

No. 259

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MAY 15, 1917

OREGON AGRICULTURAL COLLEGE BULLETIN



College Catalogue 1917-18

WITH LIST OF STUDENTS FOR 1916-17

CORVALLIS, OREGON

Entered as second-class matter May 9, 1916, at the postoffice at Corvallis, Oregon,
under the Act of August 24, 1912.

CATALOGUE
OF THE
Oregon Agricultural College
FOR
1917-18

With List of Students for 1916-17



CORVALLIS, OREGON

MAY 15, 1917

CORVALLIS
COLLEGE PRINT SHOP
1917

CALENDAR 1917-18

1917.

JULY	AUGUST	SEPTEMBER
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
OCTOBER	NOVEMBER	DECEMBER
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1918.

JANUARY	FEBRUARY	MARCH
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CHANGES IN DATES IN THE BODY OF THIS CATALOGUE

Changes in the College Calendar authorized by the Board of Regents, May 25, 1917, involve announcements made in this catalogue, according to the regular calendar, as follows:

Page 58, opening of dormitories, from September 16 to October 7.

Page 63, examinations for admission to College, from September 17 and 18 to October 8 and 9.

Page 69, date of registration, from September 17 and 18 to October 8 and 9.

COLLEGE CALENDAR 1917-18

1917.

October 8, 9, Monday, Tuesday — Registration and examinations for admission.

October 5, Friday — Quarterly meeting of Board of Regents.

October 10, Wednesday — Recitations begin.

November 5, Monday — Forestry Short Course begins.

November 29, Thursday — Thanksgiving, a legal holiday.

December 22, Saturday (noon) — Christmas recess begins.

1918.

December 31 - January 5, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday — Farmers' and Home Makers' Week and Rural Life Conferences.

January 7, Monday — Regular exercises resumed. Winter Short Course begins.

January 9, Wednesday — Quarterly meeting of Board of Regents.

February 1, Friday — Winter Short Course ends.

February 2, 4, 5, 6, Saturday, Monday, Tuesday, Wednesday — First semester examinations.

February 11, 12, Monday, Tuesday — Second semester registration.

February 13, Wednesday — Recitations begin.

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

April 3, Wednesday — Quarterly meeting Board of Regents.

April 12, Friday — Forestry Short Course ends.

May — Military inspection day.

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

June 2, Sunday — Baccalaureate sermon.

June 3, Monday — Senior Class Day exercises; Alumni Reunion.

June 4, Tuesday — Commencement exercises.

Final examinations for the second semester will be held on Tuesday afternoon, June 4; Wednesday, June 5; Thursday, June 6; and Friday, June 7.

June 10, Monday — Summer session begins.

July 20, Saturday — Summer session closes.

BOARD OF REGENTS

OFFICERS

HON. J. K. WEATHERFORD, President.....	Albany
HON. N. R. MOORE, Secretary.....	Corvallis
HON. C. L. HAWLEY, Treasurer.....	McCoy

EX-OFFICIO MEMBERS

HON. JAMES WITHYCOMBE, Governor of the State.....	Salem
HON. BEN. W. OLCOTT, Secretary of State.....	Salem
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. K. WEATHERFORD.....	Albany, 1918
HON. C. L. HAWLEY.....	McCoy, 1918
HON. M. S. WOODCOCK.....	Corvallis, 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

STANDING COMMITTEES

EXECUTIVE COMMITTEE

J. K. Weatherford, Chairman; C. E. Spence, W. M. Pierce, J. Myers.

FINANCE COMMITTEE

W. M. Pierce, C. L. Hawley.

COLLEGE COMMITTEE

J. A. Churchill, Chairman; W. M. Pierce, N. R. Moore.

STATION COMMITTEE

W. M. Pierce, Chairman; H. Von der Hellen, C. E. Spence.

FORESTRY

Geo. M. Cornwall, Chairman; Ben W. Olcott, J. Myers.

EXTENSION COMMITTEE

J. Myers, Chairman; C. L. Hawley, C. E. Spence, H. Von der Hellen.

OFFICERS OF ADMINISTRATION AND INSTRUCTION

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

ADMINISTRATIVE COUNCIL

WILLIAM JASPER KERR, D. Sc.,
President.

ARTHUR BURTON CORDLEY, D. Sc.,
Dean of the School of Agriculture; Director of the
Agricultural Experiment Station.

GRANT ADELBERT COVELL, M. E.,
Dean of the School of Engineering and Mechanic Arts;
Professor of Mechanical Engineering.

JOHN ANDREW BEXELL, A. M.,
Dean of the School of Commerce; Professor of Accounting
and Business Management.

EDWIN DEVORE RESSLER, A. M.,
Director of the Summer School; Professor of Industrial Education.

RALPH DORN HETZEL, A. B., LL. B.,
Director of Extension Service.

GEORGE WILCOX PEAVY, M. S. F.,
Dean of the School of Forestry.

MARY ELIZA FAWCETT, A. M.,
Dean of Women; Chairman Executive Committee School of
Home Economics.

ADOLPH ZIEFLE, B. S., Ph. C.,
Dean of the School of Pharmacy.

COLLEGE COUNCIL

7

COLLEGE COUNCIL *

FREDERICK BERCHTOLD, A. M.,
Professor of the English Language and Literature.

JOHN B. HORNER, A. M., Litt. D.,
Professor of History.

GORDON VERNON SKELTON, C. E.,
Professor of Highway Engineering.

JOHN FULTON, M. S.,
Professor of General and Analytical Chemistry.

CLAUDE ISAAC LEWIS, M. S. A.,
Professor of Horticulture; Vice-Director and Chief in Horticulture,
Experiment Station.

CHARLES LESLIE JOHNSON, B. S.,
Professor of Mathematics.

JAMES DRYDEN,
Professor of Poultry Husbandry; Chief in Poultry Husbandry,
Experiment Station.

HENRY DESBOROUGH SCUDDER, B. S.,
Professor of Soils and Farm Management; Chief in Soils and Farm
Management, Experiment Station.

WILLIAM FREDERIC GASKINS, B. S.,
Professor of Music.

WILLIAM ARTHUR JENSEN,
Executive Secretary.

FARLEY DOTY McLOUTH, B. S.,
Professor of Art.

LOUIS BACH, M. A.,
Professor of Modern Languages.

IDA ANGELINE KIDDER, A. B., B. L. S.,
Librarian.

ERMINE LAWRENCE POTTER, B. S.,
Professor of Animal Husbandry; Chief in Animal Husbandry,
Experiment Station.

* 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

OREGON AGRICULTURAL COLLEGE

THEODORE DAY BECKWITH, M. S.,
Professor of Bacteriology; Chief in Bacteriology, Experiment
Station.

HELEN BRYCE BROOKS,
Professor of Domestic Art.

MIRIAM THAYER SEELEY, A. B.,
Professor of Physical Education for Women

HECTOR MACPHERSON, Ph. D.,
Professor of Economics and Sociology; Director of the Bureau of
Organization and Markets.

ULYSSES GRANT DUBACH, Ph. D.,
Professor of Government and Business Law

ROY RALPH GRAVES, M. S.,
Professor of Dairy Husbandry; Chief in Dairy Husbandry,
Experiment Station.

IRA ABRAHAM WILLIAMS, M. S., A. M.,
Professor of Ceramic Engineering.

HENRY CLAY BRANDON, A. M.,
Professor of Industrial Arts; Director of Shops.

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Professor of Electrical Engineering.

GEORGE FRANCIS SYKES, A. M.,
Professor of Zoology and Physiology.

BENNETT THOMAS SIMMS, D. V. M.,
Professor of Veterinary Medicine; Chief in Veterinary Medicine,
Experiment Station.

THOMAS ANDERSON HENDRICKS TEETER, B. S.,
Professor of Irrigation Engineering.

SAMUEL HERMAN GRAF, M. S.,
Professor of Experimental Engineering

WILLIAM BALLANTYNE ANDERSON, Ph. D.,
Professor of Physics.

AVA BERTHA MILAM, Ph. B., A. M.,
Professor of Domestic Science.

VICTOR RAY GARDNER, M. S.,
Professor of Pomology; Pomologist, Experiment Station.

COLLEGE COUNCIL

9

EDWARD MICHAEL DUFFY,
Manager of Business Office.

HAROLD MANLEY TENNANT,
Registrar.

HOWARD PHILLIPS BARSS, A. B., M. S.,
Professor of Botany and Plant Pathology; Chief in Botany and
Plant Pathology, Experiment Station.

WILLIAM HAWES COGHILL, E. M.,
Professor of Mining and Metallurgy.

PAUL VESTAL MARIS, B. S.,
State Leader County Agriculturists, Extension Service.

EZRA JACOB KRAUS, B. S.,
Professor of Research in Horticulture, Experiment Station.

GEORGE ROBERT HYSLOP, B. S.,
Professor of Farm Crops; Chief in Farm Crops, Experiment Station.

WILBUR LOUIS POWERS, M. S.,
Professor of Irrigation and Drainage; Chief in Irrigation and
Drainage, Experiment Station.

ALFRED DAVID BROWNE, M. D.,
Director of Physical Education.

JOSEPH AMOS PIPAL,
Professor of Physical Education.

JOHN POMOROY VAN ORSDEL,
Professor of Logging Engineering.

VERNON A. CALDWELL, Lieutenant-Colonel, Infantry, U. S.
Army, Professor Military Science and Tactics;
Commandant of Cadets.

ELMER POLIC JACKSON, B. S., Superintendent of Buildings.

LESTER LOVETT, B. S.,
Professor of Entomology; Chief in Entomology, Experiment Station.

ARTHUR LEE PECK, B. S.,
Professor of Landscape Gardening and Floriculture; Superintendent
of Campus and Greenhouses.

ARTHUR GEORGE BOUQUET, B. S.,
Professor of Vegetable Gardening; Vegetable Gardening Specialist,
Experiment Station.

OREGON AGRICULTURAL COLLEGE

WILLIAM JAMES GILMORE, B. S. A. E.,
Professor of Farm Mechanics.

HERBERT TOWNSEND VANCE,
Professor of Stenography and Office Training.

RALPH K. STRONG, S. B., A. M.,
Professor of Industrial Chemistry.

CONDE BALCOM McCULLOUGH, C. E.,
Professor of Civil Engineering.

MARK CLYDE PHILLIPS, B. M. E.,
Associate Professor of Mechanical Engineering; Superintendent
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EDWIN THOMAS REED, B. S., A. B.,
College Editor.

HERMAN VANCE TARTAR, B. S.,*
Associate Professor of Agricultural Chemistry; Chief in Chemistry,
Experiment Station.

RENTON KIRKWOOD BRODIE, M. S.,
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HAROLD STEPHENSON NEWINS, Ph. B., M. F.,
Associate Professor of Forestry

WINFRED McKENZIE ATWOOD, Ph. D.,
Associate Professor of Botany.

EDWARD BENJAMIN BEATY, B. S., M. A.,
Associate Professor of Mathematics.

IDA BURNETT CALLAHAN, B. S.,
Associate Professor of English Language and Literature.

GODFREY VERNON COPSON, M. S.,
Associate Professor of Bacteriology.

EDWARD BLODGETT FITTS,
Associate Professor of Dairy and Animal Husbandry, Extension
Service

WALTER SHELDON BROWN, A. B., M. S.,
Associate Professor of Horticulture and Crop Pests, Extension
Service.

* On leave of absence.

COLLEGE COUNCIL

11

JOHN ELMER LARSON, B. S.,
Associate Professor of Agronomy, Extension Service.

CHARLES VLADIS RUZEK, B. S. A.,
Associate Professor of Soils, Assistant in Soils, Experiment
Station.

FRANK HENRY SHEPHERD, A. M.,
Associate Professor of Industrial Arts Education.

NICHOLAS TARTAR, B. S.,
Assistant Professor of Mathematics.

MILO REASON DAUGHTERS, A. M.,
Assistant Professor of Organic Chemistry.

SIGURD HARLAN PETERSON, B. A.,
Assistant Professor of English.

LAWRENCE FISHER WOOSTER, B. S. A.,
Assistant Professor of Electrical Engineering; Superintendent of
Light and Power.

WILLIAM ALFRED BEVAN, B. S.,
Assistant Professor of Physics.

WILLIAM EVANS LAWRENCE, B. S.,
Assistant Professor of Botany.

SARAH LOUISE LEWIS,
Assistant Professor of Domestic Science.

CHESTER COLLINS MAXEY, M. A.*
Assistant Professor of Government and Business Law.

ALICE MARKS DOLMAN, M. S.,
Assistant Professor of Household Administration.

HELEN JULIA COWGILL, B. S.,
Assistant State Leader of Industrial Clubs, Extension Service.

BERT PILKINGTON, B. S.,
Assistant in Chemistry, Experiment Station.

HARRY CASE SEYMOUR,
State Leader Industrial Clubs, Extension Service.

ANNA MAE TURLEY, B. S.,
Assistant Professor of Home Economics, Extension Service.

* On leave of absence.

OREGON AGRICULTURAL COLLEGE

JAMES GEORGE ARBUTHNOT, B. S.,
Assistant Professor of Physical Education.

GEORGE ROY SAMSON, B. S., A. B.,
Assistant Professor of Animal Husbandry; Assistant in Animal
Husbandry, Experiment Station.

