises will be required illustrating both principle and practice in a clear, simple understandable manner. In the work on letter writing the correct form, wording, and general arrangement of the business letter will be taken up. Original letters, received from the most important manufacturing concerns and business houses of the United States, will be studied. Eight lectures.

Penmanship. The work in penmanship will embrace the study and practice of the best forms and style of practical business writing. The primary aim of the course will be to develop an easy, rapid, legible business hand. Eight lectures a week.

Typewriting and Office Methods. The work in typewriting will be outlined to suit the requirements of the individual student. The beginner will be taught the correct method of fingering, the uses of the various parts of the machine, the care of the machine, manifolding, and the correct arrangement of the typewritten letter or form.

Farm Accounting. A complete analysis of farm accounts by different methods, in which simplicity, accuracy, and labor-saving are emphasized; household and personal accounts; cost accounting and special records; cost of production; special cost records; labor records; milk records; poultry records; etc.; the farm plot; office methods; business organizations; business correspondence and business forms. Eight lectures and demonstrations.

Rural Law. The general principles of common and statutory law are discussed and explained; special phases of law affecting the farm, such as titles to real estate, deeds, mortgages, county records, etc.; landlord and tenant; eminent domain, and right-of-

way; water rights and boundaries; laws governing shipping, insurance, banking, etc.; court procedure. Eight lectures.

Rural Economics. The fundamental principles of production, distribution, and exchange with special reference to rural life. Rural labor problems, farm finance, legislative problems affecting rural life, cooperative organizations, marketing products, advertising, the economics of machinery, transportation, etc. Eight lectures.

Insurance. A brief survey of the essential features of the various life, accident, and fire insurance policies and insurance laws. Four lectures.

HOME ECONOMICS

These courses are designed for all women who are interested in the practical and scientific working out of household problems, and who are unable to avail themselves of a regular course in Home Economics. Many agricultural men and their sons, yearly take advantage of the Short Courses which deal with the problems of the farm, such as feeding of cattle, judging of corn, study of soils, etc. It is to meet the demand of Oregon women who are interested in the correct feeding of the family, the judging and selection of materials used in the home, the making of suitable and attractive clothing, and study of sanitary conditions which lead to the health, comfort, and happiness of the family, that this course has been established, and is to be carried on.

Food Preparation. This course deals with the subject of foods and food preparation in its scientific and economic aspect. It is the study of the nutritive principles as they are found in various foods, and the method of cooking foods to retain those principles in a form most completely and easily digested; serving of food in simple and attractive form; economy of money, time, and labor being the watchword.

Special Food Preparation. This course consists of the selection and preparation of foods for children of different ages, adults in active life, the aged, and invalids.

Home Management.

General health and welfare of the home.

(a) Economy of time, labor, and income.

(b) Sanitation of the home.

(c) Home nursing.

Note.—These courses have been planned to meet the needs of those who have had previous work, as well as those who are entering for the first time.

Plain Sewing. This course is planned for those women wishing instruction in the economical purchasing and making of household linens and underwear; the mending and renovating of old garments usually found in all households; the draughting of patterns for underwear to the student's own measurements, together with the practice of interpreting and using purchased patterns.

All women are eligible to this course.

Dressmaking. This course offers instruction in the principles of dressmaking; the taking of accurate measurements; the draughting and use of patterns; the choosing and economical cutting of materials; the making of at least one dress, with special emphasis on artistic color combinations and suitable design.

Tests will be made showing the adulterations of textiles; and simple methods of detecting the adulterations in dress materials will be given.

This course is given for those women who have had experience in sewing and dressmaking.

Advanced Dressmaking. Students who have previously taken one winter's short course will be given instruction in advanced dressmaking, if they so desire.

Millinery. This work will be given by lectures and demonstrations only. No practice work will be given to the students.

Basketry. This course will be given three times each week.

Care of Children. Three lectures each week will be given on the care of children. Only mature women will be admitted to this class.

Camp Cookery. The course in Camp Cookery consists of two laboratory lessons each week. It is especially designed for men, but women are admitted if the class is not already full. Only twenty students can enter these classes.

ENGINEERING AND INDUSTRIAL ARTS

It is the purpose to teach the subjects offered in a straightforward, practical manner, which can be readily grasped and understood by farmers, mechanics, and others who have had only the advantage of a common school education.

Woodworking. Considerable latitude will be allowed in choos-

ing the particular line of work desired in this department as set forth under the following headings:

(a) A course for those not familiar with the care and handling of tools. This course affords instruction in the correct methods of using, sharpening, and caring for the tools of the carpenter's bench. The work is exemplified by exercises in planing, sawing, chiseling, and the construction of useful articles of furniture.

(b) The Steel Square and Its Use. This work includes laying out rafters, braces, stairs, and other work with the steel square. Lectures will be given on the use of the square, after which the actual construction of work will be undertaken by the student.

(c) Instruction in the use of paints, stains, and varnishes.

Blacksmithing. Two lines of work are offered in blacksmithing:

(a) Making repairs on machinery, tools, and farm implements. Students with no previous knowledge of blacksmithing are taught how to build and manage a forge fire; how to draw, bend, upset, forge, and weld iron; how to make chains, clevises, hooks, gate-hinges, whiffletrees and neckyoke irons, and other useful articles.

(b) A course in working and welding steel for those with some general knowledge of blacksmithing. This course includes a study of the different grades of steel; the effect of heat treatment on the quality and temper of steel; the use of the color scale in tempering; and finally the forging, dressing, and tempering of steel tools.

Road Building and Maintenance. A course of lectures on practical road construction and maintenance. This course will consist of three or more lectures each week during the short course on the fundamental principles of road construction and maintenance, and will include lectures on the following subjects: Alignment; grade; drainage; the road census and the interpretation of its results; selection of type of road; the earth, gravel, broken stone, and higher types of roads; maintenance of different types of roads; the road drag; road machinery; culverts and small bridges, etc.

Special laboratory work will be arranged for those desiring to study the physical properties of road building materials.

Concrete. A course of lectures will be given on the theory of concrete and on its practical application to farm and highway structures, walks, etc. In this course proper proportioning for different classes of work, proper aggregate, causes of failure, costs, and methods will be discussed.

THE SCHOOL OF MUSIC

The School of Music is a self-supporting department of the Oregon Agricultural College, organized in 1908 under the present management, and authorized at that time by the Board of Regents. The School has actively contributed to the artistic life and social enjoyment of the College community and of the city of Corvallis, the principals of the School of Music having had charge of the musical entertainment at all College functions of an official or ceremonial character, and of the important musical organizations of the city.

The studious atmosphere, wholesome discipline, and attractive environment of the Oregon Agricultural College are favorable alike to those just beginning the study of music and to advanced students, all of whom may begin their studies at any time and advance to graduation as rapidly as is consistent with creditable scholarship. Students not able to pursue their studies to graduation may have the privilege of selecting such studies as they desire, under conditions hereinafter explained. It is the mission of the School of Music to serve the commonwealth as efficiently as possible and at no greater expense than is charged in other educational institutions.

The advantage of studying music with instructors skilled in the psychology and practice of teaching cannot be overestimated. It results in an appreciable saving of time and expense and a maximum gain in efficiency. Hence the School of Music offers the following comprehensive courses of study to earnest students who wish to acquire scholarly musicianship at moderate cost. The courses may be begun at any time during the school year. All students may advance as rapidly as is consistent with good scholarship. The time required for completion of any of the courses is dependent upon the age, previous preparation, talent, ability, and character of work of each student.

FACULTY

DEPARTMENT OF VOICE

WILLIAM FREDERIC GASKINS, Mus. Bach.
Director of the School of Music.
Professor of Music.

Professor of Voice Culture, Singing, Conducting, Music History. Graduate student Hillsdale College Conservatory; Graduate student American Conservatory; Graduate student of Karlton Hackett, Chicago; J. D. Mehan, New York, F. X. Arens, New York.

GENEVIEVE BAUM-GASKINS
Instructor in Voice Culture and Singing.

Graduate American Conservatory, Chicago; Student of William Nelson Burritt, New York; Karlton Hackett, Chicago; William Frederic Gaskins, Chicago; John Dennis Mehan, New York.

DEPARTMENT OF PIANO

GENEVIEVE BAUM-GASKINS
Instructor.

Student of John J. Hattseaedt, Chicago; Graduate American Conservatory, Chicago.

MAY BABBITT-RESSLER
Instructor.

Student of Arthur Foote, Boston; Leschetizky method studied with Jeanne Marie Mattoon, New York.

CORINNE BLOUNT
Instructor.

Student of Emil Liebling, Chicago; and of Victor Garwood, of The American Conservatory, Chicago.

DEPARTMENT OF ORGAN

GENEVIEVE BAUM-GASKINS
Instructor.

Student of Wilhelm Middleschulte, Chicago.

DEPARTMENT OF STRINGED INSTRUMENTS

E. HELLIER-COLLENS
Violin, 'Cello, Viola.
Instructor.

Graduate and Gold Medalist of Victoria College of Music, London, England; student of Dr. Adolph Brodsky, Royal College, Manchester, England; First Violinist of Royal Opera House Orchestra, Manchester, England; for three years Director of the Stringed Instrument department, University of Idaho School of Music.

DEPARTMENT OF THEORY

WILLIAM FREDERIC GASKINS, Mus. Bach.
Theory of Music. History of Music. Conducting.

CORINNE BLOUNT
Instructor.
Harmony, Harmonic Analysis, Advanced Harmony, Counterpoint, Composition.

DEPARTMENT OF BAND INSTRUMENTS

HARRY L. BEARD
Student of Herbert L. Clarke of Sousa's Band.
Instructor in Theory and Art of Playing Band Instruments.
Band Conducting.

COURSES IN MUSIC

In these courses the following subjects are included: elements of music, history of music, interpretation, languages, music form and analysis, music pedagogics, song singing, oratorio singing, opera singing, choral singing, organ playing, organ structure, piano playing, piano structure, sight reading, stage deportment, stringed instrument playing, wind instrument playing, brass instrument playing, theory, harmony, counterpoint, composition, voice culture.

The following courses are offered:

1. **Voice.** Exercises will be given for correct breath control; purity of tone production; freedom of action and blending of registers; articulation and correct pronunciation and enunciation of vowels and consonants; elements of phrasing and style. Students must appear on programs if requested, singing from memory, and attend all rehearsals and recitals unless otherwise instructed by the Director.

Required: Two lessons a week in voice practice with instrument one or two hours daily; sight reading and ear training, two hours a week; harmony and history of music, two hours a week each; choir and chorus practice. Physical education.

2. **Voice.** This course consists of exercises for tone placing; phrasing and style; legato, marcato, and portamento delivery. Physiology of the vocal mechanism. First year German, Italian, or French, at student's option unless otherwise advised by the Director. Songs and exercises of medium grade of difficulty. Attendance at recitals and rehearsals required, unless otherwise directed as above.

Required: Two lessons a week in voice; practice with instrument one or two hours daily; harmony and counterpoint, two hours a week each; German, Italian, or French, as required in beginning work by the department of Modern Languages; physical education; choir and chorus practice.

Prerequisite: Course 1 or its equivalent.

3. **Voice.** This course includes the study of tone color, agility, the trill, messa di voce, recitation, declamation, phrasing, style; songs in English, German, French, Italian; the regular second year study of one of the above foreign languages at the student's option, in the department of Modern Languages, unless otherwise advised by the Director. Attendance at recitals and rehearsals

required unless otherwise directed as above, singing from memory on programs of the School of Music when so required.

Required: Two lessons a week in voice; two lessons a week each in advanced harmony and harmonic analysis; German, French, or Italian, at student's option, second year study as required in department of Modern Languages; choir and chorus practice; physical education.

Prerequisite: Course 2 or its equivalent.

4. **Voice.** This course includes advanced study of vocal technique by means of difficult exercises, songs, oratorios, operatic arias, declamation. Advanced composition throughout the year. Attendance at rehearsals required in preparation for public appearances, and at recitals, singing from memory. For graduation a public recital must be given as arranged by the Director, unless he may specify to the contrary. A diploma will be issued upon the satisfactory completion of this course.

Prerequisite: Course 3 or its equivalent.

5. **Piano Preparatory Course.** For Beginners. Training of the hand, fingers, wrist, and arm. Extended preparation for scales and arpeggios; exercises for same. Chords. Octaves. Sonatinas by Clementi; Kuhlau; smaller compositions of Mozart, Handel, Beethoven, and other composers. Easiest sonatas of Haydn and Mozart. Selections from easier works of Schumann, Kullak, Reineke, and Grieg; other easy, appropriate compositions.

Required: Two lessons a week in piano; practice with instrument, one to three hours daily.

6. **Piano.** Scales and arpeggios, tempi, accent, nuance, rhythm. Double notes. Trill, Exercises for endurance, speed, accent, and rhythm. Etudes from Czerny, Kramer, Kullak, Krause, two-part inventions and dance forms by Bach. Easier sonatas of Haydn, Mozart, Beethoven. Easier compositions of Mendelssohn, Schubert, Schumann, Grieg, Raff, and others.

Required: Two lessons a week in piano; two lessons a week in harmony; two lessons a week in music history for thirty-six weeks; practice with instruments, two to four hours daily. Physical education.

Prerequisite: Course 5 or its equivalent.

7. **Piano.** Two- and three-part inventions and suites by Bach. Etudes of Czerny, Cramer, Hasert, Bernes. Sonatas of Beethoven

of moderate difficulty. Sonatas of Mozart. More difficult selections from Weber, Mendelssohn, Schumann, Chopin, Grieg, Liszt, Mozart concertos; transposition of easy hymns; to sight read readily; to play from memory five compositions from the preceding course in a satisfactory manner.

Required: Two lessons a week in piano; two lessons a week for thirty-six weeks in advanced harmony; two lessons a week in counterpoint; practice with instrument three to five hours daily. German or French. Physical education.

Prerequisite: Course 6 or its equivalent.

8. **Piano.** Collegiate Course: Well-tempered clavichord, chromatic fantasy and fugue, Bach. A limited number of etudes by Rubenstein, Chopin, Henselt. The more difficult sonatas of Beethoven. Solo works of Mendelssohn, Chopin, Schumann, Grieg, Liszt, Brahms. Concertos by Mozart, Mendelssohn, Beethoven.

Required: Two lessons a week in piano; practice with instrument three to five hours daily; two lessons a week in composition; one hour a week in harmonic analysis; German or French. Physical education.

To complete this course satisfactorily the student must fulfill the requirements above outlined and appear in programs when requested by the Director.

9. Piano. Graduate Course: Beethoven sonatas Op. 57, 106, 110. Liszt Rhapsodies. Comprehensive study of the principal classics and romantic composers. Solo works of modern composers. Concertos by Schumann, Chopin, Beethoven, and other composers.

Following is the list of graduate course pieces of which the student must play six from memory: Wagner-Liszt—Tannhauser March; Chopin—Scherzo in B Minor, op. 31; Mendelssohn—Rondo Capriccioso, op. 14, Prelude and Fugue in A Minor; Variations Serieuses; Schumann—Kreisleriana, op. 16, Carnival, op. 9; MacDowell—Marzwind and Wald Idyllen, op. 19, Nos. 1, 3, and 4; Bach—Fugue in A Minor, or his Italian Concerto; Handel—Suite in D; Moszkowski—Caprice Espannol, op. 37; MacDowell—Concert Etude, op. 36; Grieg—Ballade; Liszt—Liebestod (Tristan and Isolde), Bach—Chromatic Fantasy and Fugue; Mozart—Fantasia in C Minor; Rubenstein—Sonata in F; Beethoven—Sonatas to be selected. Concertos by Chopin, Henselt, Hummel, Liszt,

MacDowell, Mendelssohn, Mozart, and Saint-Saens, or five other works at teacher's option.

Required: Two lessons a week in piano; practice with instrument three to five hours daily; advanced German or French. For graduation, students are required to perform publicity under the direction of the School of Music, playing a program not less than one hour in length, arranged by the instructor and approved by the Director, which shall include two or more numbers equal in difficulty to any composition in the list of graduate course pieces. A diploma will be issued upon the satisfactory completion of this course.

10. Theory. The course in theory will comprise systematic and progressive study in the science of music. Consideration will be given to the theories of acoustics, to notation, scales, keys, modes, sight reading, intervals, melodic progression, tempo, dynamics, rhythm, and ear training. Advanced theory will embrace harmony, counterpoint and subdivisions thereof, music history, concluding with form, composition, and orchestration.

11. Violin. This course is preparatory, and designed to develop correct fingering, free bowing, and accuracy as to pitch and rhythm and intonation.

Studies. Sevick School, Greenberg, major scales, minor scales in the first position; studies by Wohlfahrt, Kayser, Hime, elementary solos; special sight reading duos by Mazas and Dancla. Other appropriate studies may be substituted for the above, if approved by the Director, as acceptable equivalents, the same to be satisfactorily performed before entering Course 12.

Students must appear in public recitals when required, playing from memory.

Required: Two lessons a week, harmony, music history, as in Course 6.

12. Studies by Kayser, Wohlfahrt, Schradieck, Mazas, Dont, and Kreutzer. Scales by Hrimaly and Schradieck or acceptable equivalents. Suitable solos, concertos, sonatas, etc. Students must appear in performance at public recitals when required by the Director, playing from memory.

Required: Two lessons a week, harmony and counterpoint.

Prerequisite: Course 11.

13. This course consists of advanced studies by Dancla, Fiorillo, Singer, Rhode, Gavinies, Paganini; solos by Dvorak, Brahms, Vieutemps, Rovelli, Spohr, De Beriot, Viotti, Wieniawski, or other acceptable equivalents. Students must appear in public recitals when requested, playing from memory.

Required: Two lessons a week, harmonic analysis, composition, German or French, as in Course 8. As a qualification for graduation students are required to perform publicly, under the direction of the School of Music, a program not less than an hour in length, arranged by the Instructor and approved by the Director. A diploma will be issued upon the satisfactory completion of this course.

Prerequisite: Course 12.

The Orchestra. Students of stringed instruments in attendance at the College, who are sufficiently advanced, may be admitted to membership in the College Orchestra by arrangement with the Conductor on such terms as may be approved by the Director. It is the intention of the management to encourage in every reasonable manner the development and maintenance of a good orchestra under competent progressive leadership. Students are invited to investigate these opportunities for excellent training in orchestra routine and solo playing. Such experience and thorough drill are of great educational and cultural value. No student able to play fairly well should fail to avail himself of this training.

The Orchestra library consists of works by the following composers: Dvorak, Brahms, Tschaikowsky, Grieg, Gounod, Verdi, Mendelssohn, Beethoven, Elgar, Wagner, Offenbach, Strauss, and others.

Ensemble: Sonatas for violin and piano; string trios; quartettes for two violins, viola, and 'cello; and for four violins, will be studied. All students in the above classes, or registered in any of the above courses, must perform from memory in public when requested by the Director. Membership in the ensemble classes is free, and instruction is to be given by the principal violin instructor.

BAND INSTRUMENTS

Instruction will be given by the regular College band leader in the use of brass, wood-wind, and percussion instruments.

To become a member of the College Band, a student must pass a satisfactory examination in the elements of music and ability to perform on his instrument.

Members are required to attend rehearsals each school day, and a reasonable amount of individual practice is expected.

There is no charge for instruction in the band. Each member must furnish his own instrument and music stand, except basses, baritones, altos, and drums, which are furnished by the College.

Any student desiring to enter the band should see that his instrument is in low pitch.

The courses for the various band instruments are as follows:

14. **Cornet.** Methods by Arbou; characteristic studies by St. Jacome.

15. **Clarinet.** Methods by Dieppo; studies by Dieppo and Blume.

16. **French Horn.** Methods by Franz; studies by Franz and Hayffman.

17. In all other band instruments, including the oboe, bassoon, saxophone, alto, and bass clarinets, drummer's trapps, xylophone, and orchestra bells, the courses will be similar to those given above.

The work in theory required to complete these courses is that outlined for piano courses 6 and 7.

18. **Theory.** The course in theory will include systematic and progressive study of the elements of music; acoustics, notation, scales, keys, modes, sight reading, intervals, melodic progression, chords, rhythm, dynamics, and ear training.

Advanced theory will include harmony, counterpoint and subdivisions thereof, harmonic analysis, form, composition, and orchestration.

GENERAL INFORMATION

Any student in the Oregon Agricultural College with a satisfactory record in scholarship in his major course may take at least one hour a day in music.

The authority to register and assign all applicants for music instruction is vested solely in the Director, who must first be con-

sulted for the arrangement of necessary details of registration, or at any time when information is required that pertains to study in the various departments of the School of Music.

Students in the School of Music may enter classes in the several departments of the College; and in order to enhance their general culture are encouraged to take at least one study throughout the school year other than the work required in the regular music courses.

Applicants for instruction may take complete or partial courses. Those registering for the former are classified as "regular music," while the others are classified as "special music."

"Special Music" students have the option of selecting such music studies as they desire by registering for the same with the Director in the regular manner and at the catalogue rate of tuition.

Non-resident young women are required to live in the dormitories, where their conduct is subject to the approval of the Preceptress. Outside rooming and boarding places may be obtained, subject to the approval of the College authorities. The rates for board and room are listed elsewhere in detail.

Students registered for study in the regular courses of the Oregon Agricultural College School of Music are subject to the same rules and regulations as all regular students in other courses.

No student is permitted to omit lessons or practice without sufficient excuse, and no refund will be made for absence from lessons or practice or for discontinuance, except in cases of severe personal illness; for such unavoidable absence, lessons may be made up only by appointment, and before the expiration of the term.

Lessons falling on legal holidays, or on special holidays petitioned for by the student body or by special student organizations, which may be granted by the College authorities, will not be made up.

Students will not be permitted to transfer tuition accounts to others, nor to receive credit for tuition fees beyond the assigned registration period, except in cases of severe personal illness, attested by a physician, or similar extreme necessity, and then only by making suitable arrangements with the Director.

The College year in the School of Music consists of thirty-six weeks, divided into terms of about twelve weeks each, the first term beginning at the opening of the College on September 18, 1916.

Private individual instruction is given in lessons of thirty minutes each, in all departments of the School of Music. Class instruction in theoretical branches is required of candidates for graduation, as specified in the preceding outlines of courses. Terms for instruction are as follows:

Voice Culture and Singing—Professor Gaskins, private instruction:
One lesson a week, a term.....$15.00
Two lessons a week, a term..... 30.00

Organ—Genevieve Baum-Gaskins, private instruction:
One lesson a week, a term.....$24.00
Two lessons a week, a term..... 48.00

Piano—Genevieve Baum-Gaskins, private instruction:
One lesson a week, a term.....$15.00
Two lessons a week, a term..... 30.00

Piano—May Babbitt-Ressler, private instruction:
One lesson a week, a term.....$15.00
Two lessons a week, a term..... 30.00

Piano—Instructor Corinne Blount, private instruction:
One lesson a week, a term.....$12.00
Two lessons a week, a term..... 24.00

Violin, Violoncello, Viola—Instructor Hellier-Collens, private instruction:
One half-hour lesson a week, a term.....$15.00
Two half-hour lessons a week, a term..... 30.00

Mandolin, Banjo, Guitar—Instructor ———— private instruction:
One half-hour lesson a week, a term.....$12.00
Two half-hour lessons a week, a term..... 24.00

Band Instruments—Instructor Beard, private instruction:
One lesson a week, a term.....$10.00
Two lessons a week, a term..... 20.00

Music History—Professor Gaskins, class instruction:
Two hours a week, one term.....$ 3.00

Theory of Music—Professor Gaskins, class instruction:
Two hours a week, a term.....$ 3.00

Harmony, Counterpoint, Harmonic Analysis—Instructor Blount; class instruction, classes limited to six students:
Each subject two hours a week; tuition for each subject, a term .....$ 7.50

Composition (including **Form**), **Orchestration**—Instructor Blount, class instruction, classes limited to six students:
Two hours a week; each subject, a term.....$ 7.50

PRACTICE

Rooms located in one of the College buildings have been suitably furnished for the use of students wishing to practice in private. These rooms may be rented for about one-third the cost of using pianos located in private houses, and without any of the disadvantages in connection therewith. These practice rooms, with steam heat, good ventilation, electric illumination for night practice, and good janitor service, are furnished with good pianos, kept in tune by the College. Students living in the College dormitories are required to practice upon these pianos. Students living away from the campus may arrange with the Director for practice on the same terms and conditions, as follows:

Piano—

Term of twelve weeks, one hour a day	$ 5.00
Two hours	7.50
Three hours	10.00
Four hours	12.50
Five hours	15.00

Organ—

Term of twelve weeks, one hour a day	$12.00
Two hours	18.00

The pipe organ is a new, modern Kimball two manual, concave pedal board instrument of beautiful tone.

For additional information address William Frederic Gaskins, Director, Room 30, Administration Building, Oregon Agricultural College, Corvallis, Oregon.

THE EXPERIMENT STATION

ARTHUR BURTON CORDLEY, Director
CLAUDE ISAAC LEWIS, Vice Director

The Agricultural Experiment Station bears an important relation to the College, as the scientific investigations conducted by the staff strongly support the instruction given in the class room and through the extension service. Aside from the original investigations of economic significance to agriculture, the work of the Station affords daily object lessons in modern farm methods.