GEORGE EDWARD GOODSPEED, Jr., B. S.*
Assistant Professor of Geology.

RAYMOND ADAMS DUTCHER, M. S., A. M.,
Assistant Professor of Agricultural Chemistry.

LAWRENCE EUGENE ROBINSON, B. S.,
Assistant Professor of Rural Architecture.

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Assistant Professor in Civil Engineering.

CHARLES ELMER OWENS, M. A.,
Assistant Professor in Botany.

WENDELL JAMES PHILLIPS, M. D.,
Medical Adviser.

BURTON SYLVESTER ORR, B. S.,
Assistant Professor of Experimental Engineering.

LOUIS AUGUST RUFENER, Ph. D.,
Assistant Professor of Economics and Sociology.

OTTO BERGER GOLDMAN, B. S.,
Assistant Professor of Mechanical Engineering.

LOREN BURTON BALDWIN, A. M.,
Assistant Professor of English.

LUCY MAY LEWIS, A. B., B. L. S.,
Assistant Librarian, Reference Librarian.

ORAN MILTON NELSON, B. S.,
Assistant Professor of Animal Husbandry; Assistant in Animal
Husbandry, Experiment Station.

BERTHA DAVIS, M. S.,
Assistant Professor of Home Economics Education.

* On leave of absence.

COLLEGE COUNCIL

13

ALMA GRACE JOHNSON, B. S.,
Assistant Professor of Domestic Science.

NEWELL HOWLAND COMISH, M. S.,
Assistant Professor in Economics.

GEORGE EDWIN STOWELL, B. S.,
Assistant Professor of Mining Engineering.

EDGAR LeROY WESTOVER, B. S.,
Field Dairyman, Extension Service.

FRANK ABBOTT MAGRUDER, Ph. D.,
Assistant Professor of Government and Business Law.

SIBYLLA HADWEN,
Housekeeper Women's Dormitories, Preceptress, Waldo Hall.

CHARLES LEWIS PARRISH,
Auditor, Business Office.

HAZLITT VICKERS,
Secretary Extension Service.

EDWIN MONROE SMITH,
Chief Clerk, Business Office.

HELEN LUCILE HOLGATE, B. S.,
In charge of College Exchange.

OREGON AGRICULTURAL COLLEGE

INSTRUCTORS AND ASSISTANTS

HARRY LYNDEN BEARD, B. S.,
Instructor in Mathematics; Director of Cadet Band

WILLIAM McCAULLY PORTER,
Instructor in Forging.

GENEVIEVE BAUM-GASKINS,
Instructor in Pipe Organ and Piano.

GERTRUDE EWING McELFRESH, A. B.,
Instructor in English.

MAY BABBITT-RESSLER,
Instructor in Piano

AMBROSE ELLIOTT RIDENOUR, B. S.,
Instructor in Foundry Practice.

CHARLES GEORGE WILTSHIRE,
Instructor in Plumbing and Steam Fitting.

ERWIN BERTRAN LEMON, B. S.,
Instructor in Accounting and Business Management.

JOSEPH BENJAMIN YODER, B. S.,
Instructor in Mechanical Drawing.

GILBERT BRUCE BLAIR, A. M.,
Instructor in Physics.

CHARLES CHAUNCEY LAMB, B. S.,
Instructor in Poultry Husbandry, Extension Service.

REGINALD HEBER ROBINSON, M. S.,
Assistant in Chemistry, Experiment Station.

DARWIN GREENE THAYER, B. S.,
Instructor in Woodworking.

CHARLES JARVIS McINTOSH, B. S.,
Instructor in News Writing; Editor of Press Bulletins.

JOHN HARRISON BELKNAP, B. S.,
Instructor in Physics.

BARBARA MOORE, B. S.,
Instructor in Domestic Art.

* On leave of absence.

INSTRUCTORS AND ASSISTANTS

15

GRACE CHRISTINE ROSAAEN,
Instructor in English.

ASA CHANDLER, Ph. D.,
Instructor in Zoology and Physiology.

CHARLES JUNIUS CONOVER, M. S.,
Instructor in Forestry.

JOHN EDWARD COOTER, B. S.,
Instructor in Soils.

HELEN PEER,
Instructor in Domestic Art.

CHARLOTTE LEWIS NELSON, A. B.,
Instructor in Physical Education for Women.

RUSSELL MARION HOWARD, B. S.,
Instructor in Accounting.

CHRISTIE MOORE, B. S.,
Instructor in Domestic Science.

LILLIAN MABEL GEORGE, B. L. S.,
In Charge of Continuations Department, Library.

KATHERINE BARBARA HAIGHT,
Preceptress, Cauthorn Hall.

MILTON JOHN SEELEY, Ph. C.,
Instructor in Chemistry.

EDNA MAY FLARIDA,
Instructor in Art.

DEXTER RALPH SMITH, B. S.,
Instructor in Civil Engineering.

CORA ELIZABETH PLATT,
Instructor in Domestic Art.

WILLIS DHU AINE PEASLEE, E. E.,
Instructor in Electrical Engineering.

RALPH McBURNEY, M. S.,
Instructor in Bacteriology.

* On leave of absence.

OREGON AGRICULTURAL COLLEGE

ROBERT ANDREW DUNCAN, A. M.,
Instructor in Chemistry.

HOWARD SPURR HAMMOND, M. A.,
Instructor in Botany; Curator of the Botanical Herbarium.

ALDEN FORREST BARSS, A. B., M. S.,
Instructor in Horticulture; Assistant in Horticulture, Experiment
Station.

FRANK WALTER KEHRLI, B. S.,
Field Dairyman, Extension Service.

ETHA MABEL MAGINNIS,
Instructor in Stenography.

LEONARD JOHN ALLEN, M. S.,
In charge Pig Club Work, Extension Service.

MELISSA MARGARET MARTIN,
Instructor in Modern Languages.

JUNE SEELEY, B. S.,
Instructor in Domestic Art.

IRWIN LEONARD BETZEL, B. S.,
Instructor in Pharmacy.

LAURA CHENEY, B. S.,
Instructor in Domestic Science.

GRACE PATTON GILLET, B. S.,
Instructor in Domestic Art.

ARTHUR CLIFFORD McCULLOCH, B. S. A.,
Instructor in Poultry Husbandry.

IRENE TELFORD,
Instructor in Physical Education for Women.

SYLVESTER BOYER, A. B.,
Instructor in Chemistry.

EDITH FREEMAN SHERMAN,
Instructor in Art.

INSTRUCTORS AND ASSISTANTS

17

MARGARET MOREHOUSE, B. S.,*
Instructor in Domestic Art.

WILLARD JOSEPH CHAMBERLIN, B. S.,*
Instructor in Entomology; Assistant in Entomology, Experiment
Station.

PAUL STANLEY LUCAS, B. S. A.,
Instructor in Dairy Manufactures.

CHARLOTTE NEVIL HURD, A. M.,
Instructor in Zoology.

DAVIS ELLSWORTH REED,
Instructor in Industrial Arts.

MINNIE KALBUS, B. S.,
Instructor in Domestic Science.

HARRISON DUANE LOCKLIN, M. S.,
Instructor in Pomology.

CLYTIE MAY WORKINGER,
Secretary to Director of Experiment Station.

NORMA WADDLE, B. S.,
Assistant in Seed Testing Laboratory.

JACOB CORNOG, A. B.,
Instructor in Chemistry.

GUSTAV DUNKELBERGER, M. B.,
Instructor in Piano.

ANDREAS GOETTEL,
Instructor in Stringed Instruments; Director of College Orchestra.

GEORGE EMIL HECK, B. S.,
Instructor in Experimental Engineering.

MARTIN LOUIS GRANNING,
Instructor in Machine Shop.

LAURA CAMPBELL
Instructor in Physical Education for Women.

CARL HENNINGER, M. A.,
Instructor in Modern Languages.

RONALD DeVORE JOHNSON, First Lieut., Cavalry, U. S. Army,
Assistant Commandant; Instructor Military Science and Tactics.

* On leave of absence.

OREGON AGRICULTURAL COLLEGE

CYRUS FRANKLIN DUGGER, Post Commissary Sergeant, U. S. Army, Retired, Assistant Commandant, Post Adjutant.

DENIS HAYES, Regimental Sergeant Major, U. S. Army, Retired, Assistant Commandant, Post Quartermaster.

HARRY GEORGE MILLER, M. S.,
Instructor in Chemistry.

HOWARD MARSHALL WIGHT, B. S.,
Instructor in Zoology.

LOUISE ALBERTA SCHNEIDER,
Instructor in Domestic Art.

DALE EVERETT RICHARDS, B. S.,
Instructor in Animal Husbandry.

JAMES OBYE BECK, M. S.,
Instructor in Dairy Husbandry.

WALLACE LaDUE KADDERLY, B. S.,
Farm Management Specialist, Extension Service.

INEZ BOZORTH, B. S.,
Instructor in Domestic Science, Secretary School of Home Economics.

EVERETT DOHERTY, B. S.,
Instructor in Chemistry.

FRANK LLEWELLYN BALLARD, B. S.,
Field Organizer, Bureau of Organization and Markets.

FRANK HEIDTMAN LATHROP, B. S., A. B.,
Instructor in Entomology, Experiment Station.

BERTHA HERSE, B. S.,
In charge Circulation Department in Library.

LILA GRACE DOBELL, B. S.,
Assistant in Library.

MARION BERTICE McKAY, M. S.,
Assistant in Botany and Plant Pathology, Experiment Station.

JOHN ROBERT MAGNESS, M. S.,
Assistant in Horticulture, Experiment Station.

INSTRUCTORS AND ASSISTANTS

19

GEORGE FRANKLIN MOZNETTE, B. S.,
Assistant in Entomology, Experiment Station.

HARRY AUGUST SCHOTH, M. S.,
Assistant in Farm Crops, Experiment Station.

THOMAS EVERETT MAY, B. S.,*
Assistant Coach and Manager of Athletics.

HAROLD ROY TAYLOR, B. S. A.,
Assistant in Dairy Husbandry.

ETHEL ALLEN, B. S.,
Assistant in Library.

SAMUEL ROBERT KLINE,
Stockroom Keeper, department of Chemistry.

CHARLES RAYMOND HURSH, B. S. A.,
Assistant in Plant Pathology, Experiment Station.

SAMUEL KILBOURN WHITE, Jr., B. S.,
Teaching Fellow in Horticulture.

LEON HAWKINS, B. S.,
Laboratory Assistant; Foreman College Orchards.

FRED WILLHELM MILLER, D. V. M.,
Fellow in Veterinary Medicine

BURR BLACK, B. S.,
Fellow in Plant Pathology and Entomology.

JOHN BREGGER, B. S.,
Fellow in Botany and Plant Pathology.

* On leave of absence.

OREGON AGRICULTURAL COLLEGE

COUNTY AGRICULTURISTS

HAROLD ROLAND GLAISYER, B. S.,
Klamath County.

ROY CLAUDE JONES, B. S.,
Tillamook County.

JAY LATTIMER SMITH, B. S.,
Coos County.

RALPH BLANCHARD, B. S.,
Crook and Deschutes Counties.

WALTER WILLIAM HOWARD, B. S.,
Malheur County.

CLAUDE CLIFTON CATE, B. S.,
Jackson County.

SYLVESTER BENJAMIN HALL, B. S.,
Multnomah County.

MANNES SEYMOUR SHROCK,
Yamhill County.

ARTHUR CHASE, B. S.,
Wasco County.

PAUL HERMAN SPILLMAN, B. S.,
Union County.

CHARLES THOMPSON, M. S.,
Josephine County.

NEWELL ROBB, B. S.,
Lane County.

CLARENCE LLOYD JAMISON, B. S.,
Wheeler County.

D. C. HOWARD, B. S.,
Columbia County.

SUPERINTENDENTS OF BR. EXPERIMENT STATIONS 21
SUPERINTENDENTS OF BRANCH EXPERIMENT STATIONS

EASTERN OREGON BRANCH EXPERIMENT STATION

Robert Withycombe, B. S.,
Union.

UMATILLA BRANCH EXPERIMENT STATION

Ralph Wilmer Allen, B. S.,
Hermiston.

**SHERMAN COUNTY 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

Albert Edward Engbretson, B. S., (Acting Superintendent)
Astoria.

HOOD RIVER BRANCH EXPERIMENT STATION

Leroy Childs, A. B.,
Entomologist, Experiment Station,
Gordon George Brown, B. S.,
Horticulturist, Experiment Station,
Hood River.

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

In the School of Commerce, major courses in—

- | | |
|------------------------------|-----------------------------------|
| (a) Accounting and Bus. Man. | (c) Government and Business Law |
| (b) Economics and Sociology | (d) Stenography and Office Train. |

In the School of Engineering, major courses in—

- | | |
|----------------------------|----------------------------|
| (a) Civil Engineering | (d) Industrial Arts |
| (b) Electrical Engineering | (e) Irrigation Engineering |
| (c) Highway 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 | (c) Home Administration |
| (b) Domestic Science | (d) Institutional Management |

In the School of Mines, major courses in—

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

In the School 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. Dietitians' Course (two years).
- E. Forestry (November 5 to April 12).
- F. Home Makers' Course (one year).
- G. Mechanic Arts (three years).
- H. Pharmacy (two years, following two years of high-school training).

The School of Music, an affiliated self-supporting department, offers instruction in voice, piano, pipe organ, violin, orchestra, and band instruments.