About 650 acres of land are available for the use of the College and Station workers. This land is utilized by the various departments represented in Station organization, including the departments of Chemistry, Drainage and Irrigation, Farm Crops, Farm Mechanics, Silos and Farm Management, Horticulture, Animal Husbandry, Dairy Husbandry, Poultry Husbandry, Entomology, Bacteriology, Pharmacy, and Botany and Plant Pathology. Each department is actively engaged in the scientific investigation of problems presented by the different branches of agriculture.

In addition to the experimental work carried on by the departments of the School of Agriculture, experimental work is also conducted by the School of Engineering, the School of Home Economics, and the department of Pharmacy.

The value of such work, as an object lesson to the students in the various fields of study, can hardly be overestimated. Its value to the State, from the point of view of economic progress, has been greater, in the estimation of many careful observers, than the entire cost of the College to the people.

As an illustration of the comprehensive character of the investigational work carried on by the Station, the following brief summaries of projects, by departments, is presented:

Agricultural Chemistry. This department, either independently or in cooperation with other departments of the College, has under way a considerable number of experiments that are of wide significance both to the economic interests of the State and Nation and to the cause of science. Experiments with arsenical sprays, that represent a total annual expenditure throughout the country of six to eight million dollars, are directed to the object, first, of determining exactly how the efficiency of these arsenicals is best conserved, and second, how a less expensive form of a similar insecticide may be developed. The first object has been partly

accomplished, with promise of conclusive results, and the second, through the use of arsenate calcium, seems also within reach of fulfillment. Soil investigations conducted in cooperation with the department of Bacteriology are directed to the determination of how nitrogenous organic matter in the soil is made available, through ammonification and nitrification, for plant food, and how nitrogenous substances, present in the soil in forms unavailable for plant food, may be broken down and rendered soluble and available for use of growing plants. In cooperation with the Southern Oregon Branch Experiment Station, at Talent, the department has made a complete chemical survey of the soils of the Rogue River Valley, with a view to determining the deficiencies to be supplied by fertilizers. Sulfur is found to be the element, which, when added to certain of these soils, increases the production of alfalfa and other legumes by percentages running into the hundreds. These fertilizer experiments promise some very striking and valuable results. Incubation experiments, now reaching completion after several years of laborious and painstaking study, go to show that varying the conditions of incubation varies also the quality of the chicks produced. Limited experiments with loganberry juice have been conducted to determine what jelly-making acids are present in the juice, what modifications appear in the juice of the second pressing, and what use may be made of the pulp. Soil analyses conducted in connection with the reclamation service have comprehended one-half million acres of land. Routine analyses of commercial fertilizers, especially of limestone, have shown the need of caution in the use of these fertilizers at current prices unless the quality is high. Analyses of all insecticides on the market are on file at the Chemist's office, where information concerning any of them may be had, free of charge, on application.

Animal Husbandry. Experiments in Animal Husbandry, which comprehend tests with horses, beef cattle, sheep, and swine, are conducted partly at the Corvallis Station and partly at the Eastern Oregon Branch Station. Experiments with horses are directed to determine the cost of horse power for various types of farm and other work; the amount of work that may reasonably be expected from a horse; the cost of keep, etc. Experiments with beef cattle, conducted chiefly at Union, have shown striking results in the use of grain with alfalfa hay and pasture. Experiments with sheep, chiefly at the home Station, have been directed to determine the cost of production, the carrying capacity of different types of pas-

ture, methods of fattening sheep, and methods of rearing and marketing lambs for meat purposes. Experiments with hogs involve the cost of production, including rapidity of gain; and comparison of different feeding rations and methods of feeding, including use of pasture.

Bacteriology. Experimental work in Bacteriology is chiefly concerned with soil analyses, with dairy manufacturing, sanitation, and diseases of poultry. Three experimental projects of economic importance that are now under way are the following: (1) The effect of lime and landplaster on the growth of soil bacteria and therefore on the crop: (2) The effect of dryness and varying degrees of soil acidity on the growth of legume bacteria; (3) The facts concerning the prevalence, transmission, and means of control of chicken diseases such as tuberculosis and white diarrhoea.

Botany and Plant Pathology. Experimental work in this department is devoted chiefly to six projects; namely, (1) The life-history and control of brown-rot diseases of fruits and twigs; (2) Bacterial gummosis of cherries and other stone fruits; methods of communication and control; (3) Diseases of potatoes; (4) Wilt diseases of clovers and alfalfa; (5) Bacterial blight of filberts; (6) Spraying for orchard diseases. The gummosis investigations, which have now been under way for several years, have yielded striking results, and promise to lead to effective methods of controlling this most devastating disease of the chief varieties of commercial cherries in Oregon.

Dairy Husbandry. Experiments in this department are directed to standardizing the color of butter and to determining the amount of coloring matter to be added to cream of a certain test, by sample, in order to bring it to standard color, or "June shade;" to determine whether or not to use "starter" in churning butter; to determine the keeping quality of butter made from cream of different degrees of acidity, neutralized, pasteurized, and churned; to determine, by testing the different factors in the handling of milk, what are the essentials in reducing the bacterial count of milk for market; to determine the function of the so-called milk veins and their bearing on milk production; to determine the factors influencing the percentage of butter fat content in milk; to determine the feeding value of alfalfa meal as a substitute for the usual grain feeds; to determine the value of kale as compared with silage as a succulent feed.

Drainage and Irrigation. Five specific projects of considerable breadth and importance are under investigation by this department. Following is a brief outline of the projects and their aim. (1) Irrigation and Soil Moisture Investigations in Western Oregon. These are four-years' rotations to measure the value of irrigation, rotation, and manure in increasing crop yields and lessening water requirement. In connection with these investigations three-years' rotations on white lands are being conducted cooperatively to determine the effect of this rotation treatment on bacterial activity and chemical composition of the soil. (2) Duty of Water Investigations. This work is conducted cooperatively with the U. S. Office of Irrigation Investigations. It is State-wide in scope, with agencies at Paisley and Burns in Eastern Oregon. The aim is to determine the right amount of water for the chief soil types and leading crops under the main types of farming in the principal irrigated valleys of the State. (3) Drainage Experiments. This work, which is conducted on a nine-acre tiled tract of the College farm, is directed to determining the efficiency of drains spaced at intervals of 25 to 100 feet. The ten-years' trials indicate that on this type of clay soil 50 feet is the most efficient distance for spacing drains. (4) Experiments in Drainage to determine the most efficient depth for placing drains in soils of different types, and for testing the efficiency of bedding drains in straw and gravel. Since there are one-half million acres of marsh land in the State and three million acres of land periodically wet, the value of these investigations is obvious. If efficient drainage added to the value of the land the average determined for this work in the Middle West, the reclamation of the State's wet soils would add at least $10 an acre to the value of these millions of acres.

Entomology. Experiments in Entomology include tests to determine the toxicity of various insecticides with three objects in view: (1) To discover new and cheaper insecticides; (2) To discover possible combinations of sprays that will reduce the number of necessary applications; (3) To determine the actual amount of poison necessary to kill a given insect. Experiments also include tests to determine possible means of control for root borers and other root-infesting insects that carry plant diseases; a systematic and economic study of insects attacking Douglas fir; and a study of the economic slugs of the Pacific Northwest.

Farm Crops. This department has in hand four specific experimental projects of chief importance; namely, (1) Variety tests

of wheat, oats, barley, flax, vetch, potatoes, and corn; (2) Cultural tests on miscellaneous crops such as sudan grass, sunflowers, mustard, soy beans, and cow peas; (3) Seeding experiments on the time, rate, and date of seeding cereals and legumes; (4) Selection and breeding work with cereals and legumes.

Horticulture. Experiments in Horticulture comprise the following types of investigations: (1) The pollination of the Pomaceous Fruits, including the Gross Morphology of the Apple, Fruit Bud Development of the Apple; Variation of the Internal Structure of Apple Varieties, etc. (2) Irrigation work with apples and pears, (2) Experiments with stocks of both apples and pears, (4) Problems of both winter and summer pruning, (5) A study of critical temperatures, (6) Strawberry variety tests, (7) Cover-crop investigations, (8) Fertilizer investigations, (9) Breeding investigations with cherries, apples, prunes, and strawberries, (10) Investigations in orchard economics, (11) Vegetable gardening investigations with greenhouse tomatoes, onions, and type selection for canning, (12) Investigations with by-products of loganberries and other fruits; (13) Investigations in the relation of depth of planting to mortality of trees.

Poultry Husbandry. Experiments in poultry husbandry are chiefly concerned with problems of incubation and with breeding fowls for high average egg production, and for a combination of egg production and meat value. Results in both fields of experimentation have already been remarkable and promise still greater progress toward the objects desired. A new breed, the Oregon, seems to be established with the attributes sought.

Soils and Farm Management. This department is concerned with the following different lines of investigation: (1) Soil Fertility Investigations, including, (a) Fertilizer trials on Willamette Valley clay loam; on Willamette Valley white lands; on Willamette Valley fine sandy loam; (b) Cooperative trials on Willamette Valley clay loam; on Eastern Oregon silt loam; on Central Oregon sandy loam; (c) Cooperative fertilizer trials in Marion, Yamhill, Benton. Coos, and Josephine counties; (2) Agricultural lime investigations, (3) Dry-farming tillage investigations, (4) Soil moisture investigations, (5) Pumice soil investigations, (6) Adobe soil investigations, (7) Soil surveys of irrigation projects, (8) Farm Management surveys, (9) Cost of Production Investigations.

Veterinary Medicine. The experimental work of this department has been devoted chiefly to finding means for prevention of sterility in cattle.

EXTENSION SERVICE

RALPH DORN HETZEL, Director

The Extension Service of the Oregon Agricultural College represents one of the three main divisions of the college activities; namely, college instruction, experiment station, and college extension. It includes in its present form the following distinct lines of work: (1) Publication of bulletins. (2) Correspondence courses. (3) Farmers courses and meetings. (4) All exhibits made at fairs and upon special occasions. (5) Class work and lectures at local chautauquas. (6) Movable Schools of from three to six days duration. (7) Individual advisory work with the farmers of the State. (8) Officiating and judging at fairs. (9) Conducting Farmers' and Home Makers' Weeks of from one to two weeks' duration—one at the College, one in Eastern Oregon, and one in Southern Oregon. (10) The supervision and direction of the boys' and girls' industrial club work in cooperation with the Superintendent of Public Instruction. (11) Special field dairy work and assistance in dairy organizations. (12) The supervision and direction of county agent work. (13) Farm management demonstrations. (14) Assisting in rural organization and in the marketing of farm products.

Extension Subjects. Extension teaching is concerned with all instruction given by the College which is not classified as a part of the regular resident work. The subjects which are included in the extension work are, therefore, all the subjects taught at the College which are of such a nature as to lend themselves to extension methods. While the College, in the past, has been exclusively concerned with agricultural and home economics extension, it has now provided for extension work in all lines of instructional effort.

In addition to the instruction offered in the various branches of agriculture, home economics, commerce, and engineering which is specifically outlined in the pages following, extension instruction is also being given in forestry, mining engineering, mechanical engineering, electrical engineering, commerce, highway engineering, education and other scientific and industrial subjects. While it is clearly impossible to attempt to give complete and full courses in the great majority of these lines of work, there is much that is prac-

tical, usable, and valuable that can be taught through extension methods. It is, then, only such branches of the College work as can be effectively taught without residence requirement, that will come within the scope of extension work.

Extent of the Work. During the past two years college representatives have held meetings in 230 towns and rural districts of the State with a total recorded attendance of 140,543 people. Many more than this number were reached by means of educational exhibits, chautauqua lectures, and demonstrations for which no record of attendance was made. During this period 72 extension bulletins were published with a total of 341,900 copies. Of all these activities by far the greater number have been carried out during the past year. The staff of the Extension Service now consists of 33 people, including the county agents. In the work of the Service, the U. S. Department of Agriculture is cooperating by lending support to many of the activities in operation, both by providing funds and by delegating trained officers for the field service.

Importance of Extension Work in Oregon. The magnitude of the problem of College extension in Oregon can be fully realized only by keeping in mind that the State has a population of nearly 800,000 distributed over a total area of 95,600 square miles—a territory greater than the combined areas of Illinois and Indiana and almost as great as the combined areas of New York, New Jersey, and Pennsylvania. The State, moreover, has few railroads, and in certain sections is very sparsely settled. The people who are to be reached by extension methods represent the greatest extremes in age, capacity, education, and experience with the climate and the country. Oregon's great diversity in elevation, precipitation, temperature, soil, and climatic conditions, still further complicates the problem of extension service, and makes it important in proportion to its complexity.

How to Apply. All persons or communities in the State wishing assistance in any of the lines indicated, should communicate with the Extension Service as far as possible in advance of the time the appointment is desired. Short-notice requests may not find the department in position to render the best service. If a Movable School is desired, be sure to give all particulars pertaining to the time, the nature of the subjects in which the community will be interested, the number of speakers desired, and the plans

for the meeting. If a single lecture or demonstration or exhibit is wanted, be equally prompt and explicit.

It must be remembered that while the College is willing at all times to help all who apply, its staff, facilities, and funds are limited. On this account, the Extension Service is sometimes unable to give aid where it would like most to give it. Requests for instruction or other assistance, however, should not be withheld; since the great majority of the State's needs have been, and generally can be, cheerfully and efficiently met.

Any county desiring to organize under the provisions of the law for agricultural field and demonstration work and the support of a county agriculturist should communicate with R. D. Hetzel, Director of Extension Service at the Agricultural College, in order to determine the best methods of procedure.

ADMINISTRATIVE

RALPH DORN HETZEL, Director
HAZZLITT VICKERS, Secretary

The administrative work of the Extension Service is vested in a director, secretary, and heads of the various departments. The administrative duties consist of planning and coordinating the several lines of Extension work, dividing and assigning funds, planning the Extension campaigns, meetings, schools, conferences, demonstrations, etc., authorizing all Extension publications, planning and arranging exhibits, and supervising the prosecution of all phases of the work. Reports are required covering all lines of Extension service and periodical reports are made to College officials and other cooperating agencies.

AGRONOMY

JOHN ELMER LARSON, Extension Specialist in Agronomy.

Extension Agronomy embraces several distinct lines of work: soils, crops, drainage, irrigation, farm management, and farm mechanics.

The lecture work covers the composition and physical properties of soils, soil fertility, and farm manures. Drainage includes the soil management subsequent to installing drains as well as the drainage construction work. Irrigation includes the economic use of water, removal of alkali by drainage, etc. The crop work

covers crop rotation, cultural methods, housing and storing, farm management, or the business side of farming. Farm mechanics comprehends farm structures, wood and concrete, and care of farm machinery.

The demonstrations include classifications and properties of soils, judging of corn and potatoes and their selection for seed, germination of seeds, operation of farm machinery, and applied principles of drainage.

ANIMAL HUSBANDRY

RALPH ELMER REYNOLDS,
Extension Specialist in Animal Husbandry

Extension Animal Husbandry takes up the different breeds of live stock, the principles of breeding, different feeds and methods of feeding, and the general care and management of beef cattle, horses, swine, sheep, and goats. With beef cattle, special stress is laid upon the use of better sires and better care to obtain best results. Emphasis has been laid upon the unsoundnesses of horses, and the need for the exercise of great care in the selection of sound, pure-bred sires. The results of a large number of pig-feeding experiments at our Experiment Station, showing the most profitable feeds and methods of feeding, have been given the farmer. Better care and management of sheep, the use of better sires, together with improved methods of handling the wool clip, have been urged upon the sheep men. The general aim is to assist the stock raisers in producing better animals at less cost.

BOYS' AND GIRLS' CLUB WORK

HARRY CASE SEYMOUR, State Leader
HELEN JULIA COWGILL, Assistant State Leader
LEONARD JOHN ALLEN, Assistant State Leader, Pig Club Work

The Junior Extension activities of the Oregon Agricultural College take the form of club and contest work among the boys and girls. Those who are, or can be, interested in the basic farm and home enterprises, such as the growing of plants, the rearing of animals, or the work in home economics, are encouraged to enroll for one or more club projects.

The club project, which is to be worked out at home, may take the form of growing 1-16 acre or more of corn, potatoes, vegetables, etc., the management of a brood sow and litter, or a single

pig; raising a flock of chickens; keeping a milk and feed record on a herd of dairy cows; the completion of ten lessons in sewing, baking, or canning—14 different projects in all.

Assistance is rendered, enthusiasm aroused, and interest sustained in the work by means of Club meetings, circulars and bulletins, and personal visitation by local, county, and State Club leaders.

Prizes are offered to the winners in Club projects at the local, county, and State Club festivals and fairs. The Club members are made to see, however, that the most worth while prizes are the knowledge, skill, and profit that each may derive from the work.

Club work in Oregon is maintained and supervised by the Oregon Agricultural College Extension Service in cooperation with the U. S. Department of Agriculture, and the State Department of Education. The activities of all these agencies are focalized in a State Leader of Club work, who is a member of the Extension Service staff, and to whom all inquiries regarding Club work should be addressed.

COOPERATIVE FARM DEMONSTRATION WORK

PAUL VESTAL MARIS, State Leader
MERRILL OSGOOD EVANS, Assistant State Leader

The largest department in the Extension Service at the present time is the Farm Demonstration Department which includes the county agent work. In charge of this department is a State Leader and an Assistant State Leader. Prosecuting the work throughout the State are the various county agents. At the present time there are fifteen of these men in the Service, located in the counties which have made an initial appropriation for the work. They are charged with the development of the agricultural interests of their respective counties.

For the most effective accomplishment of this purpose the following plan of work has been adopted in Oregon:

Whenever possible the county agent allies himself with and works through existing farmers' organizations which have for their aim the betterment of agricultural conditions. He seeks to have formed a county-wide agricultural council made up of one member of the County Court and one representative from each of these existing organizations. Unorganized communities upon

perfecting an organization may elect a member to the aforesaid council. The county agent, acting with this agricultural council or body of leading farmers, representing the various agricultural interests of the county, decides upon a program of work for the year. This program may include the formation of marketing organizations, such as poultry and egg circles, cattle shippers' associations, potato growers' associations, etc., the organization of drainage districts, conducting practical farm demonstrations pertaining to the management of soils, crops, live stock and orchards, or the control of insect pests and contagious animal diseases.

The county agent, in short, establishes a center of local agricultural interests. He maintains a central office in which is assembled information pertaining to the agriculture of his community. He is the representative of the United States Department of Agriculture, the State Agricultural College, and the county in which he is located, and through the union of these forces he is able to apply the fullest measure of practical and scientific knowledge to the solution of problems and the improvement of country life conditions.

While the county agent renders valuable service to individual farmers, he is obliged to work largely through groups. His greatest service is rendered in dealing with the larger problems of a community, in organizing and directing the farmers in movements for self help, in securing for the county the services of specialists when specialists are needed.

How to Secure a County Agent

Under Section 3 of Chapter 110 of the session laws of 1913 provision is made whereby county courts in counties with areas of less than 5,000 square miles, may appropriate a sum up to $2000 for the employment of a county agent and maintenance of his office. Larger counties may appropriate up to twice that amount. It is further provided that there shall be available from state funds an amount equal to that appropriated by the county for the support of the work. The government also gives actual financial assistance by contributing to the salaries of administrative officers, granting the franking privilege to the county agents, providing certain supplies, etc. The government, state and county therefore jointly finance the work.

The law of Oregon specifies that the funds for county agent work shall be expended under the direct supervision of the Oregon Agricultural College. The responsibility for the success of the work in each county, therefore, rests largely with this institution.

In order that a county may avail itself of the services of a county agent it is only necessary, from the legal standpoint, that the county court make the necessary appropriation and request the Agricultural College to install and supervise the work. Experience has shown, however, that unless a consideable number of the farmers of the county understand the work and desire it, it is not advisable to introduce it. When the plan of the work and its value to a county are understood, the general experience in Oregon and the country at large is that farmers strongly favor it. In view of these facts, the following plan has been adopted for the introduction of work in counties in Oregon that do not have county agents:

Upon the receipt of a request from a sufficient number of individuals or organizations within a county to indicate an interest, the College, through the Extension Service, will cooperate with these individuals or organizations in carrying on a county-wide campaign of education regarding county-agent work. The local people of the county will be expected to arrange for a series of meetings at which the farmers of the community will be brought together. The College will provide a speaker for these meetings who will, at the same time, prepare explanatory articles for the newspapers of the county. If, after the work has been thoroughly explained in this manner, twenty-five per cent or more of the farmers of the county will request the work by petition and agree to aid in organization of an agricultural council to cooperate with the county agent, and provided further that the county court will make the appropriation, the College will then introduce and supervise county agent work in the county.

DAIRYING

EDWARD BLODGETT FITTS, Extension Specialist in Dairy Husbandry
WILLIS ARCHER BARR, Dairy Husbandman
FRANK WALTER KEHRLI, Dairy Husbandman

Extension Dairying carries throughout the State, and helps to put into effective use, information regarding all branches of the dairy industry, such as care and management of the herd, the rais-

ing of the calf, the construction of buildings, the breeding and feeding of cattle, the treatment of diseases, the care of milk and cream, and the manufacture of dairy products. Special emphasis and aid is given toward effecting dairy cooperative organizations, such as Cow Testing Associations, Breeders' Associations, Bull Associations, Farmers' Cooperative Creameries, Farmers' Cooperative Cheese Factories, and Farmers' Cooperative Cream Selling Agencies.

FARM MANAGEMENT DEMONSTRATIONS

HAROLD KEYES, Farm Management Demonstrator.

The purpose of the department of Farm Management Demonstration is to demonstrate to farmers, in connection with their own farms, a practical and efficient method of summarizing and analyzing a farm business as a means of measuring the profit or loss incurred in conducting it and of deciding upon readjustments that promise to increase its net income.

In a farm management demonstration the business of each farm in a community is analyzed from an economic standpoint and then compared with the others to determine some of the changes which should be made in its organization to make it more profitable.

HIGHWAY ENGINEERING

GORDON VERNON SKELTON, Extension Specialist in Highway Engineering

Extension Highway Engineering offers its assistance to the county courts, road officials, and citizens of the State generally in attaining a higher standard in road construction and maintenance.

Lectures and demonstrations are given before meetings of county road officials and citizens' organizations on construction and maintenance of all the ordinary types of roads in common use, including consideration of drainage, alignment, and approved methods of construction.

Personal examinations, laboratory tests, and reports on road building material are also features of the work done.

HOME ECONOMICS

ANNA MAE TURLEY, Extension Specialist in Home Economics

Home Economics Extension offers a means by which the homemakers of the State may call upon the College for assistance in solving their special problems. This work is planned, first, to meet the demand of Oregon women who are interested in all subjects related to the home and better living conditions; and second, to create a greater interest in these subjects concerning the vital problems, three of which are:

1. The food—selection, preparation, and use.
2. The house—its arrangement, decoration, and conveniences.
3. The clothing—methods of removing stains, simple tests for wool, cotton, linen, and silks, selection, preparation, and use.

HORTICULTURE

WALTER SHELDON BROWN, Extension Specialist in Horticulture

Extension Horticulture covers the whole subject of orchard operations including cultivation, pruning, spraying, thinning, harvesting and marketing, laying especial emphasis upon the vital question of reducing the cost of producing and handling fruits.

Small fruits and vegetables will have their share of attention and the improvement of the surroundings of our farm homes will be emphasized as a matter of great importance.

Imporvement in the quality of the exhibits of county and community fairs, better arrangements of such exhibits, and a clearer and more uniform method of classification of exhibits is a subject that will be given considerable attention.

Special emphasis will be laid upon two series of projects or farm schools—one for pruning and one for spraying. This work contemplates having the operations of pruning and spraying, under field conditions, performed by members of the classes enrolled under the direction of the Extension Horticulturist.

ORGANIZATION AND MARKETING

HECTOR MACPHERSON, Extension Specialist in Organization and Marketing.
GUILFORD LANSING HURD, Field Organizer

The Extension Service Bureau of Organization and Marketing takes up the investigation and marketing problems which are

confronting the farmers of the State. One man is in the field constantly, working with the farmers who are attempting, through organization, to better their conditions. Other members of the staff are sent out on definite organization projects, such as creamery and cheese factory organization, and the establishment of egg circles for the marketing of poultry products. It is the aim of this department to help farmers organizations to get started in such a way as to accomplish the most good with the lease possible risk and outlay.

Systematic instruction is being carried on through extension lectures and press bulletins, covering the whole field of marketing and rural credits.

POULTRY HUSBANDRY

CHARLES CHAUNCEY LAMB, Extension Specialist in Poultry Husbandry

Extension Poultry Husbandry involves all phases of the poultry industry as they should be applied on the farm.

The subjects, which are handled in the most practical way possible, are as follows: Breeds and Breeding; Feeding and Management of Growing Stock; Laying Hens and Market Fowls; Natural and Artificial Incubation and Brooding; and Care and Marketing of Poultry and Eggs.

PRESS SERVICE

CHARLES JARVIS McINTOSH, Editor Press Bulletin

The Extension press service assists in getting the valuable information developed by the research specialist out to the farms, factories, offices, homes, and schools where it is most needed. A printed bulletin containing more than a dozen brief news stories of seasonal information in popular language is sent each week to all newspapers and other periodicals of Oregon, and to a selected list of about four hundred publications in the Northwest and in other parts of North America. These stories remind farmers and other operators of the need of certain practice, and instruct them in the best methods of applying it. The department sends stenciled stories to all the dailies of the State once a week, a College News letter weekly to many of the leading metropolitan dailies of the United States, many specials to the newspapers in Portland as

well as other places in the State, and comprehensive articles of technical nature to hundreds of class publications. The department also supervises student special correspondence. Special announcements of field work are furnished newspapers of the communities visited by field specialists.