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 legislature 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.

Funds for the support of the College in its three grand divisions of work, Resident Instruction, Experiment Station, and Extension Service, are derived both from the National Government and the State of Oregon as follows:

FOR RESIDENT INSTRUCTION

From the National Government:

The Land-Grant Fund. The sale of the public 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 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 an annual fund of \$50,000.

From the State of Oregon:

The Millage Tax. The College is chiefly dependent for maintenance upon the income from the millage tax, as provided by the State legislature of 1913, which became operative April 1, 1915. The income from this source for the current year is \$351,500.

The State legislature of 1917 made a special appropriation of \$65,000 to apply toward the erection of a library building.

FOR EXPERIMENT STATION

Funds for the experimental work of the College, which is conducted both at the Corvallis Station and at seven branch stations located in different parts of the State, are derived from the National Government and from the State as follows:

From the National Government:

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 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.

For the support of the Branch stations at Moro, Hermiston, and Burns, the National Government appropriates \$6,700.

From the State of Oregon:

State Funds. The State Legislature of 1917 appropriated \$5,000 annually for the Corvallis station and an additional \$10,000 annually on condition that the National Government appropriate an equal sum. The State also appropriates \$28,000 annually for the support of the branch stations. Of this sum, \$3,000 appropriated

for the Hood River Branch Experiment Station is conditioned upon the county's appropriating \$2,000 for the support of the same station.

FOR EXTENSION SERVICE

From the National Government:

The Smith-Lever Fund. This fund was established by the Smith-Lever Agricultural Extension Act passed 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 is to 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."

The fund for the fiscal year July 1, 1916, to June 30, 1917, amounts to \$18,151.66. Since the State's obligation under this Act is fulfilled by matching the Government's increase over the original \$10,000, the State appropriates this year \$8,151.66 toward the support of this phase of Extension work.

Department of Agriculture Funds. The United States Department of Agriculture appropriates annually \$15,000 for cooperative work through Industrial Clubs, County Agents, Special Dairy Work, Marketing and Rural Organizations, and Farm Management and Business Demonstrations. The appropriation, however, is conditioned upon the State's granting an equal sum for the same purposes.

From the State of Oregon:

For General Extension Work. The State appropriates \$25,000 for general extension work, including movable schools, lectures, publications, Farmers' and Home-Makers' Week, correspondence, demonstrations in agriculture and home-making. From this fund money is set aside to meet the Smith-Lever requirements, which increase from year to year by about \$3,700. The fund is therefore more restricted in its uses every year.

For Cooperative Work. For cooperative work with the United States Department of Agriculture the State appropriates \$15,000 a year, to meet the requirements already indicated.

For County Agent Work. To meet the appropriations made by the several counties for maintaining the work of the county agents, the State is now appropriating approximately \$20,000 a year.

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, 34 other states, and 15 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 staffs of the Experiment Station and Extension Service. 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 Ex-

tension Service, the State Leader and County Agents, the officers in charge of Boys' and Girls' Club Work, Extension Field Specialists in Horticulture, Dairy and Animal Husbandry, Agronomy, 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 co-ordinate 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, 90 x 120 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 85 x 125 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 are housed the departments of Chemistry and Pharmacy, with their various laboratories, reci-

tation rooms, and lecture halls, together with the offices and laboratories of the Experiment Station chemists.

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 66 x 140 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 72 x 130 feet, three stories high. It is thoroughly modern in all its equipment, and while intended solely for the work in Agronomy, at present accommodates also, temporarily, the School of Commerce. The first and second floors, occupied by the departments of Soils and Farm Management, Farm Mechanics, Farm Crops, and Drainage and Irrigation, contain, in addition to the offices of these departments, rooms variously devoted to laboratory and class purposes. All of the third floor and office rooms on the first and second floors are used by the School of Commerce.

The south or Horticultural wing is 72 x 130 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 range of greenhouses, aids 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 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 54 x 141 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. A three-story Forestry building, eighty feet wide and one hundred and thirty-six feet long, has been constructed to house the work in forestry and logging engineering. This building contains roomy laboratories for work in silviculture, dendrology, mensuration, forest protection, technol-

ogy, drafting, and logging engineering. As rapidly as material can be assembled these laboratories will be 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 may 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. Portions of the building are used temporarily by the department of English.

Home Economics. The first wing, 68 x 120 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. Heating and ventilating systems of the most modern type 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 for immediate needs.

The Mines Building, which is 65 x 81 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 90 x 120 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, 52 x 52 feet, two stories high, flanked by a one-story wing on the east, 40 x 220 feet, and a similar wing on the south, 40 x 200 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, 30 x 50 feet, with a commodious blue-print room and a dark room adjoining. The south wing contains the main woodworking shop, 40 x 97 feet, a stock room, 30 x 40 feet, a carpenter shop, 20 x 40 feet, and the College printing plant, 40 x 50 feet. The east wing contains the machine shop, 40 x 80 feet, the blacksmith shop, 40 x 100 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, 70 x 120 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 79 x 54 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 90 x 150 feet, with each wing 52 x 96 feet in dimensions. The fourth unit will provide a swimming pool 50 x 100 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, 126 x 355 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 horse-

power, 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 96 x 240 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 160 x 50 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 and dramatic societies, the Cosmopolitan Club, and the staff of the Oregon Countryman. 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 50 x 100 feet, two stories high, with two wings extending to the south, each 46 x 80 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 tools.

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 52 x 120 feet for sheltering stock. The hayloft 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 40 x 90 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, farm lighting plants, 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.

Hog Barn and Feeding House. During the fall of 1916 the Animal Husbandry department secured its long-needed hog barn and feeding house. The barn is designed especially for farrowing and contains twenty-nine pens, with a four-foot alley running the length of the building from east to west. Concrete is used for the entire floor, the feeding troughs, and the automatic watering equipment. The feed house is twenty-eight by forty feet in dimensions, three stories high. The ground floor is occupied by a driveway and entrance alley, root bin, two large grain bins, which extend through the second story, and a hopper for dumping grain into the elevator, which leads to the third floor. It provides also equipment for dividing, weighing, and loading pigs, as well as a small boiler for heating water. The second story provides room for the storage of straw, six smaller grain bins with hopper bottoms, and sleeping quarters for the herdsman. The third floor contains the grinder, motor, chutes to grain bins, and storage room for movable equipment. The total capacity of the building is 15 tons of roots, 6308 bushels of grain and 40 tons of straw.

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 about one-fourth 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 whole-

some competition in the various outdoor and indoor intercollegiate sports. 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 assisting to insure a sound and conservative management.

The Varsity O Association. This association, which succeeds the Orange O Club, includes all men of the College who have been officially awarded the Orange O in recognition of service on the intercollegiate athletic teams of the College. Its function is to promote the athletic ideals of the College and to serve in an advisory capacity to the Athletic Board of Control.

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 plays 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 international friendship. At present, eleven 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 privilege 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 organization 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 College branch of the American Society of Mechanical Engineers. The purpose of the organization is to meet at regular intervals for presentation of technical papers by members and by practicing engineers. Current topics of interest to engineers are also discussed at these meetings and an effort is made 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 prominent men 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 of students registered up to the time of publication.

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.

The Teachers' Exchange, a monthly periodical prepared by the department of Industrial Education and circulated in the interests of teachers of Industrial Arts.

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 and the Home Cooperative Demonstration Projects. 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 Extension News, a monthly periodical devoted to items of timely information sent to citizens of Oregon on request.

The Station Bulletins. These publications include reports upon research problems and upon experimental investigations in agron-

omy, horticulture, drainage and irrigation, dairying, animal husbandry, poultry husbandry, insect pests, plant diseases, home economics, 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, character, 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 \$5.00 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 student 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.

The O. A. C. Alumnus. This is a quarterly periodical edited and issued for the Alumni Association by the Secretary of the General Alumni Association of the Oregon Agricultural College, whose office is at the College.

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..	5.00
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:

LABORATORY FEES AND DEPOSITS

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Animal Husbandry:	Fees	Dep.
Courses A, 1, 16.....	.25	
Courses B, 2, 101, 102, 210, 220, 230, 240.....	.50	
Course E	1.50	

Art and Architecture:

Art

Courses 102, 103, 204, 205, 206, 305, 306, 411, 412, 505, 50650	
Courses 600, 601, 602, 603.....	1.00	2.00
Courses 413, 414.....	2.00	

Architecture

Courses 518, 533, 535, 536.....	.50	
Courses 601, 602, 604, 701, 702.....	.75	
Courses 537, 538, 603.....	1.00	

Bacteriology:

Courses A, 701.....	2.00	
Courses 103, 104, 201, 202, 205, 207, 208, 302, 304, 305, 401, 402, 501, 502.....	3.00	
Course 113	4.00	
Courses 112, 116.....	5.00	

Botany:

Course 3750	
Courses 82, 83.....	.50 per credit	
Courses 22, 23, 30, 31, 69.....	1.00	
Courses 36, 41, 42, 47, 52, 67, 68, 70, 71, 101, 102, 104	1.50	
Courses 73, 75, 111, 116, 118.....	2.00	
Course 50	2.50	2.00

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, 410 A, 416, 417.....	1.00
Courses 400, 401, 402, 403, 410, 411, 412, 413.....	2.00

Dairy Husbandry:		Fees	Dep.
Courses 3, 4, A, B, C, D, P, 7.....	1.00	2.00	
Course 6	1.00		
Course 12	1.50	1.50	
Course 14	2.00	2.00	
Course 30	2.00		
Courses L, M, 2, 10.....	.25		
Courses I, 5, 9.....	.50		
Domestic Art:			
Courses 101, 102, 201, 202, 204, 601.....	1.00		
Courses K, L, N, 203, 501, 502.....	.50		
Courses 301, 701.....	1.50		
Course 401	4.00		
Course 404	3.00		
Domestic Science:			
Courses K, 150.....	.50		
Course 120	1.00		
Courses M, 110, 202, 210.....	2.00		
Courses 180, 190, 191.....	2.50		
Courses 201, 203.....	4.00		
Courses H, I, 106.....	6.00		
Course 107	7.00		
Course 530	\$5.00 per week		
Drainage and Irrigation:			
Courses A, C.....	1.00		
Courses 1, 3.....	1.00	1.00	
Courses 5, 7, 15, 19, 20.....	.50	1.00	
Engineering:			
Civil			
Courses 107, 111, 511.....	.50		
Courses 222, 223, 225, 232, 235, 242, 243, 252, 254, 256, 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, 225, 231, 232, 233, 235, 241.....	3.00		
Courses 291, 292.....	Arrange		

LABORATORY FEES AND DEPOSITS

55

	Fees	Dep.
Irrigation:		
Courses 204, 303, 305, 402, 501, 701, 802.....	1.00	
Mining:		
Courses 135, 137, 161, 171.....	1.00	
Courses 111, 112.....	3.00	
Course 401		20.00
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 Crops:		
Courses A, 1, 5, 9, 11, 13, 15, 19.....	.50	
Courses 23, 24.....	Arrange	
Farm Management:		
Courses 1, 11.....	1.00	
Courses A, 3, 7.....	.50	
Farm Mechanics:		
Courses A, 1, 9.....	1.50	1.00
Courses 3, 5, 13.....	2.00	1.00
Course 7	1.00	1.00
Course 15	2.00	
Forestry:		
Courses C, D, E, F, 205, 206.....	1.00	
Courses 201, 202, 203, 204, 304, 305, 307, 503, 507, 601, 606.....	1.50	
Courses 301, 303, 306, 308, 316, 317, 318, 501, 502, 506, 508, 604, 605.....	2.00	
Horticulture:		
Courses 201, 401.....	.50	
Courses A, B, 103, 104, 105, 127, 128.....	1.00	
Course 101 A.....	1.50	
Course 115	3.00	
Soils:		
Courses A, 5	1.00	1.00
Courses 1, 2, 3, 7, 15, 16.....	1.00	2.00
Courses 9, 13.....	.50	

Industrial Arts:		Fees	Dep.
Courses 106, 133, 202.....		1.50	2.00
Courses 152, 153, 228.....		1.50	
Courses G, 110, 111, 113, 116, 131, 132, 134, 138, 203, 206, 207, 208, 209, 212.....		3.00	2.00
Courses L, 151, 154, 155, 156, 158, 171, 173, 175, 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:			
Courses 165, 167.....		1.50	
Courses 164, 166.....		.50	
Pharmacy:			
Courses 130, 131, 140, 141, K, L, M, N.....		1.00	
Courses 118, 151, 170, E, F, Q.....		6.00	1.00
Courses 121, G.....		4.00	
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 except 220.....		2.00	
Poultry Husbandry:			
Courses 1, 2, A, B.....		1.00	1.00
Course 6			1.00
Veterinary Medicine:			
Courses 3, 4, 11, 14, B, C.....		.50	
Courses 2, 5, 6.....		1.00	
Course 1.....		2.00	

BOARD AND ROOM

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Zoology:	Fees	Dep.
Courses 106, 107, 120.....	.25	
Courses 110, 111.....	1.00	1.00
Courses A, 101, 102, 103, 108, 109, 114, 115, 116, 201, 202, 204, 207, 208.....	1.50	1.00
Courses 104, 105.....	2.00	3.00
Courses 112, 113, 205, 209.....		3.00

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, bedspreads, and towels, are furnished by the student; and many of the students prefer to make the rooms more home-like 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 16, 1917, the 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; ornaments, 85c; gloves, 40c pair; total, \$14.30. 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, exclusive of the three personal items of clothing, carfare, and amusements, 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	10.00
Laboratory fees and deposits.....	18.00
Textbooks and supplies	26.00
Board (for eight months).....	*128.00
Room rent (nine months)	36.00

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.