CORRESPONDENCE COURSES

The aim of the Extension Service of the Oregon Agricultural College in offering correspondence courses is to reach those who cannot be reached otherwise, but who are seeking special information along some line of work which can be taught through correspondence. Courses are offered only in such subjects as will prove of practical benefit to those who are working, or who are interested, in the special lines of work taken up.

It is assumed in most of the courses offered that the student has only a general acquaintance with the subject taken up and that he desires a practical working knowledge of it. Subjects, therefore, will be presented in simple and direct language.

The following courses are offered:

1. Farm Accounting
2. Rural Law
3. Rural Economics
4. Advertising and Selling
5. Cooperative Accounting and Management
6. Business Organization and Management
7. Business Management for Women
8. Business Law
9. Bookkeeping
10. Accounting
11. Farm Arithmetic
12. Gas Engines
13. Concrete Construction on the Farm
14. Shop Arithmetic
15. Shop Drawing
16. Electricity and Magnetism
17. Heat and Its Mechanical Transformation
18. Farm Irrigation Practices
19. Farm Drainage

Additional courses in other subjects will be added from time to time as demands are made for them.

General Information

Students may begin correspondence courses at any time during the year.

No preliminary examination is required for enrollment.

Students desiring to enroll in any courses offered, should fill out the attached application blank and return to the Extension Service, Oregon Agricultural College, Corvallis, Oregon, with remittance required for the course.

Upon receipt of the enrollment blank and the remittance, enough assignments will be sent to the student to enable him to begin his work and continue it without interruption. Whenever a recitation is submitted by the student, one or more assignments will be sent to him. In this way the student always has on hand sufficient material for study.

Accompanying each assignment is a set of recitation questions or exercises. After completing the study of an assignment the student is required to answer the recitation questions or to work out the exercises and send them to the instructor in charge of his work. The recitation or exercise will be carefully examined by his instructor; errors corrected; necessary explanation made; all questions answered; the paper graded and returned to the student.

Remittance for fees, text books, and notes should be made payable to Business Office, Oregon Agricultural College, and inclosed with application for the course.

The charges for the various courses are to defray, in part, the expense of providing texts, mimeographed notes, plates, postage or other material furnished, and in some cases the expense of an instructor where it is necessary for the instructor to meet with the class.

For specific information regarding correspondence courses write to the Extension Service for special circular.

ROSTER OF OFFICERS

and Non-Commissioned Officers, Military Department, O. A. C., 1915-16.

COMMANDANT OF CADETS

MAJOR U. G. McALEXANDER, Infantry, U. S. Army
Professor of Military Science and Tactics

ASSISTANT COMMANDANTS

Post Commissary Sergeant C. F. DUGGER, U. S. Army, Retired.
Regimental Sergeant Major DENIS HAYES, U. S. Army, Retired.

CADET OFFICERS, FIRST REGIMENT

Field and Staff

MARCUS F. HATHAWAY, Colonel.
FRANCES D. YEAGER, Lieutenant-Colonel.
KENNETH L. FOX, Captain and Adjutant.
MARTIN A. SCHREIBER, Captain and Quartermaster.
WALTER J. KOENIG, Captain and Commissary.

FIRST BATTALION

Field and Staff

Sereno E. Brett, Major
D. W. Minsinger, Lieut. & Adj.

Captains

Dale E. Richards "A"
Mahlon B. Gilbert "B"
John W. Green "C"
Edward C. Allworth "D"

Lieutenants

Paul H. Crouter "A"
Rodney Pearson "B"
Ira Mix "B"
R. B. McMinn "C"
F. C. Shepard "D"
L. Overholser "D"

SECOND BATTALION

Field and Staff

Leo L. Laythe, Major
Ivan H. Loughary, Lt. & Adj.
Jesse O. Turner, Lt. & Qr. Mr.

Captains

Thomas Lamoreaux "E"
Homer F. Aker "F"
Miles S. Johns "G"
Arnold J. Funk "H"

Lieutenants

Charles H. Roseman "E"
Richard J. Case "E"
John M. Hamilton "F"
E. J. Thompson "F"
Ralph P. Laird "G"
Will Boyer "H"
Armond Taylor "H"

THIRD BATTALION

Field and Staff

A. A. Amort, Major
S. N. Mayhew, Lieut. & Adjt.
F. F. Kan, Lieut. & Qr. Mr.

Captains

W. H. Gerke "I"
R. W. Burns "K"
E. H. Thompson "L"
B. B. Buchanan "M"

Lieutenants

A. L. Lindsay "I"
C. G. Walker "K"
H. A. Ballin "K"
R. L. Tweed "L"
L. E. Baldwin "M"
L. W. Seggel "M"

SECOND REGIMENT

Field and Staff

G. R. Hoerner, Lt. Col.
T. H. Soo, Lieut. & Adjt.

Captains

C. M. Hubbard "A"
G. E. Chambers "B"
R. L. West "C"
G. L. Kathan "D"

Lieutenants

P. W. Harvey "A"
A. W. Finch "A"
A. L. Lasswell "B"
B. Black "B"
H. B. Abraham "C"
N. E. Manock "C"
C. L. Strome "D"

CADET NON-COMMISSIONED STAFF

D. P. Spalding, Regimental Sergeant Major
J. H. Whitby, Regimental Quarter Master Sergeant
F. W. Walton, Regimental Comsy. Sergeant
L. D. Yates, Color Sergeant
P. B. Hofer, Color Sergeant
P. A. Currey, Sergeant, 1st Class, H. C.
A. C. Lascar, Ordnance Sergeant
E. H. Boone, Sergeant Major, 1st Battalion
P. H. Sessions, Sergeant Major, 2d Battalion
C. H. Waterfall, Sergeant Major, 3d Battalion
F. T. Murphy, Sergeant Major, 2d Regiment
J. Hayes, Chief Trumpeter

NON-COMMISSIONED OFFICERS

Band, 1st Regiment

J. Nash, Chief Musician
F. A. Holmes, Prin. Musician
S. W. Tulley, Drum Major

Company "A"

Sergeants
R. Aker
R. Kenton
W. Luxton
H. Von Lehe

Corporals
D. S. Felton
W. H. H. Keen
P. W. Martin
H. C. Richter
D. W. Richter
O. H. Schrepel
L. M. Stark
G. S. Vincent

Sergeants
A. D. Hurley (1st)
R. G. Otis
E. W. Bartruff
M. Harris

Corporals
W. F. Miller
G. L. Mickel
J. Wilson
M. Van Buskirk
W. S. Carpenter
E. E. Garbutt

Company "L"
Sergeants
R. J. Werner (1st)
H. V. Levage
C. J. Pimm
H. M. Reynolds

Corporals
W. M. Bellinger
V. Firestone
E. F. McCornack
J. B. Wilson

Company "M"
Sergeants
O. A. Mulkey (1st)
D. E. Bullis
C. W. Meyers
R. L. Morgan
L. K. Jones

Corporals
D. I. Bates
B. E. Lee
E. D. Porter
L. D. Rice
W. Wilkins

Company "A" 2d Rt.
Sergeants
C. L. Stidd (1st)
H. Blackwell
C. C. Green
H. W. Kruger
A. G. Sieberts

Corporals
F. H. Crane
G. B. Somers
J. M. Underwood
W. H. Gordon
A. Woodcock

Company "B" 2d Rt.
Sergeants
W. Riippa (1st)
R. M. Wilcox
W. S. Averill
D. V. Green
C. S. Sodhi

Corporals
R. O. Coleman
K. C. Conyers
J. R. Brooke
L. F. VanNorden

Company "C" 2d Rt.
Sergeants
R. A. Parrish (1st)
R. L. Houck
J. E. Dickerson
J. L. Turnbull
H. A. Long

Corporals
E. Englund
V. I. Basler
T. P. Cramer
F. Mudge

Company "D" 2d Rt.
Sergeants
W. L. Kadderly (1st)
P. E. Doty
C. A. Fertig
H. H. Hilton
R. C. Babbitt

Corporals
G. H. Letelier
T. J. Lowe
J. D. McKay
K. Rowntree

Company "B"

Sergeants
- W. H. Ball (1st)
- F. W. Hoover
- C. G. Tanner
- J. A. Crawford
- E. E. Grubbe

Corporals
- L. W. Coleman
- G. W. Carpenter
- J. O. Bettis
- H. W. Thayer
- A. V. Vierhus

Company "C"

Sergeants
- C. L. Meyers (1st)
- D. C. Mosby
- N. S. Lance
- J. A. Hooper
- L. L. Branthoover

Corporals
- O. H. Hampton
- E. G. Brown
- L. N. Lindeman
- L. P. Mitchell
- L. K. Couch

Company "D"

Sergeants
- A. G. Skelton (1st)
- H. C. Patton
- D. Friedman
- I. J. Wolf
- H. F. Thomas

Corporals
- A. H. Amis
- A. O. Meier
- H. P. Ebinger
- G. Corey
- R. Bissell

Company "E"

Sergeants
- E. H. Miller (1st)
- W. Anderson
- A. Ferguson
- E. M. Rand
- C. W. Werth

Corporals
- D. M. Burleigh
- F. S. Cramer
- F. P. Meyers
- R. Paroni
- A. R. Philippi

Company "F"

Sergeants
- N. C. Carnie (1st)
- H. Selby
- F. S. Metzger
- E. Dunn
- C. Wilkes

Corporals
- G. L. Jessup
- A. O. Leech
- J. R. Croswhite
- F. M. Curry
- G. S. Strome

Company "G"

Sergeants
- W. B. Arens (1st)
- J. H. Edwards
- C. S. Johnson
- C. S. Johnson
- W. B. Tilley

Corporals
- E. T. Gammon
- L. Happold
- B. T. McMinn
- S. H. Myers
- J. E. Thrailkill

Company "H"

Sergeants
- L. A. Lamoreaux (1st)
- G. Gragg
- R. Throne
- H. W. Turner
- J. E. Simpson

Corporals
- D. S. Frame
- H. C. Rogers
- C. C. Larson
- F. A. Hayes
- P. T. Fortner

Company "I"

Sergeants
- W. A. Bailey (1st)
- W. Andrews
- F. P. Cronemiller
- G. W. Vilas
- B. F. Rush

Corporals
- N. W. Reese
- S. W. Caldwell
- C. Atwood
- R. J. King
- L. R. Guthrie

Company "K"

Sergeants
- F. B. Brown (1st)
- J. C. Boone
- A. L. Lowell
- L. B. Moore
- L. M. Johnson

Corporals
- A. T. Anderson
- J. C. Chapman
- L. T. Chellis
- E. Hatton
- A. W. Oliver

CATALOGUE OF STUDENTS

(The following abbreviations are used to indicate the course in which the student is registered and the classification within the course: Agri., Agriculture; C. E., Civil Engineering; Com., Commerce; H. E., Home Economics; E. E., Electrical Engineering; For., Forestry; L. E., Logging Engineering; Hi. E., Highway Engineering; I. E., Irrigation Engineering; I. A., Industrial Arts; M. A., Mechanic Arts; M. E., Mechanical Engineering; Min., Mining Engineering; Phar. Pharmacy; Fr., Freshman; Soph., Sophomore; Jr., Junior; Sr., Senior; F. Yr., First Year; S. Yr., Second Year; T. Yr., Third Year; Voc., Vocational; Opt., Optional; Spec., Special.)

GRADUATE STUDENTS

Name	Course	Home Address
Alcorn, James Marcus (Oregon Agricultural College)	Agri.	Corvallis
Anderson, Edmund Gill (Oregon Agricultural College)	L. E.	Albany
Andrews, Alan (Oregon Agricultural College)	Hi. E.	Medford
Archbold, Alston Conway (Oregon Agricultural College)	I. A.	Hillsboro
Beck, James Obye (Oregon Agricultural College)	Agri.	Boise, Idaho
Bixby, Clarence Milton (Oregon Agricultural College)	Agri.	Freewater
Bowerman, Mrs. Elizabeth (Oregon Agricultural College)	H. E.	Fossil
Carson, Walter (Oregon Agricultural College)	Hi. E.	Hermiston
Chandler, Mrs. Belle (University of California)	Agri.	Corvallis
Corl, Leland David (Oregon Agricultural College)	M. E.	Corvallis
Cunning, Jennie (Oregon Agricultural College)	H. E.	Baker
Currin, Linnie Edith (Oregon Agricultural College)	H. E.	Corvallis
Davolt, Claude (Oregon Agricultural College)	Hi. E.	Kelso, Wash.
Dinges, Grace May (Oregon Agricultural College)	H. E.	Corvallis
Elmer, Otto Herman (Oregon Agricultural College)	Agri.	Corvallis
Gates, Fred Herbert (Stanford University)	Agri.	South Pasadena, Calif.
Gilbert, Henry (Oregon Agricultural College)	Agri.	Salem

Name.	Course.	Rank.	Home Address.
Goble, Ray Elbert (Oregon Agricultural College)	Agri.	.....	Ferndale, Calif.
Hanson, Margaret May (Oregon Agricultural College)	Opt.	.....	Corvallis
Hardman, George (Oregon Agricultural College)	Agri.	.....	Ontario
Hobgood, Guy (Oregon Agricultural College)	Agri.	.....	Madisonville, Ky.
Johnston, Jane Agnes (Oregon Agricultural College)	H. E.	.....	Corvallis
Kung, Anching (Cambridge, England)	Agri.	.....	Shanghi,, China
Lamb, John (Mississippi Agricultural College)	Agri.	.....	Brookhaven, Miss.
Mann, James Brownell (Oregon Agricultural College)	Hi. E.	.....	Portland
McCormick, Andrew (Oregon Agricultural College)	Agri.	.....	Lebanon
McFarlane, Mrs. Mary Whiting (University of Wyoming)	H. E.	.....	Corvallis
McGee, George Jose (Pennsylvania State College)	Hi. E.	.....	Corvallis
Magness, John Robert (Oregon Agricultural College)	Agri.	.....	Amity
Morgan, Carl (Washington State College)	Agri.	.....	Davenport, Wash.
Myers, Nellie (University of Idaho)	H. E.	.....	Caldwell, Idaho
Nixon, Clara (Oregon Agricultural College)	Agri.	.....	Trumansburg, N. Y.
Oakes, Charles (Oregon Agricultural College)	E. E.	.....	Corvallis
Odeen, Henry (Oregon Agricultural College)	Min.	.....	Portland
Pavey, Ralph Madison (Ohio State College)	Agri.	.....	Columbus, Ohio
Peaslee, Willis Dhu Aine (Stanford University)	E. E.	.....	Portland
Philip, Guy Lockhart (Cornell University)	Agri.	.....	Mt. Lebanon, Pa.
Reeves, Orvill Greenleaf (Oregon Agricultural College)	L. A.	.....	Corvallis
Ruth, Charles Curtis (Valparaiso University)	Agri.	.....	Corvallis
Schoth, Harry August (Oregon Agricultural College)	Agri.	.....	Oregon City
Schrepel, Minnie Anna (University of Minnesota)	H. E.	.....	Corvallis

Name.	Course.	Rank.	Home Address.
Schuster, Carl Ephraim (Oregon Agricultural College)	Agri.		Corvallis
Shattuck, Obil (Oregon Agricultural College)	Agri.		Klamath Falls
Siefert, Herbert William (Oregon Agricultural College)	Agri.		Pasadena, Calif.
Strain, Clayton (Oregon Agricultural College)	Opt.		Pendleton
Thayer, Darwin Greene (Oregon Agricultural College)	I. A.		Corvallis
Van Gundia, Gordon Keller (Oregon Agricultural College)	Agri.		Sycamore, Ohio
White, Samuel K. (Iowa State College)	Agri.		Corvallis
Williamson, Charles (Oregon Agricultural College)	Opt.		Corvallis
Wight, Howard Marshall (Bates College)	Agri.		North Budgton
Yeager, Albert Franklin (Kansas State Agricultural College)	Agri.		Bazaar, Kansas

UNDERGRADUATE STUDENTS

Name.	Course.	Rank.	Home Address.
Abbott, Christine Gordon	H. E.	Fr.	Roseburg
Abraham, Herman	Agr.	Sr.	Albany
Abraham, Marie Amelia	Com.	S. Yr.	Corvallis
Acheson, Gertrude	H. E.	Sr.	Portland
Acree, Louis Carlton	Agri.	Spec.	Alton, Missouri
Adams, Belva Lee	Agri.	Fr.	Corvallis
Agosti, Alfred Peter	Hi. E.	Fr.	Portland
Ahern, Merrie Ierne	H. E.	Sr.	Hugo
Ahlson, Charles Boone	Agri.	Fr.	Hillsdale
Aker, Homer Ferris	Agri.	Sr.	Chula Vista, Calif.
Akers, Robert	Agri.	Jr.	Portland
Albus, Fred Henry	Phar.	S. Yr.	Aumsville
Alcorn, William Vernon	Min.	Fr.	Corvallis
Alder, William John	Com.	F. Yr.	Victoria, B. C.
Alderman, Clifford	Min.	Fr.	McMinnville
Alexander, George Maxfield	Agri.	Fr.	Salem
Allen, Alex John	Agri.	Fr.	Dundee
Allen, Ethel	H. E.	Sr.	Corvallis
Allen, Fred John	Min.	Jr.	Portland
Allen, Mrs. Hattie	Com.	Spec.	Corvallis
Allen, Loyal Rupert	Min.	Fr.	Tigard
Allen, Martin Hopkins	Agri.	Soph.	Salem, Ohio
Allingham, William David	I. A.	Sr.	Corvallis
Allworth, Edward	Com.	Sr.	Crawford
Alpi, Rudolph Bill	M. A.	F. Yr.	Altadena, Calif.
Alverson, Calvin	Agri.	Voc.	La Conner, Wash.
Amerige, Violette Anna	Opt.	Soph.	Westboro, Mass.
Amis, Albert Hope	Agri.	Soph.	Los Angeles, Calif.
Amort, Albert Alexander	C. E.	Sr.	Corvallis
Amort, Paul Francis	I. A.	Sr.	Corvallis
Anawalt, Clinton La Verne	Agri.	Fr.	Jordan Valley
Anderson, Albert Thomas	L. E.	Spec.	Astoria
Anderson, Esther Anna	H. E.	Voc.	Dallas
Anderson, Henry	E. E.	Spec.	Aberdeen, Wash.
Anderson, Otto Ervin	Agri.	Voc.	Ilwaco, Wash.
Anderson, William	C. E.	Jr.	Portland
Anderton, Edwin Caldwell	Agri.	Fr.	Council Bluffs, Iowa
Andrews, Winfield	Agri.	Jr.	San Luis Obispo, Calif.
Antonsen, Charles Homer	Agri.	Fr.	Vergas, Minn.
Archibald, Harold Gilbert	For.	Sr.	Albany
Arens, Winfield Bernard	Com.	Jr.	New York City, N. Y.
Armitstead, Amy Isabella	H. E.	Fr.	Portland
Armstrong, Fay	Opt.		Corvallis
Armstrong, Jessie	Opt.		Jefferson
Arnold, Marjorie	H. E.	Fr.	Portland
Asbahr, Katherine	H. E.	Soph.	Cornelius

Name.	Course.	Rank.	Home Address.
Atwood, Cyrus Leslie	Com.	Soph.	Corvallis
Atwood, Elmina Gladys	H. E.	Sr.	Corvallis
Atwood, Ralph Guile	Agri.	Jr.	Corvallis
Ault, Byrd Moore	Agri.	Sr.	Enterprise
Austin, Helen May	H. E.	Sr.	Aberdeen, Wash.
Auterson, Jane Elizabeth	H. E.	Fr.	Portland
Averill, William Samuel	Agri.	Jr.	Corvallis
Avery, Ruth Anna	H. E.	Spec.	Klamath Falls
Axtell, Edward Goodchild	Agri.	Jr.	Corvallis
Babbitt, Richard Carrick	Phar.	Jr.	Corvallis
Bailey, Lucile	H. E.	Spec.	Lakeview
Bailey, Willis Arthur	Agri.	Jr.	Nicolet Falls, Quebec
Bair, Ray Elmer	Agri.	Fr.	Fossil
Bajpai, Ram Lal	Agri.	Fr.	Nagpur, India
Baldwin, Frank Timmons	Agri.	Sr.	Bakersfield, Calif.
Baldwin, James Daniel	Agri.	Soph.	Blue Lake, Calif.
Baldwin, Lee Ernest	Phar.	Sr.	Winlock, Wash.
Ball, Harold	Agri.	Soph.	National City, Calif.
Ball, Waldo Whitney	Phar.	Spec.	Corvallis
Ball, Wilbur Herbert	M. E.	Jr.	Portland
Ballard, Frank Llewellyn	Agri.	Sr.	Meredith, N. H.
Ballin, Herbert August	Agri.	Sr.	Portland
Bannister, Edna Mary	H. E.	Sr.	Weston
Banta, Glenn	Agri.	Soph.	Selah, Wash.
Barber, Lucile	Com.	Spec.	Ashland
Barber, Roy	Min.	Fr.	Salem
Barker, Clifford Dudley	Phar.	Spec.	Roseburg
Barden, Una Marguerite	H. E.	Sr.	Helena, Mont.
Barklow, Ervin Earl	Agri.	Fr.	Norway
Barnes, Cecile Frances	H. E.	Voc.	Goldendale, Wash.
Barnes, Clay Aaron	Agri.	Sr.	Goldendale, Wash.
Barnes, Dewitt Leonard	Com.	Spec.	Goldendale, Wash.
Baron, Joseph Philip	Agri.	Fr.	Linne, Calif.
Barratt, Marjorie Marian	H. E.	Fr.	Portland
Barrett, Gerald Joseph	Min.	Fr.	Portland
Bartholomew, Hazel	H. E.	Voc.	Corvallis
Bartruff, Elmer Walter	Agri.	Jr.	Salem
Bartu, Frank	M. E.	Jr.	Crabtree
Barzee, Pearl Faye	Com.	Jr.	Corvallis
Basler, Vernon	Agri.	Soph.	Grants Pass
Bassett, Florence Kinsey	Com.	Fr.	Newberg
Bassett, Olive Pauline	H. E.	Sr.	Newberg
Bates, Douglas	E. E.	Soph.	Portland
Bates, Floyd Everett	Agri.	Fr.	Salem
Bath, Gerald	Com.	Spec.	Tacoma, Wash.
Baum, Francis Hutchins	Agri.	Fr.	Portland
Baum, Olin Huntington	Agri.	Sr.	Portland
Bayliss, Edwin John Charles	Agri.	Jr.	Carlton

Name.	Course.	Rank.	Home Address.
Bayliss, John Clifford	Phar.	S. Yr.	Myrtle Creek
Bayley, Ewart Gladstone	Agri.	Voc.	Toowoomba, Australia
Bayley, Ralph Olaf	Agri.	Jr.	Pittsworth, Australia
Beals, Agnes	H. E.	Sr.	Corvallis
Beardsley, Florence Ellen	Opt.		Corvallis
Beard, Edward Arthur	M. E.	Soph.	Astoria
Beatie, Charles Fountain	Min.	Fr.	Oregon City
Bechen, Carl George	Agri.	Fr.	Hillsboro
Bechen, Ella	Com.	Fr.	Hillsboro
Bechen, Martha Henrietta	H. E.	Soph.	Hillsboro
Beck, Ralph	Agri.	Fr.	Corvallis
Becker, Abraham Frank	Phar.	Spec.	Independence
Beers, Ruby Evangeline	H. E.	Jr.	Corvallis
Behnke, Olive Greene	H. E.	Sr.	Florence
Belknap, Queen Inez	Opt.		Corvallis
Bellinger, Gordon Vanheuran	For.	Soph.	Moscow, Idaho
Bellinger, Wilbur Moore	Agri.	Fr.	Moscow, Idaho
Bellows, Harold Clinton	Com.	Fr.	Roseburg
Bendler, Georgina Bertha	H. E.	Fr.	Cornelius
Benham, Frank Norman	Agri.	Soph.	Seattle, Wash.
Bennett, Arthur Aldrich	M. E.	Sr.	Dallas
Bennett, Cecil Howard	E. E.	Soph.	Rainier
Benson, Robert Rowe	Agri.	Voc,	Pasadena, Calif.
Berchtold, Florence Ernestine	H. E.	Fr.	Corvallis
Bernard, Ruth	Opt.		Lakeview
Bernstein, Salome Solis-Cohen	H. E.	Sr.	Portland
Bettis, James Oliver	Agri.	Soph.	Portland
Berven, Edmund Sigurd	Min.	Soph.	Corvallis
Betts, Fred	Agri.	Spec.	Weiser
Biesen, Valeska	H. E.	Voc.	Portland
Billie, Brewer Astor	For.	Spec.	Astoria
Binswanger, Alvin Otto	Agri.	Sr.	Portland
Birch, Gracia Delle	H. E.	Soph.	Corvallis
Bishop, Leon N	Min.	Fr.	Halsey
Bissell, Rex Ide	M. A.	S. Yr.	Yreka, Calif.
Bissell, Ross Elder	Hi. E.	Soph.	Yreka, Calif.
Bissett, Lee Henry	Agri.	Soph.	Helio
Bixby, Clarence Wilson	Com.	Soph.	Paulina
Black, Kathleen	H. E.	Fr.	Medford
Black, Burr	Agri.	Sr.	Corvallis
Black, Mildred	H. E.	Jr.	Corvallis
Black, William Merle	Agri.	Spec.	Medford
Blackwell, Harlie Allen	M. E.	Spec.	Corvallis
Blagg, Henry	E. E.	Jr.	Juneau, Alaska
Blake, Ruth Lucille	Opt.	Jr.	Hood River
Blakely, Cecil Grant	Com.		Portland
Blakely, Edward	Phar.	Jr.	Dixonville
Blakely, Lloyd Herbert	I. A.	F. Yr.	Stayton

Name.	Course.	Rank.	Home Address.
Blakely, Violet Rose	Com.	Jr.	Corvallis
Boardman, Claire Christine	H. E.	Spec.	Corvallis
Bodine, Roger Campbell	For.	Voc.	Dixonville
Bogard, Troy	Agri.	Fr.	Pasadena, Calif.
Boggess, John Willis	M. E.	Soph.	Woodburn
Boies, Etta Philippi	H. E.	Fr.	Veneta
Boldenweck, Louis Charles	Agri.	Sr.	Corvallis
Bolin, Frank Gerold	Agri.	Voc.	Portland
Bond, Ruel	Agri.	Fr.	Corvallis
Bones, John W	C. E.	Jr.	Carlton
Bonner, George	Agri.	Fr.	London, England
Bonner, Joe Henry	M. E.	Fr.	Corvallis
Boone, Earl	M. E.	Jr.	Toledo, Wash.
Boone, John Carlyle	M. E.	Jr.	Toledo, Wash.
Boon, Walter William	Agri.	Soph.	Portland
Boquist, Alfred	Agri.	Fr.	Tillamook
Bower, Hazel Harriet	Opt.		Corvallis
Boss, Reuben	Agri.	Fr.	Corvallis
Bowes, Mary Jane	Com.	Voc.	Aberdeen, Wash.
Boyer, Will	Min.	Sr.	Portland
Bracons, Enola	H. E.	Fr.	Portland
Bracons, Josephine	H. E.	Sr.	Portland
Bragg, Clarence Harvey	Agri.	Fr.	Corvallis
Bragg, Harry Leon	Com.	F. Yr.	Corvallis
Brandes, Alan Carl	Min.	Fr.	Portland
Brandes, Irene	H. E.	Sr.	Portland
Branland, Verner Carl	Com.	Spec.	Colton
Branstetter, Myrtle Esther	Phar.	F. Yr.	Echo
Branthoover, Lester Lee	Com.	Jr.	Payette, Idaho
Bravinder, Ray Ross	Agri.	Spec.	Portland
Breithaupt, Alva	Agri.	Fr.	Portland
Brennan, Andrew Frank	For.	Fr.	Boise, Idaho
Brett, Sereno Elmer	For.	Sr.	Portland
Brewer, Grace Marie	H. E.	Sr.	Portland
Briggs, Merle	Agri.	Fr.	La Grande
Briggs, William Louis	Agri.	Voc.	Hilgard
Brogden, Cecil	H. E.	Soph.	Hillsboro
Brooke, John Rutter	Min.	Soph.	Vancouver, Wash.
Brownell, Dorothy Southwick	H. E.	Sr.	Portland
Brown, Donald Edgar	Agri.	Sr.	Oregon City
Brown Edward Guy	Com.	Spec.	New York City, N. Y.
Brown, Francis Bolden	Agri.	Jr.	Crystal
Brown, Lark Olaf	H. E.	Soph.	Warrenton
Brown, Waldo Frank	Agri.	Fr.	New Era
Brown, Walter Daniel	Agri.	Fr.	Medford
Brown, Zoe Agnes	H. E.	Sr.	Seaside
Bruhn, Jack Mortimer	Agri.	Fr.	Portland
Bruhn, Rosa Minnie	H. E.	Spec.	Dayton

Name.	Course.	Rank.	Home Address.
Bryant, Claude Hale	Agri.	Jr.	Gaston
Buchanan, Bayard	Hi. E.	Sr.	Roseburg
Budelier, Clarence Joseph	L. E.	Jr.	Rock Island, Ill.
Bullis, Deloss Everett	E. E.	Jr.	Payette
Burleigh, Donald Miller	M. E.	Soph.	Redmond
Burley, Stephen Brace	Com.	F. Yr.	La Grande
Burnell, Ina Ruth	H. E.	Sr.	Claremont, Calif.
Burns, John Richard	Min.	Jr.	Portland
Burns, Ralph Wilson	Agri.	Sr.	Glendive, Mont.
Burnside, Julian Bates	Agri.	Fr.	Seattle, Wash.
Bush, Carl Lee	Agri.	Fr.	Hoskins
Bush, Zetta Zeretta	H. E.	Fr.	Hoskins
Butt, Ralph	Com.	Soph.	Newberg
Byers, Oscar	For.	Soph.	Portland
Cady, Allen	Com.	Fr.	Corvallis
Cain, Grace Iva	Opt.		Corvallis
Caldwell, Alice Marie	H. E.	Voc.	Bend
Caldwell, Ruth Florence	H. E.	Fr.	Bend
Caldwell, Wally	Hi. E.	Soph.	San Dimas, Calif.
Calkins, Claude Clark	Agri.	Jr.	Airlie
Campbell, Cora Alice	Com.	Spec.	Roseburg
Campbell, Donald Neil	Com.	Fr.	Portland
Campbell, Fannie Marie	Com.	Spec.	Roseburg
Carley, Marguerite	H. E.	Soph.	Montpelier, N. D.
Carlson, Ruth	Com.	Sr.	Portland
Carnie, Norval Craigie	Agri.	Jr.	Chicago, Ill.
Carpenter, Eugene Johnson	Agri.	Sr.	Ashland
Carpenter, George Washington	M. E.	Soph.	Washougal, Wash.
Carpenter, Walter Squire	Agri.	Soph.	Ashland
Carroll, Rebecca Maurine	H. E.	Sr.	Harrisburg
Carswell, John William	Min.	Fr.	Roseburg
Carter, Claire Mary	H. E.	Fr.	Aberdeen, Wash.
Carter, Hallie Lenore	H. E.	Jr.	Eugene
Cary, Carl Verne	Agri.	Spec.	Corvallis
Case, Mary	H. E.	Fr.	Kalama, Wash.
Case, Russell Jeffery	Agri.	Sr.	Vancouver, Wash.
Case, Ruth E.	Opt.		Kalama, Wash.
Case, Theodore Dwight	Agri.	Soph.	Klamath Falls
Casebeer, Mae	H. E.	Spec.	Bly
Casey, John Michael	L. E.	Fr.	Portland
Casper, Elsie Beaulah	H. E.	Sr.	Union
Casteel, Drusilla	H. E.	Soph.	Eugene
Castle, Carrie Ethel	H. E.	Spec.	Wauseon, Ohio
Cavender, Alberta	H. E.	Sr.	Portland
Catherwood, Edith	Com.	Fr.	Dallas
Chambers, Dorothy	H. E.	Fr.	Newberg
Chambers, George Frederick	Min.	Sr.	Newberg
Champlin, Lydia Woodward	H. E.	Sr.	Tacoma, Wash.

Name.	Course.	Rank.	Home Address.
Chapman, Eearl Hoyting	For.	Fr.	Rivera, Calif.
Chapman, John Cecil	Min.	Soph.	Sheridan
Chase, Elmo Bary	Agri.	Fr.	Eugene
Chellis, Lawrence True	I. A.	Soph.	Astoria
Christensen, Hazel Marie	H. E.	Fr.	Portland
Christensen, Henry Noris	Agri.	Fr.	Portland
Churchill, Leigh Howard	Agri.	Soph.	Corvallis
Churchman, Tressa	Com.	Soph.	Corvallis
Churchwright, Clara	Opt.		Astoria
Clancy, James Patrick	L. E.	Soph.	Woodland, Wash.
Clark, Cedric William	Com.	Spec.	Canyon City
Clark, Doris Aileen	H. E.	Soph.	Portland
Clark, Frank Lewis	Agri.	Spec.	Portland
Clark, James Holbert	Agri.	Soph.	Mattoon, Ill.
Clark, Ola LaMoine	H. E.	Jr.	Salem
Clarke, William Victor	Agri.	Jr.	Laytonville, Calif.
Clock, Audrey	Com.	Jr.	The Dalles
Close, Wilbur Lawrence	Agri.	Spec.	Corvallis
Coe, Earl Alphonso	Agri.	Soph.	Portland
Coffey, Jay Russell	Agri.	Spec.	Corvallis
Coffey, Wilson Bryan	Agri.	Fr.	Portland
Cohen, Benjamin Bernard	Agri.	Sr.	Portland
Cole, Harry Julius	Com.	Soph.	Emporia, Kansas
Coleman, Lloyd Wilbur	Agri.	Soph.	Berkeley, Calif.
Coleman, Ralph Orval	Agri.	Soph.	Newport
Collins, Robert	Agri.	Spec.	Portland
Coman, Ellis Seymour	For.	Fr.	Covina, Calif.
Cone, Earl Trumman	Com.	S. Yr.	Donald
Connell, Arthur Wood	Agri.	Fr.	Hillsboro
Conner, Edna Clara	H. E.	Jr.	Sheridan
Conner, Evangeline	Com.	Spec.	Corvallis
Constable, Ora Elizabeth	H. E.	Fr.	Salem
Conyers, Kit Carson	Com.	Soph.	Clatskanie
Cooley, Florence Mable	Phar.	Sr.	Junction City
Cooley, Inez	Phar.	Sr.	Junction City
Cooper, Altha Opal	Com.	Fr.	Corvallis
Cooper, Howard Laraway	M. E.	Fr.	Hood River
Cooper, Howard Wesley	E. E.	Soph.	Milwaukie
Corey, Glen	E. E.	Soph.	Hood River
Corl, Frances Helen	H. E.	Sr.	Corvallis
Cornell, Edna Frances	H. E.	Sr.	Grants Pass
Cornwall, Alice Ellen	H. E.	Jr.	Portland
Corum, Curtis Lee	Min.	Soph.	The Dalles
Cory, William McKinley	Agri.	Fr.	Etna Mills, Calif.
Couch, Leo King	Agri.	Soph.	Wallowa
Couch, Roy	Agri.	Soph.	La Grande
Counts, Wilda	H. E.	Soph.	Grants Pass
Cowley, John Farnum	Min.	Fr.	Central Point

Name.	Course.	Rank.	Home Address.
Cox, Mrs. Gertrude Cleveland	Com.	Spec.	Corvallis
Crain. William Wallace	Agri.	Sr.	Biggs, Calif.
Cramer, Floyd Samuel	M. E.	Fr.	Corvallis
Cramer, Theodore Putnam	Com.	Soph.	Grants Pass
Crane, Jr., Fred Hovey	Agri.	Soph.	Fairview
Craven, Clair Glen	Agri.	Voc.	Meda
Crawford, Eda Maude	H. E.	Spec.	The Dalles
Crawford, Hugh Herman	Agri.	Soph.	San Dimas, Calif.
Crawford, James Arthur	L. E.	Spec.	Burlington, Iowa
Creighton, Leland David	M. E.	Sr.	Portland
Crittenden, Marjorie Elizabeth	H. E.	Fr.	Portland
Cronemiller, Fred Parks	For.	Jr.	Lakeview
Croswhite, John Raymond	Agri.	Soph.	Corvallis
Crout, Mildred	H. E.	Soph.	Portland
Crouter, Paul Henry	Agri.	Sr.	Union
Crum, McKinley	Agri.	Spec.	Olex
Cummings, Wilson	Agri.	Voc.	Los Angeles, Calif.
Cunning, William	Agri.	Soph.	Baker
Cunningham, Bessie Alta	Com.	Fr.	Woodburn
Curl, Cecil Charles	Agri.	Fr.	Pendleton
Currey, Joseph Edmond	Agri.	Sr.	Olympia
Currey, Pinney Alfred	Phar.	Spec.	Baker
Currin, Mary Edith	H. E.	Jr.	Heppner
Curry, Fred Martin	Phar.	Soph.	Albany
Cyrus, William Fletcher	Agri.	Fr.	Corvallis
Dadmun, Orin	Hi. E.	Fr.	Independence
Dalgity, James Weston	M. A.	S. Yr.	Wrangell, Alaska
Dallas, Earle Wesley	Agri.	Fr.	Corvallis
Damon, Robert Elbridge	Agri.	Soph.	Ferndale, Calif.
Damon, Ruth Columbia	H. E.	Jr.	Corvallis
Daniel, Clarence	E. E.	Fr.	Monmouth
Daniells, Hugh Orrin	Agri.	Fr.	Coeur d' Alene, Idaho
Darby, Una	H. E.	Fr.	Silverton
Darling, Lois Winnifred	H. E.	Spec.	Corvallis
Darling, Ruth Jessie	Opt.		Corvallis
Davidson, Harold Argus	Agri.	Soph.	Meridian, Idaho
Davidson, Leffie Florence	H. E.	Sr.	Portland
Davidson, Robert Herschel	Agri.	Sr.	Meridian, Idaho
Davis, Charles Elwyn	Agri.	Sr.	Union
Davis, Edgar Willis	For.	Fr.	Corvallis
Davis, LaNoel Bernard	Min.	Fr.	Salem
Davis, Mabelle Josephine	H. E.	Jr.	Corvallis
Davis, Merton	Agri.	Spec.	Union
Davis, Percy Everett	Agri.	Soph.	Albany
Davisson, Frances Louise	H. E.	Fr.	Central Point
Dearmin, Lillian Gertrude	Com.	Spec.	Baker
DeLosh, Beaumont Thomas	Com.	Soph.	Aberdeen, Wash.
Dement, Harry George	Com.	Soph.	Myrtle Point

Name.	Course.	Rank.	Home Address.
Denniston, Laneta	H. E.	Soph.	McMinnville
Detering, William	Min.	Fr.	Portland
DeWitt, Charles	Agri.	Soph.	Portland
Dickerson, Jesse Earl	Agri.	Jr.	Parma, Idaho
Dickinson, Leroy Foster	For.	Fr.	Castle Rock, Wash.
Ding, Edward Ralph	Agri.	Fr.	Portland
Ding, Frank Gow	E. E.	Fr.	Portland
Dodge, Mrs. Elizabeth Folger	H. E.	Spec.	Medford
Doerner, Armin Meredith	Agri.	Sr.	Denver, Colo.
Donahue, Kathryn Rose	H. E.	Voc.	Scio
Doolittle, George	Min.	Fr.	Corvallis
Doolittle, Harold VanRensselaer	Agri.	Sr.	Pomona, Calif.
Doolittle, Maida Laura	H. E.	Sr.	Corvallis
Dopp, Eugene	I. E.	Fr.	Forest Grove
Dorman, James	Agri.	Spec.	Corvallis
Dorris, Zed	Agri.	Soph.	Central Point
Doty, Paul Edward	Agri.	Jr.	Pasadena, Calif.
Dougherty, Helen Frances	H. E.	Soph.	Baker
Douglas, Earle	Phar.	Fr.	Grants Pass
Douglas, Olin Eugene	Phar.	Jr.	Grants Pass
Doukas, Samuel James	E. E.	Fr.	Prince Rupert, B. C.
Down, John Rosco	M. E.	Fr.	Joseph
Downs, Addie Isabella	Phar.	Sr.	Canby
Dryden, Winfield Joseph	Agri.	Fr.	Corvallis
Dufall, Esther Frances	H. E.	Fr.	Tacoma, Wash.
Duncan, Ernest Earl	Min.	Fr.	Albany
Duniway, Robert Edward	M. E.	Fr.	Portland
Dunn, Edwin	Agri.	Jr.	Ashland
Dunn, Mary	Phar.	F. Yr.	Sumpter
Dunning, Eva Marinda	H. E.	Fr.	Stanfield
Dunning, Marilla Carrie	H. E.	Fr.	Stanfield
Du Rette, Cecil	M. A.	S. Yr.	Gervais
Dutton, George Lawrence	Agri.	Fr.	Concordia
Dye, Charlotte Evangeline	H. E.	Fr.	Oregon City
Dye, Everett Willoughby	M. E.	Soph.	Oregon City
Dyson, Lizzie	H. E.	Soph.	Dahlia, Wash.
Eakin, John Jack	Agri.	Fr.	Rickreall
Eames, DeLin	M. A.	S. Yr.	Cordova, Alaska
Eastman, Eugene Harold	Min.	Spec.	Portland
Eaton, Frances	H. E.	Fr.	Independence
Ebinger, Harvey	Phar.	S. Yr.	Tillamook
Eckley, Winfield	E. E.	Sr.	La Grande
Edwards, Hermon	E. E.	Fr.	Monroe
Edwards, James Homer	Agri.	Jr.	Monroe
Egan, Homer William	Agri.	Spec.	Gervais
Ellestad, Melven Herman	M. A.	T. Yr.	Central Point
Elliott, Dorcas May	H. E.	Fr.	Vancouver, Wash.
Elmer, Esther Stout	H. E.	Voc.	Corvallis

Name.	Course.	Rank.	Home Address.
Emery, Parris Everett	Min.	Fr.	Portland
Emett, Edward Llewellyn	Agri.	Jr.	Alhambra, Calif.
Engbretson, Albert Edward	Agri.	Sr.	Astoria
Englund, Eric	Agri.	Soph	Trehorningsjo, Swed'n
English, Pennoyer Francis	Agri.	Fr.	Salem
Entermille, Jr., Fred	Agri.	Fr.	Baker
Epps, Grady David	Min.	Fr.	Hinton, Okla.
Erp, Hermann	Agri.	Voc.	Grays River, Wash.
Etsell, George	Agri.	Spec.	Seattle, Wash
Evans, Dorothy	H. E.	Spec.	Roseburg
Evans, Emmett	Min.	Fr.	McMinnville
Feathers, Mabel Etta	H. E.	Soph.	Salem
Fellows, Hurley	Agri.	Soph	Oregon City
Felton, Dannie Sherman	Com.	Soph	Corvallis
Fendall, DeVere	Agri.	Sr.	Newberg
Fendall, Virgil	Agri.	Sr.	Newberg
Ferguson, Alice	H. E.	Fr.	Helix
Ferguson, Arthur	Agri.	Jr.	Helix
Fertig, Charles Arthur	L. E.	Jr.	Hood River
Ferguson, Catherine Bruce	H. E.	Voc.	Roseburg
Ferguson, Homer	M. E.	Soph.	Portland
Ferguson, Oscar Earl	Agri.	Sr.	Helix
Finch, Arthur William	Agri.	Sr.	Gardena, Calif.
Finney, John Lawrence	Agri.	Soph.	Astoria
Firestone, Verne Chester	Agri.	Soph.	Vancouver, Wash.
Fisher, Bertha Marie	H. E.	Fr.	Haines
Fisher, Elmer	Min.	Fr.	Corvallis
Fisher, Harrison David	Agri.	Voc.	Cincinnati, Ohio
Fisk, Carlos	Agri.	Sr.	Parma, Idaho
Fitts, Grace Elizabeth	H. E.	Sr.	Corvallis
Flanery, Floyd	Phar.	Jr.	Corvallis
Flegal, Kate Susannah	H. E.	Fr.	Eugene
Fleischman, Carl Julius	Com.	Spec.	Corvallis
Fleming, Homer Robert	Agri.	Soph.	Joseph
Floss, Fritz Carl	Min.	Sr.	Milwaukie
Floydstead, Harry	Com.	Soph.	Tacoma, Wash.
Foley, James Owen	Phar.	Fr.	Corvallis
Forbes, Ernest Stuart	M. E.	F. Yr.	Central Point
Forbis, Robert	Hi. E.	Fr.	Dilley
Forest, Bernice Marian	H. E.	Soph.	Portland
Forster, Fred Henry	Hi. E.	Sr.	Tangent
Fortner, Philip Tuthill	Agri.	Soph.	Fowler, Calif.
Foster, Albert Dickinson	Phar.	Sr.	Dayton
Foster, Harriett	H. E.	Sr.	Corvallis
Fox, Kenneth Lawrence	Min.	Sr.	Portland
Fox, Otto	I. A.	Fr.	Ashland
Frame, Dana Selby	Agri.	Soph.	Talent
Frances, George Leslie	Agri.	Sr.	Portland

Name.	Course.	Rank.	Home Address.
Francis, Thomas Ernest	Agri.	Sr.	Bunkerville, Va.
Franklin, John Morton	Agri.	Jr.	Seattle, Wash.
Fraser, Irene McCoy	H. E.	Fr.	Corvallis
Fraser, John Henry	C. E.	Sr.	Parkplace
Fraser, Tom Henry	Agri.	Fr.	Corvallis
Frazier, Genevieve	Opt.		Salem
Freeland, Elsie Lucille	Agri.	Fr.	Shedd
Freeland, Eugene Louis	Min.	Fr.	Shedd
French, Irvine	Min.	Soph.	Enterprise
Freyler, Edna May	H. E.	Soph.	Corvallis
Fridley, Dora Ann	H. E.	Sr.	Klondike
Fridley, Nettie May	H. E.	Jr.	Klondike
Friedman, David	Agri.	Jr.	St. Charles, Ill.
Prink, Ellis Pearl	Min.	Fr.	Newberg
Frizzell, Elsie Echo	H. E.	Fr.	Rickreall
Frost, Carl Magnus	E. E.	Sr.	Portland
Fudge, Lawrence	E. E.	Fr.	Ballston
Fullerton, Charles Elwyn	Com.	Fr.	Olympia, Wash.
Funk, Arnold John	Com.	Sr.	Corvallis
Galbraith, Alexander	Agri.	Spec.	Langdon Hills, Eng.
Galbraith, Loren	M. E.	Fr.	Vancouver, Wash.
Gale, Marguerite	H. E.	Voc.	Union
Gammon, Earle Thomas	Agri.	Soph.	Hood Calif.
Garbutt, Earl Edward	M. E.	Soph.	Sheridan, Wyom.
Gardner, Isaac George	E. E.	Fr.	Lansing, Mich.
Gardner, Vesta Hazyl	H. E.	Fr.	Salem
Garrett, Geary	Com.	Spec.	Medford
Garvin, Victor James	Agri.	Sr.	Denver, Colo.
Gatchell, Charles Barnard	I. A.	Spec.	Peachbottom, Pa.
Gates, Pearl Emmogene	H. E.	Sr.	Corvallis
Genoud, Orlean	Phar.	F. Yr.	Camas, Wash.
Gentle, James	Agri.	Spec.	Monmouth
Gerke, Walter Henry	Agri.	Sr.	Portland
Gibson, Clarence Blaine	Opt.		Guthrie Center, Iowa
Gilbert, Mahlon Bruce	Agri.	Sr.	Woodburn
Gilfillan, Francois Archibald	Phar.	Fr.	Delmar
Glines, Emma Ione	H. E.	Soph.	Waldport
Glines, Hallie Winifred	H. E.	Soph.	Waldport
Gloman, Joseph Storey	Agri.	Soph.	Bellingham, Wash.
Glos, Karl Fredrick	Com.	Spec.	Corvallis
Godel, Howard Fisher	Agri.	Soph.	Portland
Godlove, Lenore,	Com.	F. Yr.	Medford
Goe, Henry	Agri.	Spec.	Canton, China
Goemanpott, Etta Oekeleine	H. E.	Fr.	Phoenix
Golden, Arthur Edward	Agri.	Fr.	Corvallis
Golden, Zoe Hazel	H. E.	Jr.	Corvallis
Goodrich, Lee Jesse	Agri.	Spec.	Seattle, Wash.
Goodrich, Meda	H. E.	Fr.	Yamhill

Name.	Course.	Rank.	Home Address.
Gordon, Will Hughes	Com.	Soph.	Portland
Gould, Mabel Lillian	H. E.	Fr.	Medford
Graf, Herman	M. E.	Sr.	Portland
Gragg, George Merle	Agri.	Jr.	Monroe
Graham, Earl Alvin	Phar.	Fr.	Baker
Grasmoen, Otto Melvin	M. E.	Fr.	Le Grand, Calif.
Graves, Leaman	Agri.	Soph.	Kansas City, Kansas
Graybeal, Carlyle West	Agri.	Fr.	Cashmere, Wash.
Green, Carl Clifford	Agri.	Jr.	Parkdale
Green, Dorr Dudley	Agri.	Jr.	Parkdale
Greene, Frances Kellaly	Agri.	Sr.	Aberdeen, Wash.
Green, Howard Henry	Agri.	Voc.	Parkdale
Green, John Wesley	C. E.	Sr.	Crawfordsville
Greene, Marjorie May	H. E.	Fr.	Aberdeen
Green, Medric	Agri.	Soph	Dundee
Gregg, Rodney	M. E.	Soph.	Gazelle, Calif.
Grell, Edward	Agri.	Fr.	Albany
Grenfell, Charles Waldo	Min.	Soph.	Portland
Gribskov, Maren	H. E.	Soph.	Junction City
Griffin, Earl	For.	Fr.	Ontario
Grimes, Etta Belle	H. E.	Jr.	Portland
Grow, Homer Wallace	Agri.	Soph.	Corvallis
Grubbe, Eugene Erle	Phar.	Soph.	Elkton
Guha, DakshinaRanjan	M. E.	Sr.	India
Gurley, Wayne E.	E. E.	Soph.	Canby
Gurney, Elsie Genevieve	H. E.	Spec.	Eugene
Guthrie, Eunice Jane	H. E.	Spec.	Corvallis
Guthrie, Leroy Roland	M. E.	Soph.	Corvallis
Haberer, Erwin Sam Otto	For.	Fr.	Chicago, Ill.
Hackett, Harold Nelson	E. E.	Sr.	Elgin
Hacking, Ruth Isabelle	Com.	Spec.	Corvallis
Haight, Rachel Webb	H. E.	Spec.	Corvallis
Halferty, George	Agri.	Soph.	Aberdeen, Wash.
Hallock, Clarence Elmer	Agri.	Fr.	Payette, Idaho
Hall, Eleanor	Opt.		Union
Hall, Phila Henrietta	H. E.	Spec.	Fairfax, Vt.
Hallock, Earle Dutton	Agri.	Sr.	Portland
Hamilton, Gladys	H. E.	Voc.	Corvallis
Hamilton, Harry Earl	M. E.	Sr.	Portland
Hamilton, John Monroe	Agri.	Sr.	National City, Calif.
Hamlin, Lucile Anna	Opt.		Corvallis
Hammerly, Hugh Fisher	Phar.	Sr.	Albany
Hammond, Edmund Putnam	M. E.	Fr.	Portland
Hammond, Josephine Marion	H. E.	Soph.	Silverton
Hammond, Louise Leontine	H. E.	Spec.	North Bend
Hampton, Lester	Agri.	Soph.	Randle, Wash.
Hampton, Otis Harold	Agri.	Soph.	Pendleton
Hancock, Charles Shannon	E. E.	Fr.	Forest Grove