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

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; but no student should expect to be able to secure employment by correspondence.

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 if he 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.

HEALTH SERVICE

The College Health Service, inaugurated in 1916, is a department maintained with the aim of promoting the health of all the students. This aim is sought through medical examination, through consultation during office hours, through attendance of the Medical Adviser upon those in hospital and those ill at their residences, through sanitary inspection, and through supervision in case of epidemics. The services of the department, except in so far as the welfare of the College community may require, are not imposed upon any student or group of students. They are available, however, to all students who seek them voluntarily.

The department staff comprises a regular full-time physician, the Medical Adviser, who has his headquarters at the Health Service building, and a resident graduate nurse, who is in attendance at the same building.

The Health Service is maintained by funds derived from regular student fees, twenty-five percent of such fees being devoted to this purpose. The Medical Adviser may be consulted during office hours by any student. He will give medical examinations by appointment, and medical advice and attention to those who are ill. He will be in attendance at all important athletic events on the campus to render aid in case of emergencies. He will authenticate excuses from College work because of illness.

Patients who require hospital service will be attended, on request, by the Medical Adviser, as in other cases of illness; but will be responsible for all hospital fees. Patients requiring X-ray examinations of the Health Service will be responsible also for the cost of the X-ray pictures.

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 \$7,100.00 (March 1, 1917), 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. One thousand dollars (\$1,000) from the Domestic Science Dining Room at the P. P. I. E., restricted to the use of women students.

4. Four thousand six hundred dollars (4,600), 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

L. J. SIMPSON SCHOLARSHIP LOAN FUND

Since that part of the Catalogue explaining the Student Loan Fund was printed, the College has received a gift of \$2,000 from Mr. L. J. Simpson of North Bend, Oregon, whereby five annual scholarship loans of \$100 each, continuing throughout the four years of the student's college course, will be awarded to worthy students whose needs justify the awards. The administration of the L. J. Simpson Scholarship Loan Fund is in the hands of the regular Student Loan Fund Committee, to whom applications should be made.

THE J. T. APPERSON AGRICULTURAL COLLEGE EDUCATIONAL FUND

By the will of the late Hon. J. T. Apperson, Regent of the College since its foundation, a fund amounting to between twenty-five and forty thousand dollars, is to be a perpetual endowment, administered by the State Land Board of Oregon, for the assistance of worthy young men and women, "who are actual bona fide residents of the State of Oregon, and who would otherwise be unable to bear the expense of a college course at the Oregon Agricultural College." The income from this estate is to be loaned to students at a low rate of interest. Applicants for loans must be recommended to the State Land Board by the President of the College and the State Superintendent of Public Instruction.

Cosmopolitan Club, the Faculty, the Alumni, 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, Hon. Thomas Kay, Salem, Hon. James Withycombe, and W. D. Wheelwright.

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 17 and 18.

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 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 to degree courses, 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

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

* 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.

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 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 11, 1917. 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 11 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 11, 1917, 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 11, 1917, 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, that is, work taken in the graduate year, 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 11, 1917, 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

GRADUATION

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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 11, 1917. Certificates of preparatory work will not be rejected at a later date, but applicants cannot expect to receive formal acknowledgment 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 17 or 18, 1917. 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 15, 1917, 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 Electrical Engineering, in Irrigation Engineering, in Highway Engineering, in Mechanical Engineering, in Mining Engineering, in Ceramic Engineering, 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 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, Mechanic 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 may 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."

FEEES

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.

SCHOOLS AND DEPARTMENTS

SCHOOL OF AGRICULTURE

ARTHUR BURTON CORDLEY, Dean

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

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: 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: The 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 cheese making, 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 75) prescribes 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 76) prescribes the more work in Modern Languages and science and prescribes 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 determined 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.

DEGREE COURSES IN AGRICULTURE

Group I.

	Semester	
	1st	2nd
Freshman Year		
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).....		$\frac{1}{2}$
Hygiene (Phys. Ed. 10).....		$\frac{1}{2}$
Drill (Military 1, 2).....	1	1
Gymnasium (Phys. Ed. 15, 16).....	$\frac{1}{2}$	$\frac{1}{2}$
	<hr/> 17 $\frac{1}{2}$	<hr/> 17 $\frac{1}{2}$

Sophomore Year		
Farm Accounts and Business Methods (Com. 109).....	2	
Principles of Economic Zoology (Zool. 108, 109).....	3	3
Agricultural Chemistry (Chem. 500, 501).....	3	3
General Bacteriology (Bact. 103).....	3	or 3
Principles of Fruit Growing (Hort. 101 A).....	2	
Fundamentals of Land Gard. (Hort. 101 B).....	1 $\frac{1}{2}$	
Vegetable Growing (Hort. 201).....		1 $\frac{1}{2}$
** 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).....	$\frac{1}{2}$	$\frac{1}{2}$
	<hr/> 18 $\frac{1}{2}$	<hr/> 17 $\frac{1}{2}$

* 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.

OREGON AGRICULTURAL COLLEGE

	Junior Year	Semester	
		1st	2nd
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.

DEGREE COURSES IN AGRICULTURE

Group II.

	Freshman Year	Semester	
		1st	2nd
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

	Semester	
	1st	2nd
Sophomore Year		
Agricultural Botany (Bot. 41, 42).....	3	3
Agricultural Chemistry (Chem. 500, 501).....	3	3
General Bacteriology (Bact. 103).....	3 or	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).....	$\frac{1}{2}$	$\frac{1}{2}$
* Electives	5	5
	<hr/> 18½	<hr/> 18½

Junior Year		
Agricultural Economics (Com. 219).....	3	
Drill (Military 5, 6).....	1	1
Military Science (Theo. Ins. 1, 2).....	1	1
Electives	12	15
	<hr/> 17	<hr/> 17

Senior Year		
National Government (Com. 320).....	3	
State and Municipal Government (Com. 322).....		3
Electives	13	13
	<hr/> 16	<hr/> 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 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

* Students majoring in Agricultural Chemistry take Qualitative Analysis, 3 credits first semester and Quantitative Analysis, 5 credits second semester.

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.

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.

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. C).....	2	
Horticulture (Optional)—		
Horticultural Practice (Hort. A, B).....	5	5
Poultry Husbandry (Optional)—		
Practical Poultry Keeping (P. H. A, B).....	3	3
** 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.

ANIMAL HUSBANDRY

ERMINE LAWRENCE POTTER, Professor
EDWARD BLODGETT FITTS, Assistant Professor, (Extension)
GEORGE ROY SAMSON, Assistant Professor
ORAN MILTON NELSON, Instructor
DALE EVERETT RICHARDS, Instructor

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 college, 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 livestock; 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.

The department has just completed what is considered the most convenient and modern hog barn in America. This building will aid materially in the instructional and experimental work with hogs.

COURSES IN ANIMAL HUSBANDRY

For the prescribed group courses for the freshman and sophomore years in the School of Agriculture consult pages 75-77.

	Semester	
	1st	2nd
Junior Year		
Advanced Business Law (Com. 309, 310).....	3	3
Animal Chemistry (Chem. 509).....	2	
Comparative Anatomy (Vet. Med. 1).....	3	
Comparative Physiology (Vet. Med. 2).....		3
Soils (Soils 1, 2).....	3	3
Forage Crops (Farm Crops 9).....	2	
Drill (Military 5, 6).....	1	1
Animal Nutrition (A. H. 7).....	2	
Feeds and Feeding (A. H. 21).....		4
Military Science (Theo. Inst. 1, 2).....	1	1
Elective		2
	17	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, 10).....	1	1
Live Stock Economics (A. H. 110).....		3
English or similar elective.....	6	3
	16	16

The following courses are offered:

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 \$0.50. Text: Potter, 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 and Dairy Husbandry; junior year; 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 college. 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 and 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 and 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. Live-Stock Economics. 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 familiarize the students 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: Harper, Management and Breeds of Horses.

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.

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: Day, Productive Swine Husbandry.

250. Breeds of Live Stock. A study of the breeds of horses and beef cattle, their development, breeding and type.

Prerequisite: Animal Husbandry 1 or A. Sophomore year; first semester; 3 credits, 2 recitations, 1 three-hour laboratory period. Fee \$0.25.

260. Breeds of Live Stock II. A study of the breeds of sheep and swine, their development, breeding, and type.

Prerequisite: Animal Husbandry 1 or A. Sophomore year; second semester; 3 credits; 2 recitations; 1 three-hour laboratory period. Fee \$0.25.

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.

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 West.

Vocational; second semester; 5 credits; 4 recitations; 1 laboratory period. Fee \$0.50. Text: Potter, 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.

BACTERIOLOGY

THEODORE DAY BECKWITH, Professor
GODFREY VERNON COPSON, Associate Professor
RALPH McBURNEY, 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 theoretical 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 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 purposes 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 75-77.

	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:

103. **General 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; Pharmacy, junior or senior year; either semester; 3 credits; 1 lecture; 1 recitation; 2 laboratory periods. Fee \$3.00.

104. **General Bacteriology.** A course supplementing the lecture and laboratory work of Bacteriology 103.

Prerequisite: Bacteriology 103. Agriculture; elective; sophomore, junior, and senior year; second semester; 3 credits; 2 laboratory periods; 2 recitations or lectures. Fee \$3.00.

* 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.

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 103. Agriculture; elective; junior year; first semester; 5 credits; 1 lecture; 2 recitations; 3 laboratory periods. Fee \$5.00.

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. Fee \$4.00.

114. **Seminar.** A discussion of the most important literature on the subject.

Agriculture; seniors, juniors and graduates; 1 credit; 1 hour.

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 \$5.00.

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.

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 manipula-

tion 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.

304. Home Economics 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 103, 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.

305. Home Economics Bacteriology. Primarily for Home Economics students in continuation of Bacteriology 304. 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 304 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.

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 103. Agriculture; senior year; first semester; 3 credits; 1 lecture; 1 recitation; 2 laboratory periods. Fee \$3.00.

402. Dairy Bacteriology. Continuation of Course 401. A detailed study of specific problems in dairy bacteriology, practice in

special technique and methods. Individual problems assigned, literature reviewed, and discussed. Course designed fundamentally to develop initiative and resourcefulness of student. Work adapted to particular needs of individual students as far as possible.

Prerequisites: Bacteriology 103 or 401; Chemistry 501 or equivalent. Agriculture; junior or senior year; second 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-chemicals, 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 103. Agriculture; senior year; first semester; 3 credits; 1 recitation, or lecture; 2 laboratory periods. Fee \$3.00.

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 103 and 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 103, 104, or equivalent. Agriculture; junior or senior year; second semester; 2 credits; 2 laboratory periods. Fee \$2.00.

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

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

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, Assistant Professor
HOWARD SPURR HAMMOND, Instructor, Curator of Herbarium
HENRY CLARK GILBERT, Instructor
OTTO HERMAN ELMER, Instructor
CHARLES ROY STILLINGER, 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. In the advanced laboratory a number of desks are available for special and graduate students and the equipment for advanced work in plant histology and microscopic technique includes 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 experi-

mental 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 provides 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 contains, in addition to Oregon forms, 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 75-77.

	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

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

* 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.

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: Gager, Fundamentals of Botany. Stevens, Plant Anatomy.

31. **Forest Botany.** Continuation and completion of work described under course 30. Prerequisite: Botany 30. The course in Forestry; freshman year; second semester; 3 credits; 1 lecture; 1 recitation; 2 laboratory periods. Fee \$1.00. Text: Gager, Fundamentals of Botany. Stevens, Plant Anatomy.

36. **Range and Pasture Botany.** Study and identification of native plants of importance for forage and pasturage and native hay, and of the stock-poisoning plants, their distribution and localization. Of interest to students of Forestry, Animal Husbandry, Dairy Husbandry, and Veterinary Science.

Prerequisite: Botany 30 and 31 or 41 and 42, or their equivalent; elective; first semester; 3 credits; 1 lecture; 2 laboratory periods. Fee \$1.50. Text: Piper and Beattie, Flora of the Northwest Coast.

37. **Forest Pathology.** The parasitic and saprophytic fungi which attack forest trees and destroy structural timber; the effect of these organisms upon the wood, and a consideration of preventive measures.

Prerequisites: Botany 30 and 31, or 41 and 42. The course in Forestry; sophomore year; elective for others; second semester; 1 credit; 1 lecture; 1 laboratory period. Fee \$0.50.

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; 1 recitation; 2 laboratory periods. Fee \$1.50. Text: Curtis, *Nature and Development of Plants*.

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 22 and 23, or 30 and 31, or 41 and 42, or 70, and in addition, Chemistry 500 and 501. The course in Pomology; the course in Farm Crops; 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. Text: Duggar, *Plant Physiology*.

52. Advanced Plant Physiology. Special studies of plant physiological problems of present-day interest and importance. Extensive reading and class reports on selected topics. Methods of investigating scientific literature emphasized.

Prerequisite: Botany 50. Elective; first semester; 3 credits; 1 lecture; 2 recitations; (additional credits may be taken by special arrangement). Fee \$1.50.

67. Economic Ecology. The relations between the environment and the plant. The factors affecting the distribution of plants, and the occurrence of plant associations and successions. Ecological problems of the forest, grazing range, and farm. Field studies in physiographic ecology, including the methods of plant survey.

Of interest to the student of botany, forestry, grazing, agricultural economics, irrigation and drainage, plant introduction, geology, and to all who expect to enter State or Government field service.

Prerequisites: Freshman Botany, and Botany 36, 47, or 68. Elective; second semester; 3 credits; 1 lecture; 1 recitation; 2 laboratory periods. Fee \$1.50. Text: Cowle's *Ecology*.

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 22 and 23, or 30 and 31, or 41 and 42, or 70; elective; second semester; 3 credits; 1 lecture; 1 laboratory period; and 1 field excursion for Saturday morning. Fee \$1.50. Texts: Piper and Beattie, *The Flora of the Northwest Coast*. 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*. Greenish, *Food and Drugs*. Mansfield, *Histology of Medicinal Plants*.

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*. Mansfield, *Histology of Medicinal Plants*.

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 22 and 23, 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 22 and 23, 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 22 and 23, or 30 and 31, or 41 and 42, or 70. The courses in Pomology, Olericulture, Farm Crops and Farm Management; junior or senior year; elective for others; Horticultural students are expected to enroll in section 1; Agronomy students in section 2; 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 organisms. 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.

Taken simultaneously with Botany 101, Section 2. 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 plant diseases, plant disease problems, or parasitic fungi; 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 parasitic forms.

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, 116, and 118 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 22, 23, 30, 31, 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
RALPH IRVING SCOVILLE, Assistant Professor
EDWARD BLODGETT FITTS, Assistant Professor (Ext.)
PAUL STANLEY LUCAS, Instructor
JAMES OBYE BECK, Instructor
HAROLD RAY TAYLOR, Assistant

Dairy Production and Dairy Manufacturing are the courses which the Dairy department offers.

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 approximately 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 one hundred twenty 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 75-77.

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	
Vocational Dairy Bacteriology (Bact. A).....		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
Creamery 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. A, B).....	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

	Semester	
	1st	2nd
Junior Year		
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
Advanced Testing (D. H. 14) (Elective).....	2	
Dairy Farm Equipment and Inspection (D. H. 6).....	2	
Buttermaking and Factory Management (D. H. 3).....		5
Senior Seminar (D. H. 8).....		1
Advanced Judging (D. H. 10) (Elective).....	1	
Approved Electives		4
Dairy Research (D. H. 30) (Elective)		
Market Milk (D. H. 12) (Elective).....	3	
	16	16

(b) Dairy Manufacturing

	Semester	
	1st	2nd
Junior Year		
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
Advanced Testing (D. H. 14).....	2	
Approved Elective		1
Junior Seminar (D. H. 21).....		1
	<hr/> 17	<hr/> 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	
Ice Cream and Ices (D. H. 7).....		2
Dairy Mechanics (Ind. Arts 28).....		1
Dairy Mechanics (F. M. 7).....		1
Seminar (D. H. 8).....		1
Butter and Cheese Judging (D. H. 9).....		1
Market Milk (D. H. 12).....	3	
Dairy Farm Equipment (D. H. 6) (Elective).....	2	7
Electives		7
	<hr/> 16	<hr/> 16

The following courses are offered:

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.

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. Fee \$1.00. Deposit \$2.00.

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 **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 Manufacturing; 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 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 \$0.50.

6. Dairy Farm Equipment and Inspection. The arrangement and construction of modern dairy buildings with regard to convenience and sanitation; the various types of dairy barns, silos, milk houses, manure pits, liquid manure cisterns, and septic tanks; the essentials in construction and installation of dairy equipment, such as stall ties, milking machines, separators, coolers, sterilizers, and various utensils.

Laboratory. Practice in score-card inspection of dairy barns and milk rooms. Drawing of plans for dairy barns, silos, manure pits, milk houses, and covered sheds.

Prerequisite: Elementary Bacteriology 101. Required of Dairy Production seniors; elective for Dairy Manufactures seniors; first semester; 2 credits; 1 lecture; 1 three-hour laboratory period. Fee \$1.00.

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.

12. Market Milk. City milk inspection; federal, state, and city regulations; classes of milk; chemistry and bacteriology of milk from the practical standpoint; the farm market milk retailer; the village milk plant; the city milk plant; the transportation of milk; pasteurization methods; study of methods followed, apparatus used, and division of labor in large milk plants. The laboratory work includes special tests of milk, scoring of milk exhibits and milk plants, and drawing of plans and equipment for buildings.

Prerequisite: Elements of Dairy (D. H. I). Optional in courses in Dairy Production, and required in Dairy Manufacturing; junior and senior years; first semester; 3 credits; 2 recitations; 1 laboratory period. Fee \$1.50. Deposit \$1.50.

14. Advanced Testing. Application of the Babcock test; use of the lactometer in detecting adulteration; practical tests for the detection of preservatives, drug adulterations, and artificial colors; fat determinations of cheese, butter, evaporated milk, sweetened condensed milk, and ice cream; moisture tests of butter and cheese; salt, color, and casein tests of butter.

Prerequisites: Elements of Dairy (D. H. I), and General Chemistry (Chem. 100 and 101). Required in courses in Dairy Manufactures; optional in Dairy Production; senior year; first semester; 2 credits; 1 recitation; 1 laboratory period. Fee \$2.00. Deposit \$2.00. Text: Van Slyke, Modern Methods of Testing Milk.

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.

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 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. Continuation 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.

DRAINAGE AND IRRIGATION

WILBUR LOUIS POWERS, Professor
Instructor

Courses in Drainage and Irrigation 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 of field work in Drainage and Irrigation, 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 75-77.

Junior Year	Semester	
	1st	2nd
Agricultural Economics (Com. 219).....	3	
Irrigation Farming (Drain. & Irr. 3).....	3	
Climatology (Drain. & Irr. 5).....		2
Topographical Surveying (C. E. 243).....	2	
Agricultural Bacteriology (Bact. 501).....	3	
Principles of Plant Pathology (Bot. 101).....	2	
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 Elective		1
	17	17

* 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).

DRAINAGE AND IRRIGATION

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	Senior Year	Semester	
		1st	2nd
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
Irrigation Management (Drain. & Irr. 21).....			1
Feeds and Feeding (A. H. 23).....			3
Dairy Herd Management (D. H. 40).....			3
Extempore Speaking (Eng. 104).....			2
Approved Electives		2	
		16	16

The following courses are offered:

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 effects 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. Text: Widtsoe.

5. Climatology. Practical meteorology; 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.

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; first semester; 2 credits; 2 recitations. Text: Chandler.

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 field 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 and work is to be outlined with the instructor in advance.

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 will be made, where possible, of some of the largest projects in the State.

Senior year; first semester; 3 credits. Fee \$0.50. Deposit \$1.00.

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.

21. Irrigation Management. A study of the operation and maintenance of irrigation systems. Methods and records for water masters. Control of agencies destructive to ditches. Cost and durability of materials used in distribution of water on the farm. Water rotations for different types of farming.

Required of seniors and advanced students specializing in Drainage and Irrigation. Senior or graduate year; second semester; 1 credit.

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; first semester; 2 credits; 2 recitations. Fee \$1.00. Text: Fortier, Use of Water in Irrigation.

ENTOMOLOGY

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

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 75-77.

	Semester	
	1st	2nd
Junior Year		
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 straw-

* 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.

berry, 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 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. (Course not offered 1917-18.)

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. (Course not offered 1917-18.)

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. Text: Folsom, Entomology with Reference to its Biological and Economic Aspects.

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. Fee \$1.00.

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. (Course not offered in 1917-18.)

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

Prerequisite: Entomology 312. Credits to be arranged. Fee \$1.00. (Course not offered in 1917-18.)

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.

315. Seminar. A continuation of course 310.

Senior year; second semester; 1 credit.

316. Insect Taxonomy. An intensive study of the systematic grouping of insects; insect ecology as allied to taxonomy.

Prerequisite: Entomology 301. Elective in advanced entomology and of graduate rank; second semester; 3 credits; 2 lectures; 2 laboratory periods. Fee \$2.00.

317. Advanced Thesis and Research Methods. A course offered only for graduate students. Students will select problems in applied entomology on the life-history and control of some insect or group of insects; problems in ecology; monographic problems, etc., with special emphasis on methods of research.

Elective for graduate students only; first semester; from 8 to 16 credits.

318. Advanced Thesis and Research Methods. Continuation of course 317.

Elective for graduate students only; second semester; from 8 to 16 credits.

FARM CROPS

GEORGE ROBERT HYSLOP, 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, 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 methods of crop production and improvement 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 positions, in agronomy, forage crops, grain standardization, plant breeding, crop marketing, etc., or for experiment station, 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 structure 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 75-77.

	Semester	
	1st	2nd
Junior Year		
Agricultural Economics (Com. 219).....	3	
Plant Chemistry (Chem. 510) or.....		2
Plant Physiology (Bot. 50).....		3
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 5).....		3
Drill (Military 5, 6).....	1	1
Military Science (Theo. Inst. 1, 2).....	1	1
Elective		3 or 4
	17	17
Senior Year		
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	
Elective	5	2
	16	16

The following courses are offered:

1. **Crop Production.** 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, rotation, production costs, and uses of the leading cereal, forage, and special field crops. The eradication of weeds. 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.

Agriculture; freshman year; either semester; 3 credits; 2 recitations; 1 laboratory period. Fee \$0.50.

5. **Cereal Crops.** A study of the production, standardization, and marketing of cereal and allied grains from seed to consumer. 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. Suited to cereal specialists, grain growers, and those desiring civil service work along this line.

Agriculture; junior year; first semester; 4 credits; 2 recitations; 2 laboratory periods. Fee \$0.50. Texts: Carleton, Small Grains. Montgomery, The Corn Crops.

7. **Cereal Crops, Lectures.** Same as course 5 except laboratory work is omitted. Not suited to students desiring special cereal work or to do civil service work in Agronomy, grain standardization, or grain marketing.

Agriculture; 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. Costs, storage and marketing.

Agriculture; 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. This

course with Forage Crops, Farm Crops 9, fits persons for forage and seed specialization.

Agriculture; 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, fertilization, culture, harvest, improvement, storage, costs, markets, distribution, uses, and manufacture. Varietal studies and identification. Potato judging and scoring.

Agriculture; 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.

Agriculture; junior year; second semester; 3 credits; 2 recitations; 1 laboratory period. Fee \$0.50.

17. **Advanced Crop Breeding.** An advanced course dealing with field-crop breeding from a more technical 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.

Agriculture; senior year; second 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 Botany 47 and Agrostology (Farm Crops 11).

Agriculture; 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.

Agriculture; 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, grain grading, 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.

Agriculture; senior year; either semester; 1 to 5 credits; fee to be arranged.

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

Agriculture; senior or graduate year; either semester; 1 to 5 credits; fee to be arranged.

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.

Agriculture; graduate year; either semester or both; credits and fees to be arranged.

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, rotation, production costs, 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 Agriculture; second semester; 3 credits; 2 recitations; 1 laboratory period. Fee \$0.50.

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 75-77.

	Semester	
	1st	2nd
Junior Year		
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

* 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 following courses are offered:

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; either 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.

13. **Advanced Farm Mechanics.** For students who have 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.

15. **Concrete Construction and Farm Machines.** A special course designed to meet the requirements of the Industrial Arts students who expect to teach Farm Mechanics, Farm and Ornamental Concrete Construction; detail study, operation, trouble hunting, and testing, gas engines; gas and steam engine accessories; exercises with the common farm machines and such exercises as babbitting, belt lacing, and rope tying and splicing will be given.

Elective; junior or senior year, Industrial Arts; one semester; three credits. Fee \$2.00.

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.

One-year course; first semester; 3 credits; 1 recitation; 2 laboratory periods. Fee \$1.50. Deposit \$1.00.

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, Associate Professor
WALTER SHELDON BROWN, Assistant Professor (Ext.)
MOSHER DWEN BUTLER, Instructor
ALDEN FORREST BARSS, Instructor
HARRY DUANE LOCKLIN, 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.

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, and vegetable preparation. There are special class rooms, large draughting rooms, museum, and greenhouses. 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 excellent horticultural library.

* On leave of absence.

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 study 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 box presses, grading machinery, and packing 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, located 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 other apparatus necessary for extensive research work.

On the top floor, in the horticultural museum, are exhibited all sorts of equipment used in Horticulture, such as pruning shears, budding and grafting utensils, prune-drying apparatus, fruit graders, etc. On this floor a large draughting room extends along the entire south end of the building, fully supplied with tables, cabinets, etc., for the use of students studying Floriculture, Landscape Gardening, 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 well 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 75-77.

(a) Pomology

	Semester	
	1st	2nd
Junior Year		
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

National Government (Com. 320).....	3	
State and Municipal Government (Com. 322).....		3
Systematic Pomology (Hort. 115).....	4	
Commercial Pomology (Hort. 117).....		3
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	4
	—	—
	17	17

(b) Olericulture

	Semester	
	1st	2nd
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		
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

	Semester	
	1st	2nd
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

(d) Landscape Gardening

16 16

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

Sophomore Year

17½ 17½

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

	Semester	
	1st	2nd
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
	<hr/> 17	<hr/> 17
Senior Year		
National Government (Com. 320).....	3	
State and Municipal Government (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
	<hr/> 16	<hr/> 16

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

The following courses are offered:

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 Orchardng.