Name.	Course.	Rank.	Home Address.
Hancock, Margaret Mae	Com.	Spec.	Forest Grove
Hanley, Mike Finley	Agri.	Voc.	Medford
Hanneman, Karl	Agri.	Spec.	Long Beach, Wash.
Hanns, Satolli William	I. A.	Soph.	Corvallis
Hansen, Harold, Von Stein	Com.	Soph.	Corvallis
Hansen, Henry	For.	Fr.	Woodburn
Hansen, Ingeborg Anna	H. E.	Soph.	Corvallis
Hanson, Manette	H. E.	Sr.	Corvallis
Hanthorn, Faith	H. E.	Jr.	Portland
Happold, Louie	E. E.	Soph.	Klondike
Hardman, Florence Rozelle	Com.	Soph.	Corvallis
Harper, Roy	Min.	Fr.	Woodburn
Harriman, Dickson Pain	Agri.	Fr.	The Dalles
Harris, Clifford Oscar	Agri.	Fr.	Portland
Harris, Milton	C. E.	Jr.	Portland
Harrison, Dorothy Elizabeth	H. E.	Spec.	Los Molinos, Calif.
Harrison, Leslie Edwin	Phar.	Soph.	Tillamook
Harrison, Lloyd	Agri.	Fr.	Oregon City
Hart, Martha Norden	H. E.	Sr.	Portland
Hart, Ruth Genevieve	Com.	Spec.	La Grande
Hartley, Edwin Adolphus	For.	Jr.	Point Terrace
Hartman, Orville Ernest	Agri.	Fr.	Corvallis
Hartzog, Mary Delphia	H. E.	Sr.	Corvallis
Harvey, Paul Atwood	Agri.	Sr.	Cashmere, Wash.
Hathaway, Marcus Francis	Agri.	Sr.	Corvallis
Hattan, Elton	Min.	Soph.	Oregon City
Haumeser, Elsie	H. E.	Voc.	Battle Ground, Wash.
Haverstick, Russell Noah	Agri.	Sr.	Cashmere, Wash.
Haw, Horace Leo	Agri.	Sr.	Pendleton
Hawkins, Joe Cephus	Agri.	Jr.	Sayre, Okla.
Hayes, Frank	Agri.	Jr.	Pasadena, Calif.
Hayes, Jack Joseph	Com.	Soph.	Corvallis
Hayes, Lucile	H. E.	Sr.	Portland
Hayslip, Earl	For.	Fr.	Vancouver, Wash.
Hazeltine, Caryl	L. E.	Soph.	Oakland, Calif.
Head, Cecille	H. E.	Soph.	Waldport
Heath, Charles Webster	Agri.	Spec.	Sioux Falls, N. D.
Heath, Howard Wells	Min.	Soph.	Tacoma, Wash.
Heidenreich, Heinrich	I. A.	Spec.	La Grande
Heider, Lorena Mary	H. E.	Fr.	Sheridan
Heiss, William Van Camp	Agri.	Fr.	Pasadena, Calif.
Henderson, Charles Albert	Agri.	Sr.	Gardiner
Henderson, Kate Leslie	Opt.		Lebanon
Henderson, William Wright	Agri.	Jr.	Eureka, Calif.
Hendricks, Mary Elizabeth	Opt.		Fossil
Hermann, Ursula Marie	H. E.	Voc.	Aberdeen, Wash.
Hesse, Lloyd Bryan	Agri.	Spec.	Bandon
Hewes, Cora	H. E.	Sr.	Albany

Name.	Course.	Rank.	Home Address.
Heywood, Victor	Agri.	Spec.	Portland
Hiestand, Clynton Harry	Phar.	S. Yr.	Corvallis
Hiestand, Zula	Com.	Spec.	Corvallis
Hilliar, Agatha Amelia	H. E.	Spec.	London, England
Hilton, Harold Henry	Agri.	Spec.	Portland
Hodgson, Marion	H. E.	Soph.	Ashland
Hoerlein, Paul Frank	Agri.	Spec.	Hood River
Hoerner, Godfrey Richard	Agri.	Sr.	Seattle, Wash.
Hoffard, Albert	Agri.	Voc.	Modum, Norway
Hofer, Paul Ballou	Agri.	Spec.	Pasadena, Calif.
Hoflich, Neva Leona	H. E.	Sr.	Albany
Holden, Jesse Lonson	M. E.	Fr.	Portland
Holgate, Mrs. L. C	Opt.		Corvallis
Holker, Booth	Agri.	Fr.	Toston, Mont.
Holland, Wellington Payton	Phar.	Fr.	McEwin
Hollenberg, Leo	Agri.	Jr.	Corvallis
Hollingsworth, Gertrude	H. E.	Sr.	Newberg
Holloway, Frances Mary	H. E.	Spec.	Brownsville
Holloway, William	Agri.	Spec.	Brownsville
Holmes, Frederick Aram	L. E.	Sr.	Enterprise
Hooper, John Amos	E. E.	Jr.	Corvallis
Hoover, Fenton Whitman	C. E.	Jr.	Los Angeles, Calif.
Hopkins, Horace	Agri.	Fr.	Corvallis
Hopper, Richard Homer	Agri.	Voc.	Payette, Idaho
Horner, Clyde	Phar.	F. Yr.	The Dalles
Horning, Helen Mabel	H. E.	Sr.	Corvallis
Hoskins, John Verne	M. A.	S. Yr.	Donald
Hoskins, Walter Scott	Com.	S. Yr.	Donald
Houck, Agnes Catherine	H. E.	Fr.	Portland
Houck, Roy Lester	E. E.	Jr.	Dallas
Houliston, Geoge McLean	Agri.	Sr.	East Aurora, N. Y.
Howard, Clement	Com.	Fr.	Stanfield
Howard, Dale	Agri.	Fr.	Astoria
Howell, Herbert	Agri.	Sr.	Portland
Howells, Katherine Marie	H. E.	Soph.	Medford
Howey, Iva May	H. E.	Jr.	Coquille
Howitt, Elizabeth	H. E.	Sr.	Gresham
Hubbard, Chauncey	Agri.	Sr.	Monroe
Hubbard, Clyde Wesley	Phar.	F. Yr.	Weiser, Idaho
Hubbard, Earl	Agri.	Fr.	Medford
Hubbard, Verda	H. E.	Fr.	Rickreall
Hudelson, Allen	Agri.	Voc.	Berger, Idaho
Hudson, Emil Paul	Agri.	Fr.	Milwaukie
Hudson, Jacob Ray	M. A.	Spec.	Milton
Huffaker, Wilford	Agri.	Soph.	Idaho Falls, Idaho
Hughes, Bethany Marie	H. E.	Voc.	Springfield
Hulbert, Fred Henry	Com.	Soph.	Aberdeen, Wash.
Hult, Gustaf Wilhelm	For.	Sr.	Corvallis

Name.	Course.	Rank.	Home Address.
Humphrey, Esther Cynthia	H. E.	Jr.	Portland
Hung, Tung Ming	Agri.	Fr.	Amoy, China
Hunt, Echo Clair	Phar.	Spec.	Salem
Hunter, Albert Greenwood	Agri.	Spec.	American Fork, Utah
Hunter, Dean	Agri.	Fr.	Portland
Hunter, William Gilbert	Agri.	Fr.	Island City
Huntington, James	Agri.	Fr.	Yoncalla
Hurley, Alton	Agri.	Jr.	Seattle, Wash.
Husbands, Esther Elizabeth	H. E.	Soph.	Hood River
Husbands, Myrtle Blakley	Com.	Fr.	Hood River
Huston, Helen	Opt.		Corvallis
Hutchings, Earl Albert	Min.	Fr.	Brownsville
Hyams, Leo Klein	M. E.	Jr.	Portland
Ide, Fred Stitzel	Com.	F. Yr.	Colville, Wash.
Imrie, Lillian Mildred	H. E.	Jr.	Melrose
Ingalls, Darwin Albert	E. E.	Fr.	Grants Pass
Ingham, DeEtta	Com.	Jr.	Portland
Inman, Wilbur Joseph	Com.	Spec.	Ft. Collins, Colo.
Irvine, Ward Avery	Com.	Fr.	Portland
Irving, Ralph Edison	Agri.	Fr.	Harney City
Jackson, Della Minerva	H. E.	Sr.	Lorane
Jackson, Eva Inez	H. E.	Sr.	Portland
Jackson, Laura Luella	H. E.	Soph.	Lorane
Jacoby, Carl Charles	L. E.	Jr.	Toledo, Wash.
Jacoby, Fred	Agri.	Soph.	Toledo, Wash.
Jaeger, Harry Dunsmire	Agri.	Fr.	Portland
James, Samuel Clifford	Agri.	Voc.	Rochester, Wash.
Janes, Marjorie	H. E.	Jr.	Portland
Jaquith, Roy	Agri.	Fr.	Laurel
Jeffers, Fred Marion	Agri.	Voc.	Portland
Jenkins, Merle Truman	Agri.	Sr.	Portland
Jernstedt, Maurice	Agri.	Jr.	Carlton
Jessup, George Leroy	M. A.	S. Yr.	Marion
Jetley, Arthur Christ Lee	Hi. E.	Soph.	Narrows
Jewel, Herbert	Com.	Spec.	Portland
Jewell, Leonard Dwight	Agri.	Fr.	Grants Pass
John, Morris	Com.	Sr.	Corvallis
Johns, Miles Shirk	Agri.	Sr.	Bellingham, Wash.
Johnson, Clarence Benjamin	Agri.	Soph.	Hermiston
Johnson, Carl Stewart	Agri.	Jr.	Portland
Johnson, Chris Edward	Phar.	Soph.	North Powder
Johnson, Clifford	Agri.	Voc.	Boise, Idaho
Johnson, Darrel	Com.	Soph.	Corvallis
Johnson, Franklyn Whitcomb	E. E.	Soph.	Portland
Johnson, Gus Gordon	Phar.	Fr.	Quincy, Wash.
Johnson, Jennie Evelyn	H. E.	Spec.	Portland
Johnson, John Iver	Agri.	Fr.	Winlock, Wash.
Johnson, Lillian	H. E.	Jr.	Corvallis

Name.	Course.	Rank.	Home Address.
Johnson, Louise Merle	Com.	Jr.	Portland
Johnson, Owen	Agri.	Jr.	Quincy, Wash.
Johnson, Willard	For.	Soph.	Corvallis
Johnston, Jennie Bell	H. E.	Fr.	Klamath Falls
Johnston, Perry Nolan	Agri.	Sr.	Moro
Johnston, William Waters	Agri.	Jr.	Corvallis
Jonasen, Olaf Robert	For.	Sr.	Rock Island, Ill.
Jones, Edward Delta	M. E.	Sr.	Jefferson
Jones, Leon Kilby	Agri.	Jr.	Corvallis
Jones, Ronald Ewart	M. E.	Soph.	Brooks
Jordan, Calvin Arthur	C. E.	Sr.	Pendleton
Jory, Elmo Clayton	Phar.	Spec.	Salem
Kadderly, Wallace LaDue	Agri.	Jr.	Portland
Kain, Corland, Edward	E. E.	Soph.	Portland
Kalbus, Minnie	H. E.	Sr.	Chehalis, Wash.
Kan, Frank	Agri.	Sr.	Nom Tong, China
Kane, Gardner Lewis	Agri.	Fr.	Gardena, Calif.
Kathan, Albert	Phar.	Fr.	Syracuse, N. W.
Kathan, George Lewis	Agri.	Sr.	Syracuse, N. Y.
Keatley, Eva Florence	H. E.	Sr.	Castlerock, Wash.
Keckritz, Anton Rudolph	M. E.	Fr.	Union
Keen, William Henry Harrison	Hi. E.	Fr.	Portland
Keil, Carl Herman	E. E.	Soph.	Cosmopolis, Wash.
Keller, Eugene John	Com.	S. Yr.	Grays River, Wash.
Kelley, Earl	M. A.	F. Yr.	Corvallis
Kellogg, Ralph Lester	Min.	Fr.	Portland
Kelly, Ruth	H. E.	Soph.	Portland
Kelsay, Lewis Lanas	Min.	Fr.	Fossil
Kennedy, Ruth	H. E.	Fr.	Corvallis
Kenny, Dora Lotella Agnes	H. E.	Fr.	Portland
Kent, Elva Corrina	Phar.	Spec.	Drain
Kenton, Ralph Mills	M. E.	Jr.	Albany
Kephart, Samuel	E. E.	Sr.	San Francisco, Calif.
Keppinger, Verna Mildred	H. E.	Fr.	Gervais
Ketchum, Beth	H. E.	Jr.	Independence
Ketchum, Jean	H. E.	Sr.	Independence
Kiddle, Lyle Blair	Com.	Soph.	Island City
Kimzey, Robert	Com.	Fr.	Corvallis
Kinderman, William	E. E.	Sr.	Kings Valley
King, Benjamin	I. E.	Fr.	Cottage Grove
King, Charles Allen	E. E.	Sr.	Ashland
King, Mrs. Lucile	I. E.	Fr.	Bandon
King, Philip Sheridan	Agri.	Jr.	Portland
King, Rudolph Jack	Agri.	Spec.	Portland
Kingsley, Earl Jinas	Com.	Sr.	Corvallis
Kingsley, Everette	H. E.	Fr.	Corvallis
Kinnison, Grace	H. E.	Jr.	San Francisco, Calif.
Kirkland, Clarence Gearld	M. A.	F. Yr.	Corvallis

Name.	Course.	Rank.	Home Address.
Kirkwood, Emile Glenn	M. E.	Fr.	Amity
Kirtley, Naomi Edna	H. E.	Sr.	La Grande
Knight, Florence Lillian	H. E.	Sr.	San Luis Obispo, Calif.
Knowles, Inez	H. E.	Soph.	La Grande
Knox, Leland Jay	Com.	Sr.	Fossil
Kocken, Walter Joseph	Agri.	Soph.	Cleveland
Koenig, Walter Jacob	Agri.	Sr.	Rock Island, Ill.
Kohlhagen, Florence Louise	Opt.		Roseburg
Kohli, Chet Ram	Agri.	Fr.	Jammu, India
Kooreman, Milton Abraham	M. E.	Fr.	Salem
Kotan, Mary	Com.	Voc.	Crabtree
Kraft, Harry William	Com.	Fr.	National City, Calif.
Krause, Cris Milton	Agri.	Fr.	Long Beach, Calif.
Kreitle, Margariete	H. E.	Fr.	Dallas
Kreps, Rhoda Jane	Opt.		Laurel, Wash.
Krueger, Clarence William	E. E.	Soph.	Corvallis
Kruger, Herbert William	Min.	Jr.	Portland
Kubin, Jennie May	H. E.	Fr.	Salem
Kuks, Anna May	H. E.	Jr.	Milwaukie
Kurtz, Martin	Com.	Soph.	Corvallis
Kyle, Kittie Gertrude	H. E.	Soph.	Corvallis
Lafky, Herman Ernest	Agri.	Soph.	La Grande
Lagus, Sigurd Wilhelm	Min.	Fr.	Astoria
Laing, Mabel Elsie	H. E.	Spec.	Boise, Idaho
Laird, Freda	H. E.	Spec.	Creswell
Laird, Ralph	Agri.	Sr.	Creswell
Lamb, Howard Milton	Agri.	Sr.	Fossil
Lamoreux, Louis Andre	Agri.	Jr.	Rosebank, N. Y.
Lamoreux, Thomas Liggett	Agri.	Sr.	Rosebank, N. Y.
Lamoureux, Beatrice Josephine	Opt.		Camas, Wash.
Lamson, Maude Eliza	H. E.	Soph.	Cottage Grove
Lance, John Harlan	Com.	Fr.	Corvallis
Lance, Neely Samuel	Agri.	Jr.	Corvallis
Lane, Bernice	H. E.	Soph.	Corvallis
Lane, Dorothy Elizabeth	H. E.	Jr.	Los Angeles, Calif.
Lane, Vivian Maude	H. E.	Sr.	Harrisburg
Lankenau, Walter	For.	Soph.	New York City, N. Y.
Lankins, Hazel Clair	H. E.	Soph.	Hubbard
Lansdale, Zane Arthur	C. E.	Sr.	Weston
Lantz, Harvey Lee		Sr.	Cove
Larsen, James Carl	E. E.	Fr.	Suver
Larson, Clarence Clifford	Com.	Soph.	Payette, Idaho
Larson, Melvin Laverne	For.	Fr.	La Grande
Larson, Raymond Gilbert	Agri.	Spec.	Fairfield, Iowa
Lascar, Adhar Chandra	E. E.	Jr.	Bengal, India
Lasswell, Avery Lloyd	Com.	Sr.	Portland
Laythe, Leo	Agri.	Sr.	Harriman
Leavell, Leonard	Hi. E.	Fr.	Timber Valley, Wash.

Name.	Course.	Rank.	Home Address.
Lee, Bernard	Agri.	Spec.	Meridian, Idaho
Lee, George Olin	C. E.	Sr.	Maltby, Wash.
Leech, Archer Olin	M. E.	Soph.	Albany
Legg, Gladys Loretta	H. E.	Jr.	Portland
Leibner, Emil Carl	Agri.	Spec.	Albany
Leisy, Harvey Arthur	M. A.	T. Yr.	Salem
Leisy, Linda Emelia	H. E.	Voc.	Salem
Leland, Randolph Elliott	Agri.	Soph.	Los Angeles, Calif.
Lemieux, Louis Charles	M. A.	S. Yr.	Wrangell, Alaska
Letellier, George Henri	Com.	Soph.	Mill City
Leonard, Charlie Lloyd	M. E.	Fr.	Scappoose
Le Peau, Nathaniel	Opt.		Portland
Levage, Harry Vernon	Agri.	Jr.	Florence
Lewis, Paul	Agri.	Soph.	Rex
Likins, Joseph Irving	M. E.	Fr.	Portland
Lindeman, Harold Henry	Agri.	Fr.	Alhambra, Calif.
Lindeman, Laird	Agri.	Spec.	Corvallis
Lindquist, Fric Arthur	M. A.	S. Yr.	New Hazelton, B. C.
Lindsay, Alexander Lewis	Agri.	Sr.	Corvallis
Lindsay, Annie McDonald	H. E.	Soph.	Corvallis
Lines, Ruth Joy	Opt.		Albany
Linn, Ralph Emerson	Agri.	Fr.	Meridan, Idaho
Linville, Myrtle Harriet	H. E.	Fr.	Astoria
Littlar, Florence Elizabeth	H. E.	Soph.	Forest Grove
Little, Hubert William	Com.	Spec.	McMinnville
Livingston, Jr., Will Harvey	Agri.	Spec.	Greenfield, Calif.
Locey, Percy Philip	Com.	Fr.	Weiser, Idaho
Locher, Leonard Joseph	M. E.	Sr.	Burns
Loftus, Agnes Beth	Com.	Spec.	Minneapolis, Minn.
Logan, Anna Louise	Opt.		Portland
Logan, Arthur Evan	Com.	Sr.	Escandido, Calif.
Logan, Helen Elizabeth	Opt.		Escandido, Calif.
Logan, Madalene	H. E.	Fr.	McMinnville
Long, Howard Allen	Com.	Jr.	Portland
Long, Yick	Com.	Sr.	Canton, China
Loo, Nai Fatt	Agri.	Fr.	Victoria, B. C.
Looff, Hans Walter	For.	Sr.	Oak Harbor, Wash.
Loop, Charles Roy	Agri.	Fr.	McMinnville
Loop, Rosa	Com.	F. Yr.	McMinnville
Lorence, Jennings Bryan	M. E.	Soph.	Monmouth
Lorence, Ruby Ann	Opt.		Monmouth
Loughary, Elithe	H. E.	Soph.	Monmouth
Loughary, Ivan Hill	Agri.	Sr.	Monmouth
Loughrey, Ettley Elsworth	Min.	Fr.	Payette, Idaho
Low, Charles	Min.	Fr.	Salem
Lowe, Thomas Julian	Agri.	Soph.	Nyssa
Lowell, Arthur Leslie	Agri.	Spec.	Wasco
Lowell Carlton Edward	Agri.	Voc.	Corvallis

Name.	Course.	Rank.	Home Address.
Lowry, Ralph William	Agri.	Jr.	Corvallis
Lucas, Elva Alice	Opt.		Dallas
Lucas, William	M. E.	Fr.	Parkplace
Luebke, William	Com.	Fr.	Toutle, Wash.
Luebke, James	M. E.	Fr.	Toutle, Wash.
Lundeen, Arthur	L. E.	Sr.	Rock Island, Ill.
Lundgren, Alice	H. E.	Fr.	Puyallup, Wash.
Lundgren, Carl Oliver	Agri.	Soph.	Puyallup, Wash.
Luxton, William Lee	Com.	Jr.	Idaho Falls, Idaho
Lyman, Lloyd	For.	Fr.	Cleveland, Ohio
McBride, Lola Winifred	H. E.	Fr.	Corvallis
McCaffrey, Lawrence Martin	L. E.	Soph.	Spring Valley, Ohio
McCain, Ernest Vivian	E. E.	Fr.	Jordan Valley
McClain, Arthur	Com.	Fr.	Salem
McClellan, Thomas Richard	Agri.	Sr.	West Stayton
McClelland, Ben Glascock	Agri.	Fr.	Salem
McCollum, Charles Adelbert	L. E.	Soph.	Salinas, Calif.
McCollum, John Edgar	L. E.	Jr.	Salinas, Calif.
McCormick, Anna Elizabeth	H. E.	Sr.	Lebanon
McCormick, Harl Craig	I. A.	Soph.	Corvallis
McCornack, Alice	H. E.	Soph.	Marcola
McCornack, Eugene	Agri.	Spec.	Klamath Falls
McCoy, Arthur Wallace	Agri.	Sr.	Kansas City, Mo.
McCoy, John	Agri.	Fr.	Glendale, Calif.
McCrae, George Clifford	Agri.	Spec.	Corvallis
McCullough, Addie	H. E.	Fr.	Carlton
McElhose, Mrs. R. E.	Opt.		Corvallis
McEntire, Eunice Irene	H. E.	Fr.	Weiser, Idaho
McEwen, Daniel Franklin	Agri.	Soph.	Portland
McGeorge, William	C. E.	Jr.	Eugene
McGinnis, Alice	H. E.	Spec.	Corvallis
McGinnis, Iva Belle	Opt.		Corvallis
McHenry, Bertha	H. E.	Jr.	Corvallis
McHenry, Muriel Esther	Com.	Jr.	Corvallis
McIntyre, Frank	Com.	Spec.	Hartford Conn.
McKay, James Douglas	Agri.	Soph.	Portland
McKee, Stuart	Agri.	Fr.	Selah, Wash.
McKim, Stanley Horton	Agri.	Soph.	Oakland, Calif.
McKissick, Joe Carson	Agri.	Fr.	Wallace, Idaho
McMaster, Cedric Stuart	Agri.	Soph.	Corvallis
McMindes, Elvin Winfield	Agri.	Soph.	Lorane
McMinn, Bryan Towne	M. E.	Soph.	Corvallis
McMinn, Grace Blanche	Opt.		Corvallis
McMinn, Ray Ben	M. E.	Sr.	Portland
McNeil, Alexander	Agri.	Fr.	Hauston, Scotland
McPherson, Daisy Augusta	H. E.	Sr.	Pendleton
McRay, Lela LaMiza	Com.	Spec.	Sherwood
McRay, Murry Marvin	Agri	Spec.	Sherwood