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 recitations and 1 laboratory period; for the first part of the second semester, 1 lecture and 1 laboratory period. Text: Sears, Productive Orchard-ing.

Pomology

102. Practical Pomology. A continuation of course 101-a. 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, 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 1918); 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 1918); 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. Fee \$3.00.

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; 3 credits; 3 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.

Elective for Agricultural seniors; required for 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; elective for seniors electing Horticulture 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.

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. Fee \$1.00. 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. Fee \$1.00. 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 \$0.50. 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, rotations, 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 evergreen 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 \$0.50.

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 1917-18.

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 sirups, jellies, etc.

Elective; junior or senior year; second semester; three credits; one recitation; two laboratory periods. Not offered in 1917-18.

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 sirup and juices.

Elective; junior or senior year; first semester; 3 credits; 1 recitation; 2 laboratory periods. Not offered in 1917-18.

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.

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. Fee \$1.00.

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 study of landscape gardening; and will deal with fundamental principles and their application in beautifying the farm home.

One-year course in Agriculture; second semester; 5 credits; 3 recitations; 2 laboratory periods. Fee \$1.00. 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.

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 offer 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; fattening batteries; trap-nests; and various other appliances necessary for practical poultry keeping. A recent valuable addition is forty standard exhibition coops mounted on movable tables. These are used in judging poultry from the utility standpoint. 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 75-77.

	Semester	
	1st	2nd
Junior Year		
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. 12).....	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

POULTRY HUSBANDRY

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	Senior Year	Semester	
		1st	2nd
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:

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; constructing 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. Deposit \$1.00. Text: Dryden, Poultry Breeding and Management.

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. Deposit \$1.00. Text: Dryden, Poultry Breeding and Management.

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. Text: Dryden, Poultry Breeding and Management.

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.

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, caponizing, 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; 3 credits. Fee \$1.00. Deposit \$1.00. Text: Dryden, Poultry Breeding and Management.

B. A continuation of course A, but may be taken separately. Second semester; 3 credits Fee \$1.00. Deposit \$1.00. Text: Dryden, Poultry Breeding and Management.

* These two courses are given as Vet. Med. 11 and 12.

SOILS AND FARM MANAGEMENT

HENRY DESBOROUGH SCUDDER, Professor
CHARLES VLADIS RUZEK, 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 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 electricity, 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 has been provided and equipped with exhibit cases and racks for displays of the soil sample collections, sub-soils, hardpans, soil analyses, soil colors, etc.

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 counties, 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 75-77. For students desiring to major in Soils the following course is recommended for the junior and senior years.

	Semester	
	1st	2nd
Junior Year		
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
	<hr/> 17	<hr/> 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:

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 alkali 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, Flippin and 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, Flippin and 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 and 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 and 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.

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. Text: Whitson and Walster, *The Soil*.

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 75-77. For students desiring to major in Farm Management the following course is recommended for the junior and senior years.

	Semester	
	1st	2nd
Junior Year		
Forage Crops (Farm Crops 9).....	2	
Cereal Crops, Lectures (Farm Crops 7).....	2	
Agricultural Economics (Com. 219).....	3	
Typewriting (Com. 410-a).....	1	
Practical Pomology (Hort. 102).....	2	
Gen. Farm Mechanics (F. Mech. 1).....	2	
Land Drainage or Irrigation Farming (Drain. & Irr. 1 or 3).....		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		
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	
Economic 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:

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, réquirements 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, farm-equipment costs and duty, cropping systems of 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. Whenever 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 ad-

dition 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. Problems of wide diversity 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.

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.

14. Graduate Work. Continuation of course 15 through the second semester's work.

Elective; graduate year; either semester; credits to be arranged.

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.

VETERINARY MEDICINE

BENNETT THOMAS SIMMS, Professor
FREDERIC WILLHELM MILLER, Fellow

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.

The following courses are offered:

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. Fee \$2.00.

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 non-infectious diseases of domestic animals are considered in this course. Special attention is given to the presentation 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. Fee \$1.00.

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.

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.

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; first semester; 2 credits; 1 lecture; 1 laboratory period. Fee \$0.50. Text: P. B. Hadley, The Horse in Health and Disease.

ZOOLOGY AND PHYSIOLOGY

GEORGE FRANCIS SYKES, Professor
*ALICE LEORA EDWARDS, Instructor
ASA CHANDLER, Instructor
CHARLOTTE NEVIL HURD, 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

* On leave of absence (1916-1917).

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 Leuckart 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.

As an adjunct to the laboratory facilities a set of nursery troughs for fish cultural purposes has been erected on the campus adjacent to the zoological laboratory.

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 75-77.

	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:

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 Pre-medical students; freshman year; first semester; 3 credits; 2 lectures; 1 laboratory period of three hours. Fee \$1.50. Deposit \$1.00.

102. General Zoology. A continuation of 101.

Prerequisite: Zoology 101. The courses in Pharmacy and Physical Education; 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

* 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.

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 1917-18.)

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. 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 every-day 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, or the equivalent.

Elective to students in Agriculture, Forestry and Pharmacy, Veterinary 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; or 108, or the equivalent. Elective for students in Agriculture, Pharmacy, Aquiculture, 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.

Prerequisite: Zoology 108, or the equivalent. 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 Agriculture 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.

Prerequisite: Zool. 108, or the equivalent. 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 freshman, 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. Fee \$1.50. Deposit \$1.00.

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 and others; 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 maintaining 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.

A. 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. The practical side of every subject is especially emphasized, the constant aim being to train the student for service and efficiency.

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) Accounting and Business Management, (2) Economics and Sociology, (3) Government and Business Law, (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.

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.

Departments. For administrative purposes, the School of Commerce is organized into four distinct departments: (1) Accounting and Business Management, (2) Economics and Sociology, (3) Government and Business Law, and (4) Stenography and Office Training.

REQUIREMENTS FOR GRADUATION IN THE SCHOOL OF COMMERCE

For graduation in the school of Commerce a total of 136 college credits must be completed by men, and 132 credits by women. 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, such as English, Modern Language, etc., at least 22 credits.

Natural Science group at least 6 credits.

Commerce group at least 66 credits, as follows: Accounting and Business Management 21; or Office Training 21; Economics 21; Government and Business Law 18; Business English 6.

Mathematics group at least 3 credits.

Gymnasium 2 credits for men; 6 credits for women.

Military Science 2 credits for men.

Military Drill 6 credits for men.

Free Electives 29 credits.

DEGREE COURSE IN COMMERCE

Freshman Year	Semester..	
	1st	2nd
Accounting (Com. 100, 101)**	3	3
Stenography (Com. 400, 401)*	4	4
Advanced Commercial Correspondence (Eng. 143) or Modern Language	3	
Technical Business English (Eng. 142)		3
Commercial Geography (Com. 200)**	3	
Economic History of Europe (Com. 208)		3
Commercial Mathematics (Math. 8)	3	
Contemporary American History (Hist. 62)		3
Library Practice (Lib. 1)	$\frac{1}{2}$	
Hygiene (Ph. Ed. 10)	$\frac{1}{2}$	
Gymnasium (Phys. Ed. 15, 16)	$\frac{1}{2}$	$\frac{1}{2}$
Gymnasium (Phys. Ed. 5, 6)	(1)	(1)
Drill (Military 3, 4)	1	1
	<hr/> 18½	<hr/> 17½

* Or Science. See requirements for Graduation.

** Students who have not had elementary accounting should register for course 107 in addition to 100, and omit course 200.

OREGON AGRICULTURAL COLLEGE

	Semester	
	1st	2nd
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 Business Law (Com. 309, 310).....	3	3
Accounting (Com. 102, 103) or Stenography (Com. 402, 403)	4	4
History of Oregon (Hist. 70)*.....	3	
Modern European History (Hist. 40)*.....		3
Gymnasium (Phys. Ed. 17, 18).....	$\frac{1}{2}$	$\frac{1}{2}$
Gymnasium (Phys. Ed. 7, 8).....	(1)	(1)
Drill (Military 3, 4).....	1	1
	<hr/> 17 $\frac{1}{2}$	<hr/> 17 $\frac{1}{2}$

Junior Year **

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 (6-6) (See groups).....	6	6
	<hr/> 17	<hr/> 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
	<hr/> 16	<hr/> 16

* Optional with science or second year in Accounting or Office Training.

** 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.

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Freshman Year, Second Semester Registration **

	Semester	
	1st	2nd
Accounting (Com. 100).....		3
Modern English Prose (Eng. 82)		3
Advanced Commercial Correspondence (Eng. 143).....		3
Principles of Economics (Com. 210).....		3
Economic History of Europe (Com. 208).....		3
Typewriting (Com. 411) or.....		2
Stenography (Com. 400).....		(4)
Gymnasium (Phys. Ed. 16).....		$\frac{1}{2}$
Gymnasium (Phys. Ed. 6).....		(1)
Drill (Military 4).....		1
		<hr/>
		18 $\frac{1}{2}$

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.

VOCATIONAL COURSE IN COMMERCE

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).....	$\frac{1}{2}$	$\frac{1}{2}$
Gymnasium (Phys. Ed. 5, 6).....	(1)	(1)
Drill (Military A, B).....	1	1
	<hr/>	<hr/>
	17 $\frac{1}{2}$	17 $\frac{1}{2}$

** For irregular students after consultation with the Dean.

	Semester	
	1st	2nd
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
Business Law (Com. P).....	3	
Elementary Industrial Problems (Com. J).....		3
Penmanship (Com. W, X).....	1	1
Gymnasium (Phys. Ed. 13, 14).....	$\frac{1}{2}$	$\frac{1}{2}$
Gymnasium (Phys. Ed. 7, 8).....	(1)	(2)
Drill (Military C, D).....	1	1
	<hr/>	<hr/>
	16 $\frac{1}{2}$	17 $\frac{1}{2}$

First Year, Second Semester Registration

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).....	$\frac{1}{2}$
Gymnasium (Phys. Ed. 6).....	(1)
Drill (Military B).....	1
	<hr/>
	17 $\frac{1}{2}$

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. Accounting and Business Management Semester

	Junior Year	
	1st	2nd
Commercial Pharmacy (Phar. 160).....	3	
Labor Problems (Com. 213).....		3
Practical Public Speaking (Eng. 105, 106).....	3	3
	<hr/>	<hr/>
	6	6

SCHOOL OF COMMERCE

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	Semester	
	1st	2nd
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
	<hr/> 10	<hr/> 10

Group 2. Economics and Sociology

Junior Year		
American Literature (Eng. 71, 72) or.....	3	3
Modern Language		
Cooperation (Com. 260).....		3
Science	3	
	<hr/> 6	<hr/> 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. Ed. 101).....	3	
History of Education (Ind. Ed. 120).....		3
Lecture and Reading Course (Com. 140, 141).....	1	1
	<hr/> 10	<hr/> 10

Group 3. Government and Business Law

Junior Year		
History of English Literature (Eng. 61, 62).....	3	3
Economic Organization of Agriculture (Com. 264).....	3	
Insurance (Com. 235).....		3
	<hr/> 6	<hr/> 6

	Semester	
	1st	2nd
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
	<hr/>	<hr/>
Group 4. Teachers' Course	10	10
Junior Year		
General Psychology (Ind. Ed. 101).....	3	
Educational Psychology (Ind. Ed. 102).....		2
Principles of Education (Ind. 131).....	3	
History of Education (Ind. Ed. 120).....		3
Lecture and Reading Course (Com. 141).....		1
	<hr/>	<hr/>
Senior Year	6	6
Special Methods (Ind. Ed. 180, 181).....	2	2
Business Organization and Management (Com. 110).....	3	
Labor Problems (Com. 213).....		3
Approved Electives	5	5
	<hr/>	<hr/>
Group 5. Minor in Agriculture	10	10
Junior Year		
Soils (Soils 1).....	3	
Crop Production (Farm Crops 1).....		3
Approved Electives	3	3
	<hr/>	<hr/>
Senior Year	6	6
Stock Judging (A. H. 1).....	2	
Live Stock Management (A. H. 2).....		3
Plant Propagation (Hort. 105).....		2
Orchard and Garden Practice (Hort. 103).....	2	
Approved Electives	6	5
	<hr/>	<hr/>
	10	10

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Group 6. Minor in Home Economics

	Semester	
	1st	2nd
Junior Year		
Food Preparation (D. S. 101).....	3	
Food Preparation (D. S. 102).....		3
Approved Electives	3	3
	<hr/> 6	<hr/> 6
Senior Year		
Dressmaking (D. A. 201).....	3	
Dressmaking (D. A. 202).....		3
Approved Electives	7	7
	<hr/> 10	<hr/> 10

Note.—If the student has not already six college credits in Science he should register according to Note concerning requirement for graduation page 173, in the Junior or Senior year.