Name.	Course.	Rank.	Home Address.
McReavy, Cecila Cameron	H. E.	Spec.	Tacoma, Wash.
McVey, Clarence LeRoy	For.	S. C.	Corvallis
McVicar, Ward	Agri.	Soph.	Los Angeles, Calif.
Maag, Esther Verna	H. E.	Fr.	Salem
MacCrow, Hughretta Naomi	H. E.	Fr.	Goldendale, Wash.
MacDonald, Helen	H. E.	Jr.	Corvallis
Madsen, Alvin Hjalmar	Agri.	Voc.	Silverton
Magnuson, Hazel Johanna	H. E.	Fr.	Everett, Wash.
Mahon, James Lake	M. E.	Fr.	Hillsboro
Mainwaring, William Bernard	Com.	Fr.	Newberg
Malone, Earl Nicholas	Agri.	Fr.	Castle Rock, Wash.
Mamlet, Alfred Moses	Agri.	Soph.	Passaic, N. J.
Manary, Gertrude Marguerite	H. E.	Soph.	Portland
Manock, Nathan Edwin	Phar.	Sr.	Corvallis
Manuel, Mildred Marian	H. E.	Sr.	Oakland, Calif.
Margson, Mrs. Margaret	Com.	Voc.	Salem
Mars, Lewis Donald	Min.	Spec.	Gervais
Marshall, Julian Stephens	Min.	Fr.	Corvallis
Martin, Elsie Pauline	H. E.	Fr.	McMinnville
Martin, Glen	Agri.	Fr.	McMinnville
Martin, Porter Wilson	M. E.	Jr.	Corvallis
Martyn, Wallace Howell	Com.	Spec.	Eugene
Mason, Ben	M. E.	Soph.	Puyallup, Wash.
Mason, Earl George	For.	Fr.	Salem
Mason, Howard	Agri.	Fr.	Pasadena, Calif.
Mason, Walter Harold	I. A.	Sr.	Ione
Mateer, Ruth Marion	H. E.	Sr.	Nampa, Idaho
Mather, Horace Spencer	Agri.	Soph.	Geneva, Wash.
Matson, Lloyd	M. E.	Fr.	Vancouver, Wash.
Maxey, Mrs. Elnora	Opt.		Corvallis
Maxwell, Jane Irene	H. E.	Voc.	Eugene
May, Lula Litten	H. E.	Soph.	Monkland
Mayhew, Spencer Neff	Agri.	Sr.	North Bend
Mayne, Harry McDonald	Agri.	Soph.	Salt Lake City, Utah
Meacham, Leta	H. E.	Soph.	Weiser, Idaho
Meek, Margaret Rhoda	H. E.	Jr.	Oakland, Calif.
Meier, Albert Otto	Agri.	Soph.	Hillsdale
Meier, Edwin	Hi. E.	Fr.	Mist
Meloy, George Everett	M. E.	Fr.	Corvallis
Mendenhall, Fred	Phar.	F. Yr.	Corvallis
Mentzer, Leland	I. A.	Fr.	Pendleton
Mercer, Helen Bernetta	H. E.	Jr.	Salem
Mesher, Sophie	H. E.	Soph.	Portland
Mettie, Zena	H. E.	Spec.	Ukiah
Metzger, Floyd	Com.	Jr.	Gresham
Metzler, Ivan	Com.	Soph.	Corvallis
Meyers, Cornelius William	Min.	Jr.	Portland
Meyers, Cyril Lawrence	Min.	Jr.	Portland

Name.	Course.	Rank.	Home Address.
Meyers, Donald	Com.	Sr.	Salem
Michelbrook, Roy	M. E.	Sr.	McMinnville
Mickel, George Lawrence	Phar.	S. Yr.	Corvallis
Middlekauff, Donald	Agri.	Sr.	Lewiston, Idaho
Middlekauff, Harold	Agri.	Sr.	Lewiston, Idaho
Middlekauff, Mark Humbert	Agri.	Sr.	Corvallis
Mifune, Shizno	Hi. E.	Fr.	Portland
Miller, David Baker	Agri.	Spec.	Denver, Colo.
Miller, Edwin Harvey	Min.	Jr.	Lexington
Miller, Eula Ellen	H. E.	Fr.	Corvallis
Miller, Eva	H. E.	Sr.	Fillmore, Ill.
Miller, Gail James	Agri.	Spec.	Forest Grove
Miller, Grace	H. E.	Fr.	Corvallis
Miller, Helen Lavena	H. E.	Jr.	Corvallis
Miller, Kenneth Earl	Min.	Fr.	Creswell
Miller, Leo Waldemer	E. E.	Soph.	Portland
Miller, Marjorie Modelle	Opt.		Union
Miller, William Franklin	Com.	Spec.	Newberg
Millikin, Damon Edmund	Agri.	Sr.	Ontario
Miltimore, Anne Laurel	Com.	Spec.	Corvallis
Minsinger, David William	Com.	Sr.	Portland
Mintonye, Clare	Agri.	Voc.	Coquille
Mirick, Laurence Payson	Agri.	Voc.	Creswell
Mitchell, Lloyd Paul	Agri.	Soph.	Boise, Idaho
Mix, Ira Delbert	Com.	Jr.	Independence
Moberg, James Dalgety	E. E.	Soph.	Astoria
Moist, Charles	Phar.	F. Yr.	Lebanon
Moloney, James Lovering	Com.	F. Yr.	Marshfield
Monger, Walter Victor	E. E.	Sr.	Parkplace
Moody, Charlotte Elizabeth	H. E.	Soph.	Carlsbad, Calif.
Moody, Clifford Heegler	Com.	F. Yr.	Fairbanks, Alaska
Moore, Alice	Agri.	Spec.	Portland
Moore, Herman Harvey	Agri.	Voc.	Bend
Moore, Leland Bernard	Agri.	Jr.	Gresham
Moore, Myra Lucille	H. E.	Soph.	Corvallis
Moore, Merle	M. E.	Sr.	Corvallis
Moore, Ralston Temple	Phar.	Spec.	Oak Grove
Moore, Willetta	H. E.	Sr.	Eugene
Morgan, Beulah Inez	H. E.	Jr.	Corvallis
Morgan, Ralph Lester	Agri.	Jr.	Corvallis
Morgan, Victor	Agri.	Sr.	Winona, Minn.
Morgan, Walter John	Agri.	Jr.	Portland
Morian, Harold Louis	Min.	Fr.	Portland
Mornhinweg, Charles	For.	Soph.	Halsey
Morris, Blanche	H. E.	Jr.	Tennant, Iowa
Morris, David Clyde	Min.	Jr.	Edmond, Okla.
Morris, Homer	M. E.	Soph.	Yamhill
Morris, Mrs. Winifred Dunlap	Opt.		Corvallis

Name.	Course.	Rank.	Home Address.
Morris, Ray August	Agri.	Fr.	Oregon City
Morrison, Eugene Franklin	Min.	Soph.	Williams
Morrison, Ruth	H. E.	Sr.	Hood River
Morrow, William Harold	Agri.	Fr.	Portland
Morse, Mildred Phoebe	H. E.	Soph.	West LaFayette, Ind.
Morse, Wilmetta Emily	H. E.	Sr.	West LaFayette, Ind.
Morton, Ruth	H. E.	Soph.	White Salmon, Wash.
Mosby, David Clayborn	Agri.	Jr.	Corvallis
Moss, Lloyd Arthur	Agri.	Fr.	Hood River
Motz, Fred Allen	Agri.	Jr.	Rock Island, Ill.
Moulton, Arthur Samuel	Agri.	Fr.	Portland
Mudge, Frank	Com.	Spec.	Knappa
Mulkey, Oren	E. E.	Jr.	Myrtle Creek
Muller, Ruth Margaret	H. E.	Fr.	Eugene
Munford, Ruby Elizabeth	H. E.	Sr.	Senecaville, Ohio
Munson, Robert Bliss	M. A.	F. Yr.	Oakland, Calif.
Murneek, Andrew Edward	Agri.	Jr.	Talsen, Russia
Murphy, Clara May	H. E.	Jr.	Eden
Murphy, Frank Thomas	Agri.	Jr.	Alhambra, Calif.
Myers, Clarence William	Agri.	Jr.	Moneta, Calif.
Myers, Francis Parker	M. E.	Soph.	Corvallis
Myers, Stanley Howard	E. E.	Soph.	Corvallis
Naderman, George Vincent	M. E.	Fr.	Turner
Nash, Jack Walker	C. E.	Sr.	Albany
Neal, Martena Ruth	H. E.	Soph.	Long Beach, Calif.
Neale, Aubrey Richard	Agri.	Sr.	Corvallis
Neill, Alletah Marcella	Opt.		Chippewa Falls, Wis.
Nelson, Willard Young	C. E.	Sr.	Lafayette
Neovius, Carl Fredrick	Com.	Fr.	Helsingford, Finland
Nesbitt, Clarence Scott	Com.	Soph.	New Plymouth, Idaho
Nestelle, Fred William	Agri.	Soph.	Corvallis
Neuhaus, Karl Frank	Agri.	Fr.	Ferndale, Calif.
Nevius, John	Agri.	Fr.	Long Beach, Calif.
Newell, Joseph Webster	Agri.	Jr.	Portland
Newins, Geraldine	H. E.	Sr.	Corvallis
Newman, Erbine	Agri.	Soph.	Scott Mills
Newman, Meier	Com.	Spec.	Portland
Newmeyer, Ruth	H. E.	Sr.	Salem
Newton, Bessie Fay	H. E.	Spec.	Corvallis
Niblin, Amy Christine	H. E.	Soph.	Portland
Niblin, Ruth Calvina	H. E.	Fr.	Portland
Nichols, Jr., Benjamin Hodge	M. E.	Fr.	Glendale, Calif.
Nichols, Mrs. Eleanor Bailey	H. E.	Spec.	Corvallis
Nichols Floyd Myron	M. A.	Spec.	Corvallis
Nichols, Fred Herbert	Agri.	Soph.	Glendale, Calif.
Nichols, Rudolph	Agri.	Soph.	Corvallis
Nichols, Tressa Elizabeth	Opt.		Corvallis
Nielson, Sidney Maurice	Agri.	Fr.	Ferndale, Calif.

Name.	Course.	Rank.	Home Address.
Nikka, Albert	Phar.	Fr.	Astoria
Nisley, Barbara Hoffman	H. E.	Fr.	Portland
Nolan, Victor Edward	Com.	Jr.	Corvallis
Noles, Carl	Com.	Jr.	Dundee, Texas
Nordhoff, Franklin Whitall	Agri.	Spec.	National City, Calif.
Norman, Ruth	Com.	Jr.	Milton
Norton, Cecil Conrad	Agri.	Fr.	Raymond, Calif.
Norton, Edmund Carlyle	Com.	Spec.	Corvallis
Norton, Harry Stewart	Com.	Fr.	Coquille
Norton, Lola Catherine	H. E.	Jr.	Vacaville, Calif.
Norton, Mabel	H. E.	Sr.	Vacaville, Calif.
Norton, Walter Bert	Agri.	Jr.	Vacaville, Calif.
Oakes, Mary Agnes	H. E.	Sr.	Grants Pass
O'Harra, Herman Edward	Agri.	Soph.	Weston
Oliver, Alfred Weaver	Agri.	Soph.	Salem
Oliver, Burt Leroy	Com.	F. Yr.	Burns
Oliver, Fred Lloyd	Agri.	Fr.	Monroe, Wash.
Olsen, Edward Carl	Com.	F. Yr.	Portland
Olsen, Leander	For.	Fr.	Moroni, Utah
O'Neill, Larkin Alucius	Agri.	Fr.	Mountain Home, Idaho
O'Neil, William James	L. E.	Jr.	Chippewa Falls, Wis.
Ono, Robert Tokiro	Agri.	Sr.	Nuda, Echigo, Japan
Orem, Elsie Hazel	H. E.	Sr.	Klamath Falls
Orr, Victor	Agri.	Soph.	Corvallis
Osborne, Gifford Lawson	M. A.	S. Yr.	Aurora
Osburn, Orren Edgar	E. E.	Soph.	The Dalles
Ostrander, Aubrey	Agri.	Soph.	Portland
Otis, Ralph Grey	Agri.	Jr.	Newberg
Overholser, Leroy Leighton	Com	Sr.	Jefferson
Owens, Jacob Henry	Agri.	Fr.	Raymond, Wash.
Page, Charles Culver	Agri.	Spec.	Crookston, Minn.
Page, Chester Leroy	E. E.	Fr.	Whitehall, Mont.
Page, Harold	Agri.	Fr.	Whitehall, Mont.
Paine, Charles Levi	Agri.	Fr.	Caldwell, Idaho
Paine, Edward Allen	E. E.	Jr.	Portland
Palmer, Bertie Cecil	Agri.	Fr.	Jordan Valley
Palmer, Charles Luther	Phar.	F. Yr.	Baker
Palmer, Lowell Elbert	M. A.	T. Yr.	Jordan Valley
Palmer, Ralph Russell	Phar.	Sr.	Grand Junction, Colo.
Palmer, Walter	Phar.	Soph.	Grand Junction, Colo.
Palmer, Winona Marion	H. E.	Voc.	Silverton
Pardridge, John	Agri.	Spec.	Pasadena, Calif.
Parker, Lewis Griffin	Agri.	Fr.	Needles, Calif.
Paroni, Romeo	Agri.	Fr.	Berkeley, Calif.
Parpala, Taimie Armas	Agri.	Sr.	Nasel, Wash.
Parr, Fern Gail	H. E.	Sr.	Woodburn
Parrish, Philip Hammon	Agri.	Jr.	Corvallis
Parrish, Robert	Agri.	Jr.	Corvallis

Name.	Course.	Rank.	Home Address.
Partin, Rae	H. E.	Soph.	Summer Lake
Passmore, Dorothy Ellen	H. E.	Sr.	Tualatin
Patterson, Margaret	H. E.	Soph.	Ashland
Patton, Harry Clifford	L. E.	Jr.	Macleay
Paull, James Gregory	Agri.	Soph.	Los Angeles, Calif.
Paulsen, Edward Meier	L. E.	Sr.	Portland
Payne, Merle Henry	For.	S. C.	Roseburg
Peabody, Natalie Bemus	Opt.		Castle Rock, Wash.
Pearcy, Harry Leland	Agri.	Sr.	Portland
Pearson, Roderic	C. E.	Sr.	Portland
Pease, Pauline Mary	H. E.	Sr.	Portland
Pechin, William	Com.	Jr.	Forest Grove
Pendergrass, James Elmo	Phar.	Spec.	Clovis, Calif.
Peterson, Inez	Com.	Fr.	Corvallis
Peterson, Ira	Agri.	Soph.	Corvallis
Peterson, Robert	Agri.	Fr.	Aumsville
Pfouts, George Ward	M. A.	F. Yr.	Monroe
Phetteplace, Edwin Erastus	Phar.	Soph.	The Dalles
Philippi, Albert Roy	Agri.	Spec.	Early
Philips, James Commons	Agri.	Spec.	Seattle, Wash.
Phillips, Columbus	Com.	F. Yr.	Corvallis
Phillips, Elijah Edward	Min.	Spec.	Salem
Phillips, Hazel Elsie	Opt.		Corvallis
Pierce, Loyd Byron	Agri.	Spec.	La Grande
Pietzker, Henry Fred	E. E.	Soph.	Portland
Pimm, Charles Jesse	E. E.	Jr.	Corvallis
Pinckney, Dunbar	Agri.	Jr.	Aberdeen, Wash.
Pine, William Douglas	Agri.	Soph.	Berkeley, Calif.
Pinkerton, Harry Bennett	Agri.	Soph.	Moro
Pinn, Frederick Edward	E. E.	Jr.	White Salmon, Wash.
Pitney, Mary Eleanor	H. E.	Soph.	Junction City
Plank, Esther	H. E.	Sr.	Woodburn
Platt, Dwight Gilbert	M. E.	Jr.	Idaho Falls, Idaho
Poling, Harold Wayne	Agri.	Fr.	Portland
Polson, Nellie Irene	H. E.	Soph.	Mt. Vernon
Poole, Roy Mabee	Min.	Fr.	Beaverton
Porter, Ercil Dale	E. E.	Soph.	McMinnville
Porter, Harry Baxter	M. E.	Sr.	Yoncalla
Porter, Ted John	Agri.	Soph.	Halsey
Post, Clara Olga	Com.	Jr.	Blachly
Post, Elmer Oren	Agri.	Jr.	Blachly
Potter, Genevieve	H. E.	Sr.	Salem
Powell, Charles Kelly	Agri.	Sr.	Fruitland, Idaho
Powell, Frank Braxton	Agri.	Sr.	Monmouth
Powell, Lydia	H. E.	Jr.	Monmouth
Powell, William Lester	Agri.	Soph.	Azusa, Calif.
Powers, Fred	I. A.	Jr.	Oakland
Prather, Marie Alma	Com.	Fr.	Corvallis

Name.	Course.	Rank.	Home Address.
Prather, Mildred Esther	H. E.	Fr.	Corvallis
Prentiss, Mrs. Sara Watt	H. E.	Jr.	Bay City
Preston, Edward Lincoln	Agri.	Fr.	Dallas
Prill, Alice	H. E.	Sr.	Chetek, Wis.
Prindle, Ray	E. E.	Jr.	Payette, Idaho
Prindle, Susan Esther	H. E.	Fr.	Fossil
Pritchard, Robert Arthur	I. A.	Fr.	Portland
Proebstel, John Elden	Agri.	Fr.	Big Pine, Calif.
Pryer, Clarence Edwin	Phar.	F. Yr.	Fortuna, Calif.
Purrington, Leland Lincoln	Agri.	Voc.	Sebastopol, Calif.
Putnam, Wyatt Huston	M. A.	F. Yr.	Fossil
Raab, Edith Belle	H. E.	Fr.	North Bend
Rackleff, David Edward	Phar.	F. Yr.	Florence
Radcliff, Edward Everett	Agri.	Fr.	Burbank, Calif.
Raddas, Gladys	Com.	S. Yr.	Corvallis
Rains, Opal Irene	H. E.	Fr.	West Linn
Ramsdell, George Vittz-James	Agri.	Soph.	Portland
Rand, Earl	Agri.	Jr.	Irrigon
Rawlings, Ellen Madeline	H. E.	Sr.	Albany
Ray, Howard	Agri.	Soph.	Roslyn, Wash.
Raymond, Thayer	H. E.	Fr.	Raymond, Wash.
Ream, Rebecca	H. E.	Spec.	Sioux City, Iowa
Rearden, Barton,	I. A.	Fr.	Corvallis
Rearden, Henry John	Com.	Fr.	Corvallis
Reber, Albert Roy	Agri.	Soph.	Kansas City, Kansas
Redmond, Agnes Theresa	H. E.	Soph.	Portland
Reed, Ada Jeanette	H. E.	Soph.	Portland
Reed, Frank Leland	For.	Fr.	Hemet, Calif.
Reese, Neilson Walker	Hi. E.	Soph.	Corvallis
Reeves, Edgar Allen	Agri.	Fr.	McMinnville
Regnell, Lloyd Clifford	L. E.	Fr.	Hood River
Reichart, Emanuel Henry	Agri.	Sr.	Corvallis
Reichart, Robert Ray	Com.	Jr.	Corvallis
Reid, Ralph	Min.	Fr.	Portland
Reitsma, Ray	Com.	F. Yr.	Portland
Renfro, Charles Harold	E. E.	Sr.	Eugene
Reynolds, Earl Childers	Agri.	Fr.	La Grande
Reynolds, Frederick William	E. E.	Fr.	Camas, Wash.
Reynolds, Hugh Milton	Agri.	Jr.	Pasadena, Calif.
Rhodes, Solomon Martin	Agri.	Fr.	Covington, Tenn.
Rice, Clarence De Puy	Agri.	Soph.	Redmond
Rice, James Leonard	Agri.	Voc.	Portland
Rice, Leaton Alanson	Min.	Soph.	Corvallis
Richards, Dale Everette	Agri.	Sr.	Kalispell, Mont.
Richards, Lorene	Com.	Jr.	Corvallis
Richey, Lester	For.	Fr.	Corvallis
Richman, Parnell	Agri.	Spec.	Sutherlin
Richter, Henry Carl	Agri.	Sr.	Salem

Name.	Course.	Rank.	Home Address.
Richter, Paul Eugene	Agri.	Fr.	Oak Grove
Ricketts, Ellsworth Gould	H. E.	Fr.	Portland
Riddle, Julius	E. E.	Fr.	Roseburg
Rigdon, Harriet	H. E.	Sr.	National City, Calif.
Riippa, Wainard	Min.	Jr.	Portland
Risley, Hayden Israel	M. E.	Fr.	Albany
Ritchie, Douglas William	Agri.	Soph.	Corvallis
Roberts, Clyde Stewart	For.	Spec.	Portland
Roberts, Jessamy Lillian	H. E.	Soph.	Portland
Roberts, Melvin Parker	Agri.	Spec.	Arcata, Calif.
Robertson, Catharine	H. E.	Fr.	Portland
Robins, Mabel Gertrude	H. E.	Spec.	Harriman
Robinson, Paul Winfield	Phar.	Spec.	Corvallis
Robson, Allan Edwin	M. E.	Sr.	Corvallis
Rock, John Fairbank	Agri.	Fr.	Santa Barbara, Calif.
Rock, John Herbert	Agri.	Spec.	Oretown
Rodgers, Gladys Belle	H. E.	Jr.	Gardena, Calif.
Rodgers, Hugh Graham	Agri.	Soph.	Cupertino, Calif.
Roehrig, Fredrick Austin	E. E.	Soph.	Pasadena, Calif.
Rogers, Mary Alice	H. E.	Soph.	Corvallis
Rogers, Wilbur Leslie	E. E.	Soph.	Corvallis
Rohde, George	Phar.	Jr.	Portland
Rohr, Frank Charles	M. E.	Sr.	Astoria
Romans, Squire Bernard	Agri.	Voc.	Danbury, Conn.
Romig, Frank Vernon	M. E.	Sr.	McCoy
Rooper, William	Phar.	Spec.	Antelope
Roseman, Arthur Mills	Agri.	Fr.	Corvallis
Roseman, Charles Hammer	Agri.	Sr.	Corvallis
Roseman, Edward	Agri.	Sr.	Corvallis
Ross, Linden Ninde	Agri.	Voc.	Los Angeles, Calif.
Ross, Myrtle Vivian	H. E.	Spec.	Pendleton
Rowntree, Kenneth	Min.	Soph.	Hillsdale
Runyan, Wilbur Arthur	Hi. E.	Soph.	Portland
Rush, Benjamin	C. E.	Jr.	Elgin
Russell, Charles	Agri.	Fr.	Pendleton
Russell, Frank	L. E.	Jr.	Portland
Russell, John M.	Agri.	Voc.	Portland
Russell, Ralph	Agri.	Spec.	La Grande
Ruthven, Arthur Rerford	Agri.	Voc.	Corvallis
Sahasrabudhe, Janardan Vishwanath	Agri.	Fr.	Nagpur, C. P. India
Samuelson, Carl Reinhald	M. A.	T. Yr.	Colton
Samuelson, Oliver Lorenzo	Agri.	Spec.	Brownsville
Sanders, Lewis Claude	I. A.	Jr.	Corvallis
Sanderson, Maysel Ellen	H. E.	Sr.	Klamath Falls
Sandon, Helen Beatrice	H. E.	Fr.	Corvallis
Sarpola, Alexander	For.	Fr.	Astoria
Sato, Juemon	Agri.	Sr.	Corvallis

Name.	Course.	Rank.	Home Address.
Satterlee, Guy Norman	Agri.	Spec.	Tidewater
Saunders, Towle Edward	Min.	Fr.	Portland
Sawyer, Doris	H. E.	Soph.	Salem
Sayer, Noble Gregory	H. E.	Spec.	Condon
Schmidt, Ernest Carl	Com.	S. Yr.	Corvallis
Schneider, Nicholas	Agri.	Voc.	Portland
Schooley, Paul	Agri.	Sr.	Santa Ana, Calif.
Schoth, Albert Joseph	Agri.	Soph.	Oregon City
Schott, Rena	H. E.	Soph.	Salem
Schreiber, Martin Andrew	Agri.	Sr.	McMinnville
Schrepel, Oliver Henry	Agri.	Sr.	Corvallis
Schroeder, Bertha Amelia	H. E.	Sr.	Corvallis
Schroeder, Carl Alfred	Agri.	Fr.	Portland
Schubert, Ben	L. E.	Sr.	Silverton
Schultz, Elsie Elizabeth	H. E.	Sr.	Gresham
Schuster, Earl John	Phar.	Sr.	Corvallis
Schwarz, George Marion	E. E.	Fr.	Portland
Scott, Albert Miles	Agri.	Soph.	Ada
Scott, Clarence Vincent	Agri.	Jr.	Oak Park, Ill.
Scott, Elmer Riggs	Agri.	Fr.	Ada
Scrivner, Ina	H. E.	Sr.	Boise, Idaho
Sears, Briton	M. E.	Spec.	Portland
Sears, Cassie	Opt.		Amity
Seeley, Hazel Martenia	Opt.		Independence
Seely, Elmer Glen	Agri.	Jr.	Wilsonville
Seely, Marie	H. E.	Voc.	Medford
Seggel, Louis William	Agri.	Sr.	Jersey City, N. J.
Seibert, Harry	E. E.	Sr.	Pendleton
Selby, Halbert Edgerton	Agri.	Jr.	Bellingham, Wash.
Selover, Eleanor Marie	H. E.	Fr.	Klamath Agency
Selph, Raymond	Agri.	Soph.	Sheridan
Sessions, Philip Roddis	Com.	Jr.	Portland
Shake, Harold	Phar.	Spec.	Payette, Idaho
Shake, Rodney Hudson	E. E.	Fr.	Payette, Idaho
Shank, Arthur Lincoln	Agri.	Soph.	Seattle, Wash.
Shankland, Albert	I. A.	Soph.	Estacada
Sharp, Anne	H. E.	Fr.	Yamhill
Shattuck, Mrs. Goldie Opal	H. E.	Voc.	Burns
Shaver, Leonard Raymond	Min.	Fr.	Portland
Shaw, Ralph Fred	Agri.	Spec.	Portland
Shawver, Loyd James	Agri.	Voc.	McMinnville
Shedd, Bertha Lucile	H. E.	Soph.	Shedd
Shepard, Fred Cecil	Agri.	Sr.	Roosevelt
Sheppard, Will Orville	Com.	Fr.	Hood River
Sherrod, Frances Fern	H. E.	Fr.	Berkeley, Calif.
Shields, Harley Rex	Phar.	Sr.	Amity
Shook, Gaylord	Phar.	Spec.	Meridian, Idaho
Short, Clara Elaine	Opt.		Corvallis
Short, Vivian Frank	Agri.	Voc.	Corvallis