Group 7. Office Training

Junior Year		
Office Training for Stenographers (Com. 412).....	3	
Secretarial Training for Stenographers (Com. 413).....		3
Approved Electives	3	3
	<hr/> 6	<hr/> 6
Senior Year		
Reporters' Course (Com. 404).....	2	
Reporters' Course (Com. 405).....		2
Approved Electives	8	8
	<hr/> 10	<hr/> 10

Group 8. Minor in Physical Education for Women *

Junior Year		
Theory of Gymnastics (Phys. Ed 41, 42).....	2	2
Massage (Phys. Ed. 47, 48).....	1	1
Physical Examination & Prescription (Phys. Ed. 49, 50)	1	1
Physical Education—Practice.....	2	2
	<hr/> 6	<hr/> 6

* Note: Prerequisites for this course are Zoology, Physiology and Anatomy (201, 202).

	Semester	
	1st	2nd
Senior Year		
Methods and Practice Teaching (Phys. Ed. 51, 52).....	2	2
Playground (Phys. Ed. 53).....		2
Home Nursing D. S. 511).....		3
General Psychology (Ind. Ed. 101).....	3	
Basketry D. A. 402).....	2	
Story Telling (Eng. 192, 193).....	1	1
Physical Education—Practice.....	2	2
	<hr/> 10	<hr/> 10

COURSE IN FARM BUSINESS AND RURAL LEADERSHIP

For the prescribed group courses for the freshman and sophomore years see Degree Courses in Agriculture, Group I, page 75-76.

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 (Soils 7).....	4	
Feeds and Feeding (A. H. 23).....		3
Drill (Military 5, 6).....	1	1
Military Science (Theo. Inst. 1, 2).....	1	1
	<hr/> 18	<hr/> 17
Senior Year		
Public Finance (Com. 233).....	3	
Comparative Governments (Com. 325).....		3
Economic Organizations of Agriculture (Com. 264).....	3	
Rural Sociology (Com. 252).....		3
Literature and Exposition of the Rural Life (Com. 255).....	3	
Farm Management (Farm Man. 1).....		3
Forage Crops (Farm Crops 9).....	2	
Elementary Laboratory Bacteriology (Bact. 102).....		2
Practical Pomology (Hort. 102).....	2	
Approved Electives	3	5
	<hr/> 16	<hr/> 16

COURSE IN MARKETING AND RURAL ORGANIZATION

	Semester	
	1st	2nd
Freshman Year		
Business English (Eng. 143, 142).....	3	3
Modern Languages	3	3
Commercial Geography (Com. 200).....	3	
Economic History of Europe (Com. 208).....		3
Science	3	3
Commercial Mathematics (Math. 8).....	3	
Accounting (Com. 107).....		3
Library Practice (Libr. 1).....	$\frac{1}{2}$	
Hygiene (Phys. Ed. 10).....	$\frac{1}{2}$	
Gymnasium (Phys. Ed. 15, 16).....	$\frac{1}{2}$	$\frac{1}{2}$
Drill (Military 3, 4).....	1	1
	<hr/>	<hr/>
	17½	16½
Sophomore Year		
Practical Public Speaking (Eng. 105, 106).....	3	3
Modern Languages (Continuation).....	3	3
Economic History of United States (Com. 206).....	3	
Principles of Economics (Com. 210).....		3
Soils (Soils 1, 2).....	3	3
Accounting (Com. 103).....	4	
Office Training (Com. 410).....		4
Gymnasium (Phys. Ed. 17, 18).....	$\frac{1}{2}$	$\frac{1}{2}$
Drill (Military 5, 6).....	1	1
	<hr/>	<hr/>
	17½	17½
Junior Year		
Business Management (Com. 110).....	3	
Farm Crops (Farm Crops 1).....		3
National Government (Com. 320).....	3	
State and Municipal Government (Com. 322).....		3
Advanced Business Law (Com. 309, 310).....	3	3
Farm Management (Farm Man. 1).....	3	
Elements of Dairying (D. H. 1).....		3
Animal Husbandry, Stock Judging (A. H. 1).....	2	
Live Stock Management (A. H. 2).....		3
Drill (Military 5, 6).....	1	1
Military Science (Theo. Inst. 1, 2).....	1	1
	<hr/>	<hr/>
	16	17

	Semester	
	1st	2nd
Senior Year		
Markets and Marketing (Com. 283, 284).....	3	3
Economic Organization of Agriculture (Com. 264).....	3	
Rural Finance (Com. 265).....		3
Transportation (Com. 240).....		3
Insurance (Com. 235).....		3
Electives	11	5
	17	17

ACCOUNTING AND BUSINESS MANAGEMENT

JOHN ANDREW BEXELL, Professor
 JOHN B. HORNER, Professor of History
 ERWIN BERTRAN LEMON, Instructor
 RUSSEL MARION HOWARD, Instructor

The distinctive work of the department of Accounting and Business Management 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 Accounting and Business Management 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 management are very important.

Equipment. The department of Accounting and Business Management 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 ACCOUNTING AND BUSINESS MANAGEMENT

For outline of courses in Accounting and Business Management consult pages 174-175.

The following courses are offered:

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 and closing entries; adjustments 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.

* 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.

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) **Bank Accounting.** A thorough course in modern bank accounting. The organization of private, state, and national banks, trust companies, and other financial institutions. (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; 3 credits; 1 recitation; 4 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) **Theory of Accounting** including depreciation, reserves, and investment accounting; advanced form of final statements; the statement of affairs and deficiency account; realization and liquidation. (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. U. S. Office of Markets, Elevator Accounting and Organization of Cooperative Enterprises.

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. U. S. D. A. Bulletins.

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) **Theory of Cost Accounting.** The elements of costs; cost and stock records; relation of cost accounts to the financial records; distribution of overhead; cost statements; graphical representation of costs. (b) **Factory Costs.** A laboratory course especially adapted to a manufacturing business with a considerable pay-roll. (c) **Farm Costs Accounts.** A system of cost accounts

adapted to the farm or any productive enterprise. (d) **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:** Wildman, Principles of Cost Accounting. Klein, Elements of Accounting. U. S. D. A. Bulletins.

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 material 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:** Cox, C. P. A. Problems. Original Exercises.

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 procedure in public systems form an important part of this course. (b) **Auditing.** The duties and responsibility 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. Harvard Bulletins.

107. Bookkeeping. A thorough but rapid study of the general principles of bookkeeping. The aim 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; 1 recitation; 4 laboratory periods. 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. (b) **Business Organization.** Individual proprietorship, partnership, joint stock companies, and corporations are carefully studied and their adaptations discussed from the standpoint of efficiency; the status of stockholders; the rights and obligations of bondholders; and the functions of officers and directors are treated in detail.

Agriculture; sophomore year; first semester; 2 credits; 2 recitations. Texts: Bexell and 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 control. (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; departmental 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 Accounting and Business Management. 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, proof reading, 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.

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.

Farm Management; senior year; first semester; 3 credits; 2 recitations; 1 laboratory period. Text: Robinson, Organizing a Business. 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. Ten lectures; first semester; 1 credit.

141. Business Men's Lectures and Reading. A continuation of course 140. Second semester; 1 credit; ten lectures.

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; 1 laboratory period.

160. Military Business Practice. A study of the business methods and accounting in the United States Army as represented by its blanks and forms, and the regulations governing the use of the same. The business methods of the Supply and Adjutant General Department will be analyzed and compared with those used in civil life. Considerable outside reading will be required to obtain credit in this course.

Open to all juniors and seniors; second semester; 2 credits; 1 recitation; 1 laboratory period.

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, and the preparation of statements, receive much attention. The subjects of partnership, shipments, and consignments are also introduced.

Vocational Course; first year; either semester; 1 recitation; 4 laboratory periods. Fee \$1.00. Text: MacFarland and Rossheim, A first year in Bookkeeping and Accounting.

C. Bookkeeping. Continuation of Course B. Elementary problems in 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.

Vocational Course; first year; second semester; 3 credits; 1 recitation; 4 laboratory periods. Fee \$1.00. 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 and Nichols, Principles of

Bookkeeping and Farm Accounts. I. C. S., Cost Accounting. Robinson, Organizing a Business.

E. Farm Accounting and Business Methods. (a) **Accounting.** 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 and 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. 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.

Mechanic Arts; third year; second semester; 2 credits; 2 recitations. Text: Miners, Bookkeeping. Original exercises.

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.

ECONOMICS AND SOCIOLOGY MARKETS AND RURAL ORGANIZATION

HECTOR MACPHERSON, Professor
LOUIS AUGUST RUFENER, Assistant Professor
NEWEL HOWLAND COMISH, Instructor
GUILFORD LANSING HURD, Instructor

The work of this department of the School of Commerce serves 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 page 175.

The following courses are offered:

ECONOMICS

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, Commerce and Industry.

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 knowledge 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.

208. Economic History of Europe. 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, Guild 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: De Gibbins, Industry in England. Bland, Brown and Tawney, Select Documents in English Economic History.

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: Groat, Organized Labor in America.

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 prob-

lems 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. Text: Assigned readings and lectures.

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 and 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 dis-

cussed. 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 dealt 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; farm credit and land settlement; colonization policies.

(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 standpoint 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 1917-18 unless demand warrants it.

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.

GOVERNMENT AND BUSINESS LAW

ULYSSES GRANT DUBACH, Professor
CHESTER COLLINS MAXEY, Assistant Professor

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:

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: Lawrence, Principles 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.

Prerequisite: Course 320. **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.

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, drainage, and water rights in general.

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

309. Advanced Business 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) Sales of Personal Property. Subject matter, passage of title, rights of third parties, warranties and remedies.

Sophomore year; first semester; 3 recitations. Text: Spencer, Manual of Commercial Law. Bays, Cases on Commercial Law.

Note: Credit will not be given for Commerce 309 without Commerce 310 except on special permission of the department.

309-a. Class work same as 309, special research work required in addition. For graduate students only.

First semester; 3 credits; 3 recitations.

310. Advanced Business Law. Continuation of course 309.

(c) 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, etc.

(d) Partnership and Corporation Law. Comparison of methods of formation, powers, liabilities of members, and dissolution.

(e) Property. Classes, methods of acquiring and transferring titles, mortgages, and leases, landlord and tenant.

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. Bays, Cases on Commercial Law.

310-a. Class work same as 310, special research work required in addition. For graduate students only.

Second semester; 3 credits; 3 recitations.

311. Business 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.

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.

Prerequisite: Course 304. Elective; junior or senior year; second semester; 3 credits; 3 recitations. **Text:** Jones, Statute Law Making in the United States.

P. Business 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.

STENOGRAPHY AND OFFICE TRAINING

HERBERT TOWNSEND VANCE, 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; Convention and Court Reporting, one year; Secretarial Training, one year; and Methods of Teaching Commerce, one year.

Equipment. The Office Training department is well equipped with the latest appliances and fixtures, including the standard types of typewriters, duplicators, mimeographs, dictaphones, mimeoscope, 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 order.

The following courses are offered:

400. Elementary Stenography and Typewriting. (a) Gregg Shorthand. Theory manual covered thoroughly. Shorthand penmanship given special attention. Primary, intermediate, and complete certificates granted.

(b) Rational Typewriting.* The theory and practice of touch typewriting, covering mastery of the alphabet, numerals, mechanical arrangement of business correspondence and legal forms, tabulating, and speed practice. Special attention is given to the mechanics of the typewriter.

Degree course, freshman year, and Vocational course, first year; either semester; 4 credits; 4 recitations; 4 laboratory periods of one hour each. Fee \$2.00. Texts: Gregg Shorthand Manual. Gregg Writer. 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, freshman year, and Vocational course, first year; either semester; 4 credits; 4 recitations; 4 laboratory periods of one hour each. Fee \$2.00. Text: Gregg Shorthand Manual. Gregg Writer. Rational Typewriting.

* By special permission of the instructor, 400 (b) may be omitted, with a reduction of two credits. 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); lessons of an advanced character will be assigned. Credit will not be given for first semester's work in Course 400, unless the course is carried the full year.

402. Advanced Stenography and Typewriting. Dictation covering vocabularies of representative businesses, such as real estate, law and collections, banking and finance, life and fraternal insurance, publishing, railway, manufacturing, and a drill in matter qualifying one to pass the United States Civil Service examination.

The typewriting periods will be utilized in transcribing matter which has been taken in dictation. The use of the dictaphone will be introduced as an aid to increasing speed both in stenography and typewriting. 80-, 100-, and 120-word speed certificates granted.

Degree course, sophomore year, and Vocational course, second year; first semester; 4 credits; 4 recitations; 4 laboratory periods of one hour each. Fee \$2.00. Text: Eldridge Dictation Exercises. Gregg Writer.

403. Advanced Stenography and Typewriting. A continuation of course 402. Court and convention reporting introduced. Course 413 must be taken concurrently with this course by Commerce students.

Degree course, sophomore 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. Gregg Writer.

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: 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.** The theory and practice of touch typewriting; complete training in the use and care of the typewriter. Not open to stenography students.*

(b) **General Office Methods.** Office records and systems, relations between employer and employee; office equipment and its

* Farm Management; junior year; 1 credit; 3 one-hour laboratory periods. Fee \$1.00. Text: Rational Typewriting.

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; 3 laboratory periods of 2 hours each. Fee \$2.00. Text: Rational Typewriting.

411. Typewriting and Office Training. Continuation of 410, Not open to Stenography students.

Elective; all courses; either semester; 2 credits; 3 laboratory periods of 2 hours each. Fee \$2.00. Text: Rational Typewriting.