Name.	Course.	Rank.	Home Address.
Sibley, Cassius	Agri.	Fr.	San Bernardino, Calif.
Sieberts, Adolph Gustaff	Com.	Jr.	Portland
Silver, Kathleen	H. E.	Voc.	Ashland
Silver, Madeleine	H. E.	Voc.	Ashland
Simpson, John Ernest	M. E.	Jr.	Portland
Sims, Andrew Raymond	Min.	Soph.	Woodburn
Sims, Bonnie Marine	H. E.	Fr.	Sheridan
Singh, Mahadeo	Agri.	Soph.	Hasanpore, India
Sinks, Victor Hammond	E. E.	Sr.	Portland
Sitton, Paul	Agri.	Voc.	Carlton
Sivenius, Charles Victor	Com.	Soph.	Astoria
Skelton, Albert Gordon	C. E.	Jr.	Corvallis
Skelton, Mary Vernon	H. E.	Sr.	Corvallis
Skidmore, Maude May	H. E.	Fr.	Curtin
Slayton, Mabel Adaline	H. E.	Fr.	Prineville
Slayton, Mildred Lura	H. E.	Fr.	Prineville
Smilie, Robert Stanley	L. E.	Soph.	Oakland, Calif.
Smith, Clifton	Min.	Sr.	Salem
Smith, Doyle Bertie	Com.	Fr.	Salem
Smith, Elizabeth Hargraves	H. E.	Sr.	Corvallis
Smith, Elva	H. E.	Soph.	Portland
Smith, Harvey	Agri.	Soph.	Corvallis
Smith, Henry Anderson	Com.	Fr.	Portland
Smith, Hiram Chester	I. A.	Soph.	Newberg
Smith, Howard Parvin	Agri.	Sr.	Corvallis
Smith, Hubert	Phar.	Spec.	Clovis, Calif.
Smith, Kathryn Matilda	H. E.	Spec.	Marshfield
Smith, Laurence Howard	Com.	Soph.	Frances, Wash.
Smith, Leone Adell	H. E.	Soph.	Carnation
Smith, Margaret Irene	Com.	Soph.	Medford
Smith, Marion Ruth	H. E.	Voc.	Weed, Calif.
Smith, Orville Charles	Min.	Fr.	Albany
Smith, Wendell	Agri.	Fr.	Jennings Lodge
Smith, Wallace	Agri.	Fr.	Corvallis
Smith, Wilbur Joseph	M. E.	Fr.	Rainier
Smyth, Darius	Phar.	Sr.	Baker
Smyth, Fred Wendell	Com.	Fr.	Diamond
Snowberger, Fred	Phar.	F. Yr.	Payette, Idaho
Soden, Frances Jeanette	H. E.	Spec.	Portland
Soderstrom, Victoria Jennie	H. E.	Soph.	Halsey
Sodhi, Charn Singh	Com.	Jr.	Quetta, India
Somers, Eugenia Hazel	Agri.	Sr.	Corvallis
Somers, George Brooks	Min.	Soph.	Ft. Wayne, Ind.
Soo, Taki Herbert	Agri.	Sr.	Hong Kong, China
Soth, Rodney Olen	Agri.	Sr.	Toledo, Iowa
Southern, Raymond Duncan	E. E.	Fr.	Brownsville
Spalding, Anna Mary	H. E.	Voc.	San Francisco, Calif.
Spalding, Donald Parker	For.	Jr.	Lowell, Mass.
Sprague, Hazel Emma	H. E.	Jr.	Corvallis

Name.	Course.	Rank.	Home Address.
Spriggs, James Llewellyn	Agri.	Fr.	Portland
Staiger, Guy	Phar.	Fr.	Corvallis
Stark, Ailene	H. E.	Soph.	Eugene
Stark, Leslie	Com.	Soph.	Holdrege, Nebr.
Stearns, Carey Sumner	Agri.	Voc.	Prineville
Steele, Roy	Agri.	Fr.	Portland
Steiger, Freda Amelia	H. E.	Fr.	Klamath Falls
Stephens, James Thomas	For.	Spec.	Beagle
Stephenson, Mervyn	Hi. E.	Fr.	Condon
Steusloff, Claude	Agri.	Fr.	Salem
Stevens, Kenneth	Com.	Fr.	Albany
Stewart, Harry James	Agri.	Fr.	Portland
Stewart, James Oscar	Agri.	Fr.	Lorella
Stewart, Stanley Earl	Agri.	Spec.	Seattle, Wash.
Stickler, Walter Clarke	Agri.	Voc.	Pleasanton, Calif.
Stidd, Charles Leland	Com.	Jr.	Corvallis
Stidd, Erma Phoebe	Com.	Spec.	Corvallis
Stimpson, Etta Lorene	H. E.	Soph.	Corvallis
Stockdale, Elbert Walter	Com.	Fr.	Mt. Vernon
Stone, Herman Al	For.	Soph.	Woodburn
Stoneberg, Hugo	Agri.	Sr.	Coburg
Stoneroad, Paul Lewis	Agri.	Fr.	Portland
Stoppenbach, Donald Chapman	E. E.	Sr.	Portland
Storm, Earl Vasberg	For.	Soph.	Milton
Storms, Kate Clare	Opt.		Laredo, Mo.
Storrs, Isabella Garrison	H. E.	Fr.	Pomona, Calif.
Storrs, Ruth Parsons	H. E.	Fr.	Pomona, Calif.
Story, Carl Leverne	Com.	Sr.	Airlie
Storz, Charles	Phar.	Sr.	Portland
Stow, William Raymond	Agri.	Soph.	Salinas, Calif.
Strader, Ruth Moore	H. E.	Fr.	Pomona, Calif.
Straughn, Orson	Agri.	Soph.	Pendleton
Streiff, Albrecht	E. E.	Jr.	Hillsdale
Strome, Carey Lloyd	Agri.	Sr.	Corvallis
Strome, Glenn Smyth	Agri.	Soph.	Eugene
Strome, Katherine Marcelle	H. E.	Fr.	Corvallis
Strong, Geoffrey	Com.	Fr.	Myrtle Creek
Strong, Ida Marianne	H. E.	Spec.	Monmouth
Strowbridge, Howard Blasdel	Agri.	Fr.	Portland
Struck, Martha Bertha	H. E.	Jr.	Lyle, Wash.
Stuwe, Herman Carl	I. A.	T. Yr.	Aurora
Summers, Mitchell	Com.	Fr.	Condon
Supple, Joseph	Agri.	Soph.	Oakland, Calif.
Sutherland, Frank Gillette	Agri.	Jr.	Honolulu, Hawaii
Sutton, Harry Allen	Min.	Sr.	Aumsville
Swan, Harry Twiss	Min.	Fr.	Baker
Sweeney, Philips Brooks	Agri.	Fr.	Walla Walla, Wash.
Tadlock, Laura Christine	H. E.	Soph.	Corvallis
Tallmadge, Frances Moore	H. E.	Voc.	Portland

Name.	Course.	Rank.	Home Address.
Tamerlane, Rex	M. E.	Sr.	Portland
Tanner, Clifford Gilbert	Agri.	Jr.	Morro, Calif.
Tatham, Frank Selby	Com.	Fr.	Portland
Taylor, Armond	For.	Spec.	Klamath Falls
Taylor, Eva Gertrude	H. E.	Voc.	Corvallis
Taylor, Herbert Harold	For.	Fr.	Lowell, Mass.
Taylor, Harold	Agri.	Sr.	Baker
Teeter, Mrs. Katharine Hitchcock	H.E.	Spec.	Corvallis
Thayer, Harold	Agri.	Soph.	Rainier
Thayer, Jessie	Opt.		Rainier
Thayer, John Alden	Agri.	Fr.	Rainier
Theobald, Wanda Muir	H. E.	Sr.	Silverton
Thomas, Frank	Agri.	Fr.	Salt Lake, Utah
Thomas, George Warren	Agri.	Soph.	Auburn, Ind.
Thomas, Herbert Franklin	For.	Spec.	Duluth, Minn.
Thomas, Marie Laura	H. E.	Fr.	Auburn, Ind.
Thomas, Ralph William	C. E.	Sr.	Corvallis
Thompson, Benjamin Garrison	Agri.	Spec.	Shedd
Thompson, Byron Cooley	Com.	Fr.	Brownsville
Thompson, Cecil Adelbert	Agri.	Soph.	Stevensville, Mont.
Thompson, Earl Horstad	Agri.	Sr.	Pasadena, Calif.
Thompson, Elmer Julian	Agri.	Sr.	Minneapolis, Minn.
Thompson, Gertrude Luella	Opt.		Portland
Thompson, Mildred Irene	H. E.	Spec.	Pasadena, Calif.
Thoms, Harold Wayne	Min.	Soph.	Jefferson
Thrailkill, Jay Everett	M. E.	Soph.	Weiser, Idaho
Throne, Robert Franklin	M. E.	Jr.	Ashland
Tidball, Lynn Hudson	Com.	Soph.	Corvallis
Tillery, Gladys	H. E.	Fr.	Corvallis
Tillery, Merle	Com.	Jr.	Corvallis
Tilley, Walker Boutelle	For.	Jr.	Arcata, Calif.
Tilton, Arthur James	Agri.	Fr.	Portland
Tinker, George Henry	Agri.	Voc.	Seattle
Todd, Jr., Charles Brooke	Agri.	Soph.	Webster Grove, Mo.
Tonseth, Einar Aune	Com.	F. Yr.	Fairbanks, Alaska
Tooker, Floyd Llewellyn	Com.	Fr.	Salem
Towne, Elbert Louis	Opt.		Carrolls, Wash.
Towne, Mildred Beulah	H. E.	Fr.	Carrolls, Wash.
Trigg, John William	Agri.	Voc.	Ferndale, Calif.
True, Mrs. Elsie Gay	H. E.	Sr.	Corvallis
Truesdell, Charles Milton	Agri.	Fr.	Redlands, Calif.
Tubbesing, William Herman	M. E.	Fr.	Portland
Tulley, Stewart Wendell	Agri.	Sr.	Corvallis
Turnbull, James Lockhart	Min.	Jr.	Mooreville
Turner, Arthur Edward	I. A.	Sr.	North Powder
Turner, Harold Willard	I. A.	Jr.	Eugene
Turner, Jesse Oland	Agri.	Sr.	Heppner
Turner, Winnifred	H. E.	Sr.	Corvallis
Tuttle, LeRoy James	For.	Soph.	Cumberland, Wis.

Name.	Course.	Rank.	Home Address.
Tweed, Catherine	H. E.	Fr.	Corvallis
Tweed, Robert	Agri.	Sr.	Corvallis
Tyrrel, Claude Alonzo	Agri.	Fr.	Alhambra, Calif.
Underwood, Edward Franklin	Agri.	Sr.	Dufur
Underwood, Joseph Marion	Min.	Soph.	Pasadena, Calif.
Uyei, Nao	Agri.	Sr.	Ohyodo, Mil, Japan
Van Buskirk, Elinor	H. E.	Fr.	Portland
Van Buskirk, Mac	Agri.	Soph.	Portland
Van Couvering, Martin	Min.	Sr.	Riverside, Calif.
Vandecar, Mary	H. E.	Voc.	Haines
Van Horn, Ray Radecliff	Com.	Fr.	Fossil
Van Norden, Freeman Loys	Agri.	Soph.	The Dalles
Van Orden, Walter Hamilton	Min.	Spec.	Corvallis
Van Orsdel, Clark Thomas	L. E.	Spec.	Dallas
Van Raes, Fred Adolph	Com.	F. Yr.	Fairbanks, Alaska
Van Winkle, Dorothy Charlotte	H. E.	Spec.	Spokane, Wash.
Varma, Sanghi Ram	Agri.	Soph.	Batala, India
Vaughan, Blanche La Verne	Com.	S. Yr.	Smithfield, Ill.
Vedder, Harold Troxell	M. A.	S. Yr.	Grants Pass
Vestal, Edgar	Agri.	Sr.	Payette, Idaho
Vestal, James Finix	I. A.	Fr.	Eagle Point
Vierhus, Albert Victor	Min.	Soph.	Oregon City
Vihari, Ambalal Jivabhoy	Com.	Fr.	Baben, India
Vilas, George Warren	Com.	Jr.	Medford
Vincent, George Sylvester	C. E.	Sr.	Sherwood
Virgil, Fannie Eldora	H. E.	Soph.	Klamath Falls
Visel, Nelson	Agri.	Sr.	Santa Ana, Calif.
Vogel, Anna	H. E.	Spec.	Corvallis
Vogel, Charles Emmons	Agri.	Voc.	Corvallis
Vogelsang, Dorothy Marie	Com.	F. Yr.	Corvallis
Von Lehe, Herbert Henry	Agri.	Soph.	Corvallis
Voruz, Ruth	H. E.	Fr.	Baker
Waddell, Gladys	Com.	Spec.	Long Beach, Calif.
Wagner, Henrietta	H. E.	Soph.	Laurel, Ind.
Waite, Katherine Douglas	Phar.	Fr.	Roseburg
Wakeman, William James	L. E.	Sr.	Portland
Walen, Lulu	H. E.	Fr.	North Yakima, Wash.
Walker, Claude Gilbert	Agri.	Sr.	Fairbanks, Alaska
Walker, Ethel Elaine	H. E.	Fr.	Corvallis
Walker, Eva Estelle	H. E.	Sr.	Florence
Walker, Thomas	Agri.	Voc.	Fairbanks, Alaska
Walling, Ethel Lucile	Opt.		Salem
Walton, Fremont Winston	Agri.	Jr.	Salem
Walton, Roy Frank	M. E.	Fr.	Portland
Ward, Sidney Valentine	Com.	Voc.	Goldendale, Wash.
Wascher, Frank Earl	Agri.	Soph.	Portland
Watenpaugh, Harold Leory	Agri.	Fr.	Ontario, Calif.
Waterfall, Charles Hardy	Com.	Jr.	Vancouver, B. C.
Waterman, Fay Ernestine	Phar.	Sr.	Hermiston

Name.	Course.	Rank.	Home Address.
Waterman, Whitney	Agri.	Fr.	Pasadena, Calif.
Waters, Frank Northup	E. E.	Fr.	Portland
Watson, Irvin	Agri.	Soph.	Corvallis
Watson, Virginia Glenn	Opt.		Aberdeen, Wash.
Wattenburger, Ina	H. E.	Jr.	Echo
Watters, William Harp	Min.	Sr.	Corvallis
Weatherly, Jessie	Com.	Fr.	Portland
Weaver, Clifford Scott	Phar.	Spec.	Springfield
Webber, John	Min.	Fr.	Independence
Weber, Richard Merle	Agri.	Fr.	The Dalles
Wedel, Nettie	H. E.	Voc.	Aberdeen, Idaho
Weller, Theodore Warford	Agri.	Sr.	Corvallis
Wells, Richard	Agri.	Spec.	Seattle, Wash.
Werlein, Edward Eldridge	E. E.	Fr.	Portland
Werner, Richard John	Agri.	Jr.	Los Angeles, Calif.
Werth, Conrad Walter	E. E.	Soph.	Portland
Wescott, Merton Girard	Agri.	Spec.	Winter Harbor, Me.
West, Ralph Lowell	Agri.	Sr.	Westport
Westervelt, Raymond	Min.	Fr.	Portland
Wetteland, Rolf Theodore	M. E.	Sr.	Camas, Wash
Wharton, Jane Azalea	Com.	Spec.	Roseburg
Wharton, Malcolm	Agri.	Fr.	Garden Grove, Calif.
Wheeler, Alfleda Margaret	H. E.	Spec.	Corvallis
Wheeler, Alvin Wilbur	Agri.	Sr.	Corvallis
Wheeler, Coleman Hawley	L. E.	Fr.	Portland
Wheeler, Harold Edward	Com.	Soph.	Portland
Whipple, Gladys Louise	H. E.	Sr.	Corvallis
Whitby, Harris	Com.	Jr.	Corvallis
White, Charles Elmer	Agri.	Voc.	Cato, N. Y.
White, Ethel Belle	Opt.		Brownsville
White, Harold	Com.	F. Yr.	Kerby
White, Roy Whitworth	Agri.	Spec.	Seattle, Wash.
White, Walter	Phar.	Sr.	McMinnville
Whitham, Strayer Earle	Agri.	Spec.	Corvallis
Whitmore, Corrine Marion	H. E.	Voc.	Jermyn, Pa.
Wicks, Forrest Thrift	M. E.	Jr.	Albany
Wiglesworth, Myra	Com.	Sr.	Union
Wilcox, Lyle	Agri.	Sr.	Milton
Wilcox, Ralph	Com.	Jr.	Portland
Wild, James Herbert	Agri.	Fr.	Portland
Wilkes, Clair	Agri.	Jr.	Hillsboro
Wilkins, Leroy Edmond	Agri.	Fr.	Soquel, Calif.
Wilkins, William Elmer	Com.	Spec.	Condon
Willer, Ernest Koch	Phar.	Spec.	Detmold, Germany
Willey, Earl Clark	M. E.	Soph.	Coquille
Williams, Ivan	M. E.	Spec.	Athens, N. Y.
Williams, Llewellyn Morris	Com.	Soph.	Corvallis
Williams, Miriam Blanche	H. E.	Sr.	Fort Sanderdale, Fla.
Williams, Richard	Agri.	Spec.	Newberg

Name.	Course.	Rank.	Home Address.
Williams, Richard Hippsley	Agri.	Fr.	Salmon, Idaho
Williams, Robert Franklin	Agri.	Fr.	Coye
Williams, William	E. E.	Jr.	Portland
Williamson, Martha Jane	H. E.	Fr.	Corvallis
Williamson, Pearl Frances	H. E.	Sr.	Albany
Williamson, William Hesper	Agri.	Voc.	Pasadena, Calif.
Willoughby, Charles Elbert	Com.	Fr.	National City, Calif.
Wilmot, Richard Kenneth	For.	Soph.	Portland
Wilt, Clarence Oliver	M. A.	S. Yr.	Corvallis
Wilson, David McKinnen	For.	Sr.	Linnton
Wilson, Jalmar	M. E.	Soph.	Astoria
Wilson, John Bushrod	Agri.	Jr.	Corvallis
Wilson, Olive Isabel	H. E.	Jr.	Yoncalla
Wilson, Otis Estee	M. E.	Fr.	Salem
Wilson, Robert Whipple	Engr.	Spec.	Corvallis
Wilson, Stella Nora	H. E.	Fr.	Salem
Winder, Beatrice Vesta	H. E.	Spec.	Oakland, Calif.
Wingert, Arlo	Agri.	Voc.	Haratine Is., Wash.
Winsor, Charles Joseph	Com.	Spec.	North Bend
Winter, Thaddeus Ardina	Agri.	Fr.	Los Angeles, Calif.
Wise, Clarence Jerome	Com.	Soph.	Corvallis
Witzig, Ivy Emily	H. E.	Sr.	Corvallis
Wolfe, Glenn Alfred	I. A.	Fr.	Corvallis
Wolfe, Ira John	Agri.	Jr.	Mt. Vernon, Wash.
Woodburn, Howard Robert	L. E.	Jr.	Portland
Woodcock, Arthur James	Phar.	Soph.	Portland
Woods, Lee Roy	For.	Sr.	Cottage Grove
Woodsum, Edna May	H. E.	Fr.	Corvallis
Woodward, Roy Elmer	For.	S. C.	Corbett
Woodworth, Gladys	Com.	Spec.	Portland
Woodworth, Grace	Opt.		Portland
Wootton, William Barker	I. A.	Spec.	Astoria
Wotton, Richard	Agri.	Fr.	Friday Harbor, Wash.
Wright, Dorothy Lois	H. E.	Soph.	Portland
Wright, Mark Foss	For.	Sr.	Forest Grove
Wright, Marshall Simpson	Agri.	Fr.	Sierra Madre, Calif.
Wright, Minnie Ethel	H. E.	Jr.	La Grande
Wright, William SoRelle	Agri.	Soph.	San Gabriel, Calif.
Yamamoto, Francis	E. E.	Soph.	Seattle, Wash.
Yates, Eva	H. E.	Soph.	Alsea
Yates, Lloyd Dexter	For.	Jr.	Milton
Yeager, Francis DeWitt	Agri.	Sr.	Centralia, Wash.
Yeatman, Sara Eleanor	H. E.	Sr.	Oakland, Calif.
Young, Adam Glenn	Agri.	Voc.	Atlanta, Ga.
Young, Vida	H. E.	Jr.	Stayton
Zetzman, Wilma Magdalene	H. E.	Voc.	Cornelius
Ziegler, Helen Marie	H. E.	Fr.	White Salmon, Wash.
Ziegler, Laura Elizabeth	H. E.	Fr.	White Salmon, Wash.
Zosel, Elsie Louise	H. E.	Voc.	Salem

SUMMER SCHOOL STUDENTS

(Course classification in the Summer School roll is necessarily arbitrary. Few students register in a single group of subjects. Where the major subject is easily determined it is indicated as Art, Commerce (Com.), Education (Ed.), Home Economics (H. E.), Methods in Teaching (Meth.), Music. College (Coll.) indicates those who took college courses included in two or more of the foregoing or in other subjects. Agriculture (Agri.) indicates Boys' Agricultural Course.)

Name.	Course.	Home Address.
Abraham, Herman J.	Coll	Albany
Abraham, Richard	Meth.	Forest Grove
Abegg, Fred	Coll.	Portland
Anderson, Ella R.	Coll.	Cottage Grove
Anderson, Helen Best	H. E.	Portland
Anderson, Joan	Com.	Medford
Appelman, Marguerite	Mus.	Corvallis
Armstrong, Josephine	Art	Corvallis
Armitage, H. Carleton	Coll.	Sunset Beach, Calif.
Asbahr, Katherine	Coll.	Cornelius
Atwood, Elmina	Coll.	Corvallis
Balcom, Herbert	Meth.	Medford
Baldwin, Ernest L.	Coll.	Winlock, Wash.
Ballard, Alice Julia	H. E.	Meredith
Ballin, Hubert	Coll.	Portland
Bauchet, Herman	Coll.	Condon
Barrett, Inez	H. E.	Portland
Barton, Raymond	Agri.	Salem
Bassett, Olive Pauline	Coll.	Newberg
Beals, Agnes	Coll.	Corvallis
Bechen, Martha Henrietta	Coll.	Hillsboro
Bedynek, John	Mus.	Corvallis
Beebe, Alice	H. E.	Eugene
Beebe, Edith	H. E.	Eugene
Benson, Mary Ellen	Art	Cottage Grove
Benson, Mrs. Orpah	Meth.	Cottage Grove
Birch, Gracia D.	Coll.	Corvallis
Bocklund, Bessie	Meth.	Husum, Wash.
Boies, Etta	Coll.	Corvallis
Bovee, Robert	Coll.	Corvallis
Boyd, Mrs. Martin Francis	Meth.	Corvallis
Bracons, Josephine	Coll.	Portland
Brandes, Irene	Coll.	Portland
Brewer, Grace M.	Coll.	Portland
Brown, Zoe A.	Coll.	Seaside
Buret, C. W.	Meth.	Hillsboro
Burnell, Ruth	Coll.	Claremont, Calif.
Burns, Thomas	Meth.	Corvallis
Cain, Grace	Meth.	Corvallis
Case, Richard	Coll.	Portland
Cavender, Alberta	Coll.	Portland

Name.	Course.	Home Address.
Chioco, Juan	Coll.	St. Domingo, Philippines
Clock, Audrey	Coll.	The Dalles
Cochrane, Adone	Coll.	Albany
Conklin, Evelyn	Art	Grants Pass
Connell, Henry	Meth.	Eatonville, Wash.
Connell, Mrs. Bertha	Coll.	Eatonville
Cooley, Florence	Coll.	Junction City
Cooley, Inez	Coll.	Junction City
Cordley, Dorothea McLouth	Art	Corvallis
Croswhite, John Raymond	Coll.	Long Beach
Cunning, Jennie	Art	Baker
Cunningham, Bessie	Com.	Woodburn
Cunningham, Beulah	H. E.	Corvallis
Damon, Ruth	H. E.	Corvallis
Darby, Herbert	Agri.	Salem
Darling, Ruth	Mus.	Corvallis
Davis, Robert	Meth.	Prineville
Delk, Charles	Agri.	Drain
Denniston, Laneta	Coll.	McMinnville
Deyo, Edna	Meth.	Eagle Creek
Dietsch, Frank	Com.	Day Creek
Dolde, W. E.	Com.	Corvallis
Doolittle, Maida	Coll.	Corvallis
Doxsee, Earl DeWitt	Meth.	Brownsville
Dryden, Winfield Joseph	Com.	Corvallis
Dunn, Lucile	H. E.	Portland
Ellested, Theo.	Meth.	Central Point
Emery, Juanita	Coll.	Corvallis
English, Charles	Meth.	Ashland
Fiedler, Anna	Mus.	Corvallis
Fiedler, Elizabeth Clare	Coll.	Corvallis
Fitts, Grace	Mus.	Corvallis
Foster, Harriett	Coll.	Corvallis
Freyler, Edna	Coll.	Corvallis
Friday, Roberta Fay	Coll.	Hood River
Frost, Louis	Agri.	Salem
Garrett, G. S.	Meth.	Corvallis
Gaskins, Mrs. Leon	Com.	Corvallis
Gates, Pearl Emmogene	Coll.	Corvallis
Gerke, Walter Henry	Coll.	Portland
Gerking, Beulah Bethsheba	Meth.	Pleasant Hill
Goddard, Jackson	Meth.	Cottage Grove
Gooding, Loyd	Meth.	Harrisburg
Green, Helen	Com.	Newberg
Grimes, Etta	H. E.	Portland
Hall, Mildred Agusta	H. E.	Corvallis
Hansen, Harold	Coll.	Portland
Hanson, Manette	Coll.	Corvallis
Hardie, Jessie	Art	Condon

Name.	Course.	Home Address.
Hamlin, Louis	Mus.	Corvallis
Hamlin, Lucile Anna	Art	Corvallis
Hathaway, Marcus Francis	Coll.	Corvallis
Hathaway, Merle Alice	Coll.	Corvallis
Hemphill, John Cannon	Agri.	Albany
Henry, Laurel	Meth.	Pullman, Wash.
Heater, R. E.	Meth.	Hillsboro
Hess, F. P.	Coll.	Corvallis
Hiestand, Zula	Com.	Corvallis
Hill, Ruth Jessie	H. E.	Eugene
Hoaglund, Aurilla	H. E.	Gresham
Hobart, Alvin	Agri.	Silverton
Holt, Hazel	Com.	Corvallis
Horning, Helen Mabel	Coll.	Corvallis
Hubbard, Chauncey Mulks	Coll.	Monroe
Hubbard, Roland	Coll.	Medford
Huddy, Hanora	Meth.	Portland
Hughes, Winfield	Meth.	Ilo, Idaho
Hukill, Myra Evangeline	Coll.	Corvallis
Humphrey, Esther Cynthia	Coll.	Eugene
Irving, Iona	Coll.	Corvallis
Irving, Robert	Agri.	Corvallis
Jackson, Eva	Coll.	Portland
Jackson, Laura	Coll.	Lorane
Johnson, Anna Marie	Meth.	Albany
Jones, O. H.	Meth.	Eugene
Jordan, Marvin	Coll.	Corvallis
Kan, Frank F.	Coll.	Nom Tong, China
Kelly, Ethel	H. E.	Drain
Kerr, Marion	Mus.	Corvallis
Ketchum, Jean	Coll.	Independence
King, William	Meth.	Eugene
Kleinwachter, Bertha	H. E.	Atlanta, Ga.
Knight, Florence	Coll.	San Luis Obispo, Calif.
Lamb, Howard	Coll.	Fossil
Lamoreux, Louis Andre	Coll.	Ft. Wordsworth, N. Y.
Lane, Bernice	Art	Corvallis
Lane, Dorothy Elizabeth	Coll.	Corvallis
Lane, Vivian Maude	Coll.	Harrisburg
Lasswell, Avery Loyd	Coll.	Portland
Leeper, Enid Glenda	Meth.	Corvallis
Lesher, Lucile Josephine	Meth.	Portland
Lewis, Ada Snow	Coll.	Somerville, Mass.
Logan, Helen Elizabeth	Coll.	Escondido, Calif.
Long, Walter Scott	Com.	Portland
Loo, Nai Fat	Coll.	Canton, China
McCornack, Alice	Coll.	Marcola
McCornack, Helen Evelyn	Coll.	Marcola
McFarlane, Mrs. Mary	Meth.	Salem

Name.	Course.	Home Address.
McIntyre, Frank	Coll.	Hartford, Conn.
McIntyre, Frederick	Agri.	Oswego
McKay, James Douglas	Coll.	Portland
McMindes, Elvin Winfield	Com.	Lorane
McPherson, Daisy	H. E.	Pendleton
MacDonald, Helen	Coll.	Corvallis
Manuel, Mildred Martin	H. E.	Oakland, Calif.
Marshall, Julian Stephens	Com.	Portland
Masterton, David	Coll.	Corvallis
Matthews, Verle	Coll.	Corvallis
Matthiew, Theo.	H. E.	Stayton
Mercer, Helen Bernetta	Coll.	Salem
Metzler, Ethel	Coll.	Corvallis
Miller, Emily Marie	Meth.	Corvallis
Miller, Eva	Coll.	Fillmore, Ill.
Miller, Helen	Coll.	Corvallis
Morgan, Beulah Inez	H. E.	Corvallis
Morse, Mildred	H. E.	West Lafayette, Ind.
Morse, Wilmetta	Coll.	West Lafayette, Ind.
Moses, Everett	Mus.	Corvallis
Morton, Ruth	Coll.	White Salmon, Wash.
Myers, Eva	Meth.	Long Creek. Ill.
Newkirk, Rhoda	Meth.	Oregon City
Nichols, A. R.	Meth.	Corvallis
Nichols, Fred	Coll.	Glendale, Calif.
North, David S.	Meth.	Monmouth
Parcher, Phillip	Meth.	Marysville, Mo.
Parpala, Taimie	Coll.	Nasel, Wash.
Parrish, Philip	Com.	Corvallis
Parrish, Robert	Coll.	Corvallis
Passmore, Dorothy Ellen	Coll.	Tualatin
Patterson, Margaret	Meth.	Ashland
Patterson, Winifred	H. E.	Corvallis
Pechin, W. G.	Coll.	Forest Grove
Persinger, Clanton	Com.	Corvallis
Peterson, Joy Cecil	H. E.	Beaverton
Philpott, Elsie	Meth.	Prosper
Pickett, Perry Nathan	Agri.	Salem
Pimm, Alice Petra	Meth.	Philomath
Plank, Esther	Coll.	Woodburn
Prill, Alice	Coll.	Chetek, Wis.
Rawlings, Ellen Madeline	Coll.	Albany
Reed, D. R.	Meth.	Tillamook
Richardson, Ivy Rose	Coll.	Tacoma, Wash.
Ridenour, Elinor	Art	Corvallis
Ripley, Mrs. Miriam Sheldon	Meth.	The Dalles
Robey, Donald	Meth.	Marysville, Mo.
Robinson, Mary	Coll.	Corvallis
Romtvedt, Alvhild	Meth.	Toledo

Name.	Course.	Home Address.
Russell, John Martin	Coll.	Portland
Sarft, Gladys Versal	H. E.	Duluth, Minn.
Sanders, George	Meth.	The Dalles
Sanders, Mrs. Hazel M.	Coll.	The Dalles
Seeley, Hazel	H. E.	Independence
Sellers, Tressa	H. E.	Creswell
Sevy, Genevieve Bertha	Coll.	Milton
Sevy, I. B.	Meth.	Milton
Sevy, Mrs. Orpha	Meth.	Milton
Sherwood, Rose Agnes	Coll.	Portland
Simons, Avery	Agri.	Sodaville
Simons, Glenn,	Agri.	Sodaville
Simons, L. A.	Meth.	Sodaville
Skei, Alfred	Meth.	Mt. Angel
Smith, Elizabeth	H. E.	Gardena, Calif.
Smith, Grace	Meth.	Portland
Spaulding, Donald	Coll.	Lowell, Mass.
Staley, Paul	Agri.	Salem
Stevens, Henry Clowes	Coll.	Portland
Stidd, Charles Leland	Coll.	Corvallis
Storz, Charles	Com.	Portland
Strachan, Lexie	Meth.	Dufur
Straughan, J. A.	Meth.	Pendleton
Strome, Katharine Marcelle	Coll.	Corvallis
Struck, Martha B.	H. E.	Lyle, Wash.
Sweeney, Edna	Meth.	Buell
Thomas, George Randolph	Meth.	Portland
Thomas, Walter	Meth.	Washougal, Wash.
Thompson, J. B.	Meth.	Portland
Tompkins, Mabel	Com.	Monroe
Vanaker, Mrs. W. J.	Art	Corvallis
Vickers, H. A.	Coll.	Corvallis
Vineyard, Sara Bledsoe	Meth.	Boise, Idaho
Wagner, Henrietta	Coll.	Laurel, Ind.
Waterfall, Charles Hardy	Coll.	Vancouver, B. C.
Waters, Roderick	Agri.	Salem
West, George	Agri.	Portland
Whipple, Gladys Louise	H. E.	Portland
Whitby, J. Harris	Coll.	Corvallis
Whitham, Earle	Coll.	Corvallis
Williams, Edna	Mus.	Alpine
Williams, Miriam Blanche	Coll.	Fort Landerdale, Fla.
Williamson, Lorna	Coll.	Corvallis
Williamson, Louise	Com.	Medford
Williamson, Martha	Coll.	Corvallis
Williamson, Pearl Frances	Coll.	Albany
Wilson, Kenneth	Agri.	Salem
Wilt, Clarence Owen	Coll.	Sisters
Witzel, Edith	Meth.	Salem

SPECIAL MUSIC STUDENTS*

Name.	Course.	Home Address.
Adams, Harry	Clarinet	Corvallis
Appelman, Marguerite Ruth	Voice	Corvallis
Bauer, Marian	Piano	Corvallis
Bedynek, John	Violin	Corvallis
Blount, Corinne	Voice	Corvallis
Boies, Blanche	Violin	Corvallis
Broders, Chester	Piano	Corvallis
Brown, Mark Lester	Cornet	Corvallis
Brown, Mrs. W. S.	Piano	Corvallis
Browning, Pansy	Violin	Corvallis
Brumbaugh, Madeline	Violin	Corvallis
Buckingham, Lottie May	Piano	Blodgett
Burton, Mabel Stevens	Voice	Corvallis
Cordley, Dorothea McLouth	Voice	Corvallis
Eaton, Helen	Piano	Independence
Fisher, Mrs. Gertrude	Voice and Organ	Philomath
Flarida, Edna	Voice	Corvallis
Foster, Ada Elizabeth	Piano	Corvallis
Fuselman, Elizabeth Frances	Violin	Corvallis
Graham, Willa	Saxophone	Corvallis
Gray, Glenva	Violin	Corvallis
Grimm, Hazel	Voice	Corvallis
Hamlin, Louis Ward	Violin	Corvallis
Hanson, Florence	Violin	Corvallis
Hardman, Eleanor	Piano	Corvallis
Hargrove, Harriet	Voice	Salem
Hatch, Leonard Smith	Clarinet	Corvallis
Hawson, Lucile	Violin	Condon
Hess, Lorinne	Voice	Astoria
Howell, A. E.	Voice	Corvallis
Jackson, Nellie	Violin	Moro
Jokisch, Donald Irving	Violin	Corvallis
Knight, E. F.	Voice and Piano	Vancouver, Wn.
Kerr, Geneve	Piano	Corvallis
Kerr, Marion	Violin	Corvallis
Kiger, Martha	Piano	Corvallis
Kuhlman, Mrs. D.	Voice	Corvallis
Lowell, Ethel May	Piano	Corvallis
McLeod, Jessie Anna	Piano	Corvallis
Neale, Dorothy Ellen	Piano	Corvallis
Osborne, James	Voice	Corvallis
Oxford, Klein Etta	Piano	Corvallis
Peck, A. L.	Violin	Corvallis

* In addition to the names listed here, 170 regular students of the College whose names are listed elsewhere in the catalogue took work in the School of Music.

Name.	Course.	Home Address.
Schubert, Placidus	Violin	Corvallis
Shipley, Alarine	Piano	Philomath
Short, Mabel	Piano	Corvallis
Siler, Beatrice Pauline	Voice and piano	Randle, Wash.
Skipton, Laurence	Violin	Corvallis
Smyth, Lenora Mary	Piano	Diamond
Snyder, Helen	Piano	Corvallis
Taylor, Velma	Piano	Corvallis
Tharp, Ethel Wave	Voice	Corvallis
Todhunter, Grace	Piano	Corvallis
Warren, Mrs. Olive Frances	Violin	Corvallis
Watkins, Anna	Piano	Philomath
Watson, Margaret	Piano	Corvallis
Williams, Mary Edna	Piano	Alpine
Williams, Mrs. Richard	Voice	Corvallis
Williamson, Mary	Organ	Corvallis
Yates, Bertha Lois	Piano and Voice	Shedd
Yates, Irma	Piano	Corvallis

WINTER SHORT COURSE STUDENTS

Name.	Home Address.
Adams, Frances	Silverton
Alexander, E. H.	Sheridan
Annala, F. J.	Hood River
Ashton, Charles Rice	Tangent
Ashton, John Paul	Lebanon
Barfoot, May Emily	Corvallis
Barss, A. F.	Corvallis
Beck, Roy S.	Corvallis
Bennett, Enos S.	Sheridan
Bergstrom, Ellen	Gooseberry
Bergstrom, Emma	Eight Mile
Bergstrom, Hannah	Eight Mile
Bergstrom, John	Eight Mile
Bissell, S. T.	Yreka, Calif.
Blackden, Ralph	Corvallis
Boden, John	Portland
Boesel, Albert H.	Scappoose
Bohrnstedt, Mrs. A. C.	Macleay
Bohrnstedt, A. C.	Macleay
Boulan, Frank H.	Sheridan
Brodie, Mrs. R. K.	Corvallis
Brown, Bertha	Amity
Carter, Clarence M.	Alicel
Case, B. O.	Vancouver, Wash.
Cooper, Kenneth L.	Mosier
Cooper, Mrs. Kenneth L.	Mosier
Cooper, Mrs. George E.	Corvallis
Copple, Mrs. Mary M.	Philomath
Crain, Julia	Santa Cruz, Calif.
Crum, Mrs. S. E.	Olex
Davolt, Mrs. Claud O.	Corvallis
Dickinson, H. R.	East Sound, Wash.
Downie, Archie T.	Portland
Dorman, Mrs. Louis B.	Corvallis
Farmer, Oliver	Shedds
Fish, Henry	Lynden, Wash.
Gay, J. L.	Corvallis
Gadegaard, Christian	Marshfield
Geary, Harry Logan	Underwood, Wash.
Gillenwater, Glen	Hillsboro
Golden, Mrs. C. E.	La Grande
Graham, S. C.	White Salmon, Wash.
Gravesen, G. C.	Coles Valley
Gross, Charles	Corvallis
Grubbe, Lola	Elkton
Gulliford, Arthur J.	Eugene
Gulliford, Mrs. Arthur J.	Eugene

Name.	Home Address.
Gunn, Mrs. R. J.	Corvallis
Hacking, Esther	Corvallis
Hamilton, Herbert C.	Prineville
Hammond, Mrs. H. S.	Corvallis
Harper, William	Junction City
Hawson, Lucile	Condon
Heminger, Willard L.	Corvallis
Heminger, Mrs. Norris	Corvallis
Henderer, Charles G.	Elkton
Himelwright, Lyle	Klamath Falls
Hogan, Eli	Corvallis
Hohnan, Ralph L.	Molalla
Howell, Delbert	Woodburn
Hoyt, Charles H.	Jefferson
Hukari, William T.	Hood River
Hurd, Mrs. G. Lansing	Corvallis
Johnston, Mrs. Bessie	Corvallis
Jorgensen, Peter	Portland
Kay, O. E.	Wellen
Keasey, C. C.	Corvallis
Kerr, Mrs. A. J.	Hubbard, Ohio
Knox, John J.	Fossil
Lafferty, Mrs. Pearl	Corvallis
Landreau, C. Z.	Corvallis
Langlois, James M.	Langlois
Ling, Mrs. E. E.	Corvallis
LittleJohns, Helen C.	Corvallis
Loomis, Mrs. W. I.	Corvallis
McCart, Earl	Harrisburg
McCready, Mrs. C. E.	Corvallis
McDonald, G.	San Francisco, Calif.
McDonald, L. A.	Corvallis
MacKinnon, John	Naches, Wash.
MacRae, Earl	Portland
Mainwaring, Hazel	Langlois
Maris, Mrs. Paul V.	Corvallis
Maronda, Mary	Corvallis
Masterton, Mrs. C. H.	Corvallis
Matthews, Mrs. R. R.	Corvallis
Miller, Iwan Z.	Gervais
Miller, Harry Dale	Corvallis
Montell, Edgar W.	Hood River
Muller, E. W.	Helix
Moore, Mrs. Alina	Mt. Vernon
Myers, Grace Adelle	Lookingglass
Neale, John Edward	Nelson, B. C.
Nestelle, Mrs. E. H.	Seattle, Wash.
Nielsen, Christian	McCoy

Name.	Home Address.
Noyes, Frederic B.	Oakland, Calif.
Olsen, E. W.	Blind Slough
Parker, John	Oregon City
Persinger, W. C.	Corvallis
Peterson, Mrs. Emelia	Corvallis
Phillips, Bertha C.	Corvallis
Potter, Mrs. E. L.	Corvallis
Reed, Medford	Linnton
Reed, Mrs. Medford	Linnton
Richey, G. H.	Corvallis
Richter, Theodore	Amity
Roberts, Elliott P.	The Dalles
Robinson, P. M.	Carlton
Rosencrants, Dorothy	Corvallis
Rosencrants, J. W.	Corvallis
Ruth, Mrs. C. C.	Corvallis
Salzman, A. G.	Corbett
Sayre, Noble G.	Condon
Shelton, Arthur L.	Pomeroy, Wash.
Shelton, Wilbur	Pomeroy, Wash.
Shrook, M. S.	Forest Grove
Sprague, Louise	Gardiner
Smith, Harry	Corvallis
Sproul, Niles	Canyon City
Stegerwald, Andrew	Corvallis
Stevenson, Mrs. A. L.	Corvallis
Stockton, R. V.	Sheridan
Stoller, Fred E.	Trout Lake, Wash.
Stout, Erwin Cory	Sheridan
Swanson, Axel N.	Portland
Talbott, Roscoe A.	Grand Ronde
Tappert, Paul R. W.	Harrisburg
Taylor, Mrs. William	Prairie
Teeter, Mrs. Katharine H.	Corvallis
Theobald, Zelda	Silverton
Tucker, Mrs. Bertha G.	Corvallis
Uhlman, Walter	Ridgefield, Wash.
Uptegrove, G. M.	Parkdale
Utter, Ruth	Corvallis
Vierhus, James L.	Oregon City
Wade, Henry S.	Pomeroy, Wash.
Walker, Mrs. M. L.	Corvallis
Ward, Sidney V.	Goldendale, Wash.
Watson, James A.	Pomeroy, Wash.
Weart, George	Hood River
Wellman, Walter	Baker
Wickethier, A.	Portland
White, Georgia	Corvallis

Name.	Home Address.
Whitmore, Rodney M.	Corvallis
Wilkinson, R. C.	Lompoc, Calif.
Wilkinson, Mrs. R. C.	Lompoc, Calif.
Wilson, Alta	Riddle
Witter, George H.	Kent
Wood, J. LeRoy	Albany
York, F. M.	Carlton
York, Mrs. M. O.	Corvallis
Young, P. A.	Albany

NOTE.—In addition to the above listed names, out of a total of 1673 students registered in the Farmers' Week and in the special Home Economics courses, the names of 1213 students who were registered in these courses, but in no other College courses, do not appear.

HONOR STUDENTS

Honor students, at graduation, are selected on a basis of pre-eminence in both class work and student activities. All courses are represented by honor students, the representation being on the basis of one honor student to every ten seniors in each degree course. No student, however, will be named in the honor list whose merit grade is below seventy-five. The selection is made jointly by faculty and students.

SELECTION FOR JUNE 1915

AGRICULTURE
Hill, Charles Edwin.
Curtis, Roland Edward.
Miller, Roy Edmund.
Gentner, Louis Gustave Oswald
Gilbert, Henry.
Case, Richard Burton.
Belton, Howard Clair.
Flint, John Walter.

FORESTRY
Chamberlin, Willard Joseph.

PHARMACY
Smith, Simeon Charles.

COMMERCE
Burns, Lillian.
Crouter, Leogrand DeHart.

DOMESTIC SCIENCE AND ART
Warner, Katherine.
Crockatt, Edith.
Hansen, Beneta Kareen.
Chase, Lucile.
Seeley, June.
Burns, Amelia Earle.

ENGINEERING
Oakes, Charles Ernest.
Hubbard, Harry Lee.
Larsen, Walter Winfred.

CLARA H. WALDO PRIZES

The Clara H. Waldo Prizes are awarded on a basis of both scholarship and general achievement as follows: (a) Proficiency in literary and scholastic attainments; (b) Success in student activities; (c) Qualities of womanhood; (d) Qualities of leadership. The selection is made by a joint arrangement between faculty and students. To the senior woman selected, a prize of forty dollars is awarded; to the junior woman, thirty dollars; to the sophomore woman, twenty dollars; and to the freshman woman, ten dollars. Students receiving second and third place in each class are given Honorable Mention.

SELECTION FOR JUNE 1915

SENIORS
Frances Lucile Chase,
Beneta Kareen Hansen,
Lorene Augusta Parker,

JUNIORS
Ruth Marion Mateer,
Geraldine Newins,
Della Jackson,

SOPHOMORES
Lorna Anne Collamore,
Grace Woodworth,
Grace Kinnison,

FRESHMEN
Lulu Litten May,
Gertrude Luella Thompson,
Genevieve Frazier,

FORENSIC HONOR ROLL
FOR 1914-15

INTERCOLLEGIATE ORATOR

F. J. Dietsch

INTERCOLLEGIATE PEACE ORATOR

Z. A. Lansdale

INTERCOLLEGIATE DEBATERS

E. H. Reichart — H. W. Russell
G. R. Hoerner — R. R. Reichart
H. M. Currey — V. J. Garvin

E. J. Fraley, Alternate.

CHAMPION INTERCLASS ORATOR

Eric Englund

CHAMPIONS IN INTERCLASS DEBATE

E. Englund
A. O. Leech — Freshmen
T. J. Lowe

WINNER OF SHAKOPEAN CUP

Awarded annually to the member of the senior class having the best record in forensics for the whole College course.

Currey, H. M.

SUMMARIES*

CLASSIFIED AS TO COURSE
(All Duplicates Excluded)

Course	Men	Women	Total
Agriculture	549	6	555
Forestry	56		56
Logging Engineering	19		19
Home Economics		352	352
Engineering and Industrial Arts	230	1	231
Mining	79		79
Commerce	130	43	173
Pharmacy	61	9	70
Optional	3	51	54
Music	12	48	60
Summer School	95	142	237
Winter Short Courses	793	572	1365
Total	2027	1224	3251**

CLASSIFIED AS TO RESIDENCE
(All Duplicates Excluded)

States and Territories:		
Oregon		2668
Alaska	9	
California	154	
Colorado	16	
Connecticut	3	
Florida	2	
Georgia	2	
Idaho	53	
Illinois	13	
Indiana	10	
Iowa	7	
Kansas	10	
Kentucky	1	
Louisiana	2	

* The enrollment statistics include only those who have pursued work at the College; correspondence students are omitted.
** Total to and including March 16, 1916.

Maine	2	
Massachusetts	6	
Michigan	5	
Minnesota	8	
Missouri	8	
Montana	8	
Nebraska	1	
New Hampshire	1	
New Jersey	2	
New York	12	
North Dakota	6	
Ohio	10	
Oklahoma	3	
Pennsylvania	5	
Tennessee	1	
Texas	1	
Utah	4	
Vermont	1	
Virginia	1	
Washington	161	
Wisconsin	7	
Wyoming	1	536
		3204

Foreign Countries:

Australia	2	
Canada	13	
China	8	
England	3	
Germany	1	
Hawaii	1	
India	9	
Japan	3	
Norway	1	
Philippine Islands	1	
Russia	2	
Scotland	1	
Sweden	2	47
Net total		3251

COMPARATIVE ENROLLMENT

1888-1889	97
1889-1890	151
1890-1891	201
1891-1892	208
1892-1893	282
1893-1894	240
1894-1895	261
1895-1896	397
1896-1897	316
1897-1898	336
1898-1899	388
1899-1900	405
1900-1901	436
1901-1902	448
1902-1903	541
1903-1904	530
1904-1905	680
1905-1906	735
1906-1907	833
1907-1908	1156
1908-1909	1352
1909-1910	1591
1910-1911	1778
1911-1912	2868
1912-1913	2314
1913-1914	2435
1914-1915	4176
1915-1916*	3251

The great difference in the total enrollment for the two years, 1910-11 and 1911-12, was due largely to the increase in the number of students registered for the winter short courses in Agriculture. The increase in the number of regular students in the 36-weeks courses was 24 per cent.

The decrease in the number of students in 1912-13 from the year 1911-12 is due to the decrease in the short course registration. The increase in the number of regular students in the 36-weeks courses was 19 per cent.

* Totals to and including March 16, 1916.

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