412. Office Training for Stenographers. Designed to give such knowledge and training as is called by employers, "experience." 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 proof reading; a day's work coordinated into an organized whole. Thorough drill in the use of the dictating machines.

Junior year; first semester; 3 credits; 3 lectures; 3 laboratory periods of two hours each. Required of all taking course 402. Fee \$2.00. 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; 3 credits; 3 lectures; 3 laboratory periods of two hours each. Fee \$2.00. Text: Office Training for Stenographers.

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 source of material.

Dewey Decimal Classification: 3 lectures and problems by the College Librarian. Subject Headings: 3 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; 3 one-hour laboratory periods. Fee \$1.00. Text: Rational 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; 3 one-hour laboratory periods. Fee \$1.00. Text: Rational Typewriting.**

SCHOOL OF ENGINEERING AND MECHANIC ARTS

GRANT ADELBERT COVELL, Dean

The School of Engineering offers courses leading to the advanced professional degrees, the degree of Bachelor of Science, and the vocational certificate in Mechanic Arts.

Advanced Degrees. The professional degree of Civil Engineer, Electrical Engineer, or Mechanical Engineer, is offered to graduates of this College, or other colleges of equal rank, who have attained the degree of Bachelor of Science in the corresponding engineering course, and met the further requirements for graduate study laid down on pages 70-71 of this catalogue. These requirements specify one full year of resident work amounting to 32 college credits, including an acceptable thesis.

Baccalaureate Degrees. 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, with majors in Highway Engineering, Irrigation Engineering, and Structural Engineering.

A course in Electrical Engineering.

A course in Industrial Arts.

A course in Mechanical Engineering.

Vocational Course. 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.

The Requirement for Graduation in each of the four degree courses offered in the School of Engineering is 136 college credits. These credits are mostly in the form of required subjects in the individual courses, but they may be classified in groups as follows:

GROUP	Civil Eng.	Elec. Eng.	Indus. Arts	Mech. Eng.
Professional Group	80	72	51	66
Pure Mathematics	19	18	3	18
General Science	14	18	12	14
Shop Work		8	16	12
General Subjects, including electives..	13	10	44	15
Military Science	2	2	2	2
Military Drill	6	6	6	6
Gymnasium	2	2	2	2
	136	136	136	136

It is expected that the student will closely follow the outline of the course specified in the department in which he is registered.

CIVIL, HIGHWAY, AND IRRIGATION ENGINEERING

EXECUTIVE COMMITTEE

GORDON VERNON SKELTON, Chairman
Professor of Highway Engineering

THOMAS ANDERSON HENDRICKS TEETER,
Professor of Irrigation Engineering and Hydraulics

CONDE BALCOM McCULLOUGH,
Professor of Civil Engineering

Since the Board of Higher Curricula has restored the degree course in Civil Engineering to the College, it seems best to discontinue the degree of Bachelor of Science in Highway Engineering, and in Irrigation Engineering. Hereafter students who have met all of the requirements for graduation in either of these courses will receive the degree of Bachelor of Science in Civil Engineering also naming the major subject, as B. S. in Civil Engineering, majoring in Highway Engineering, etc. The work of this entire division of Civil Engineering is organized under three department heads, each responsible for the administration of his particular department.

The Executive Committee composed of the three heads of departments, decides matters of general policy, secures coordination, and promotes general efficiency.

Equipment. In addition to joint use with the other engineering departments of the testing laboratories described elsewhere, this division 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.

CIVIL ENGINEERING

CONDE BALCOM McCULLOUGH, Professor
SAMUEL MICHAEL PATRICK DOLAN, Assistant Professor
DEXTER RALPH SMITH, Instructor

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 instruments 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.

In addition to the specified required work a number of technical lectures will be given to freshmen by members of the engineering faculty. The purpose of these lectures is to acquaint the entering class with the general scope and purpose of the work which they have chosen as a profession.

OREGON AGRICULTURAL COLLEGE

DEGREE COURSE IN CIVIL, HIGHWAY, AND
IRRIGATION ENGINEERING

	Semester	
	1st	2nd
Freshman Year		
College Algebra (Math. 21).....	2	
Trigonometry (Math. 11).....	3	
Spherical Trigonometry (Math. 15).....	1	
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).....	$\frac{1}{2}$	
Hygiene (Phys. Ed. 10).....	$\frac{1}{2}$	
Plane Surveying (C. E. 222).....		5
Gymnasium (Phys. Ed. 15, 16).....	$\frac{1}{2}$	$\frac{1}{2}$
Drill (Military 1, 2).....	1	1
	<hr/> 17 $\frac{1}{2}$	<hr/> 17 $\frac{1}{2}$
Sophomore Year		
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).....	$\frac{1}{2}$	$\frac{1}{2}$
Drill (Military 3, 4).....	1	1
Electives (Restricted)	3	3
	<hr/> 17 $\frac{1}{2}$	<hr/> 17 $\frac{1}{2}$

CIVIL ENGINEERING

211

	Semester	
	1st	2nd
Junior Year *		
Statics and Dynamics (M. E. 251).....	5	
Strength of Materials (M. E. 252).....		3
* Roads and Pavements (H. 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		
Engineering Seminar (C. E. 605, 606).....	1	1
Roofs and Bridges (C. E. 513, 514).....	4	4
Reinforced Concrete (C. E. 557).....	3	
Contracts and Specifications (C. E. 607).....		2
Municipal Water Supply (I. E. 305).....	3	
Sanitary Engineering (I. E. 702).....		3
Engineering Electives	5	6
	16	16

Senior Year		
Structural Option		
Roofs and Bridges (C. E. 513, 514).....	4	4
Engineering Seminar (C. E. 605, 606).....	1	1
Reinforced Concrete (C. E. 557).....	3	
Contracts and Specifications (C. E. 607).....		2
Advanced Structural Engineering (C. E. 515, 516).....	3	3
Design of Highway Structures (H. E. 415).....	2	
Advanced Materials Laboratory (Exp. E. 235).....		2
Engineering Electives	3	4

* Irrigation students in the junior year will take Irrigation Farming (Drainage and Irr. 3) instead of Roads and Pavements; and Soil Physics (Soils 5) instead of Structural Materials Laboratory.

** Approved Electives: English, Modern Language, Economics, National Government, State and Municipal Governments, Geology, Differential Equations, Least Squares.

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.

Civil, 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. 107. The course in Civil, Highway, 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 the descriptions and existing evidence.

Prerequisite: Math. 11 and C. E. 107. The courses in Civil, Highway, and Irrigation Engineering, and Landscape Gardening; freshman year; second semester; 5 credits; 2 recitations; 3 laboratory periods. Fee \$1.00. Text: Breed and 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 Civil, Highway, and Irrigation Engineering, and Landscape Gardening; sophomore year; first semester; 5 credits; 1 recitation; 4 laboratory periods. Fee \$1.00. Text: Breed and 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; sophomore year; second semester; 4 credits; 2 recitations; 2 laboratory periods. Fee \$1.00. Text: Breed and 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, 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 and Hosmer, Plane Surveying.

235. Topographic Surveying. A condensation of course 223. This course is designed for students in Forestry and Logging Engineering

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 and 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 irri-

gation work. Problems will be given in profile and contour work as applied to farm drainage, road construction, and irrigation.

Agricultural course; freshman year; first semester; 2 credits; 1 recitation; 1 laboratory period. Fee \$1.00. Text: Pence and 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 an 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 and 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.

Prerequisite: C. E. 222, 223, 272. Elective; senior year; second semester; 3 credits; 2 recitations; 1 laboratory period. Fee \$1.00.

254. Plane Surveying. A brief course in surveying for those who do not find time to take C. E. 222, 232, or 234. Lectures, field and office practice in the care and use of surveying instruments. Transit and traverse work. Leveling and topography.

The course in Electrical Engineering; junior year; second semester; 2 credits; 2 laboratory periods. Fee \$1.00.

256. 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 instruments. Tests and adjustments of instruments. Transit and traverse work. Leveling and topography. Computation of earthwork. Computation of reservoirs, etc..

Elective; junior year; second semester; 4 credits; 2 recitations; 2 laboratory periods. Fee \$1.00.

272. Railroad and Canal Surveying. This course will include a study of the simple compound, transition, 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. Civil, 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. Elective; first semester; 3 credits; 2 recitations; 1 laboratory period. Text: Webb, Railway Construction.

282. **Railway Engineering.** Continuation of course 281.

Elective; second semester; 3 credits; 2 recitations; 1 laboratory period. Text: Webb, Railway Construction.

511. **Graphic Statics.** A study of graphic analysis as applied to the determination of stresses in cranes, derricks, roof and bridge trusses, and similar problems. A study is also made of the more recent methods of graphical analysis as applied to the evaluation of four dimensional expressions.

The courses in Civil, Highway, Irrigation, and Mechanical Engineering; first semester; 2 credits; one recitation and one three-hour laboratory period. Fee \$0.50.

513. Roofs and Bridges. A study of stress analysis and design as applied to simply supported structures, including the preparation of stress diagrams, general detail drawings, shop drawings, and material bills. Trusses of the Pratt, Howe, Warren, and similar types, curved chord and subpaneled trusses, plate girder, and beam spans will be treated in this course.

Prerequisites: M. E. 251, 252. Senior year; first semester; 4 credits; 2 recitations; 2 laboratory periods of three hours each. Fee \$1.00. Text: Kirkham, Structural Engineering.

514. Roofs and Bridges. A continuation of course 513. Advanced work in highway bridge design including a treatment of "higher bridge structures." Draw spans, continuous girder and truss spans, cantilever, suspension, and arch spans of the various types are treated in this course.

Senior year; second semester; 4 credits; 2 recitations; 2 laboratory periods. Fee \$1.00. Text: Johnson, Bryan, and Turneure, Modern Framed Structures, Part II.

515. Structural Engineering. Advanced draughting room work including the preparation of detail drawings, shop drawings, material bills, etc. Preparation of itemized estimates and analysis of cost will be treated in this connection. Plans and working drawings will be prepared for roof trusses, girder spans, pin-connected and riveted bridge trusses and similar construction.

Senior year; first semester; 3 credits; 3 laboratory periods. Fee \$1.00.

516. Structural Engineering. Continuation of course 515. Draughting room and class room treatment of advanced work in structural design, including a study of the theories of internal work, secondary stress calculation and allied problems, together with a discussion of the more recently developed methods for the solution of indeterminate structures.

Senior year; second semester; 3 credits; 3 laboratory periods. Fee \$1.00.

552. Masonry and Foundations. A study of the properties of stone, brick, lime, cement, mortars, and concretes, and methods of their adaptation for use in foundations, retaining walls, piers, dams, and similar construction. Recitations, lectures, and work in the draughting and computing room.

The courses in Civil, Highway, and Irrigation Engineering; junior year; second semester; 3 credits; 3 recitations.

557. Reinforced Concrete. A study of the fundamental principles of reinforced concrete design as applied to beams, girders, columns, walls, and arches. Designs for the beam, girder, and arch types in bridge construction; also typical retaining wall and irrigation structures are worked out in the draughting room and detailed drawings made of the same. This course also includes the investigation of the elastic arch together with a study of the use of influence diagrams in arch analysis.

The courses in Civil, Highway, and Irrigation Engineering; senior year; first semester; 3 credits; 2 recitations; 1 laboratory period. Fee \$1.00. Text: Turneure and Maurer, Principles of Reinforced Concrete.

605. Engineering Seminar. The members of the senior class in the courses of Civil, 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.

HIGHWAY ENGINEERING

GORDON VERNON SKELTON, Professor

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 Engineering and in Civil Engineering courses the opportunity of studying by direct observation and experiment 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

The prescribed courses of the freshman, sophomore, and junior years in Highway, Civil, and Irrigation Engineering are identical.

	Semester	
	1st	2nd
Senior Year		
Roofs and Bridges (C. E. 513, 514).....	4	4
Engineering Seminar (C. E. 605, 606).....	1	1
Reinforced Concrete (C. E. 557).....	3	
Contracts and Specifications (C. E. 607).....		2
Highway Engineering (H. E. 407, 408).....	4	4
Economics of Highway Construction (H. E. 410).....		2
Advanced Highway Laboratory (Exp. E. 233).....	2	
Engineering Electives	2	3
	16	16

The following courses are offered:

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 Civil, Highway, and 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.

415. Design of Highway Structures. A draughting room course in the design of the various structures required in highway work. The various culvert types, short-span beam bridges, tunnels, retaining walls and similar construction, including a consideration of methods for preliminary waterway engineering, selection of type, and allied questions.

Elective; senior year; 2 credits; 2 laboratory periods. Fee \$1.00.

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 Wednesday, January 2, 1918, 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 Civil, Experimental, 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 1918 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.

IRRIGATION ENGINEERING

THOMAS ANDERSON HENDRICKS TEETER, Professor

Successful agriculture in the arid parts of Oregon is based on the science 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 too frequently caused by the employment of incompetent engineers and managers. In recognition of the need, in the Pacific Northwest, for engineers trained in hydraulics, irrigation, and water power, 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 Hydraulics and Irrigation Engineering is arranged to cover as broad a field as prac-

ticable, in order that the graduate may experience little difficulty in accommodating himself to the available positions. The curriculum in the freshman and sophomore years is the same as in the general civil engineering courses. It has for its purpose the laying of a foundation on which to build the more specialized 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 and power 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, drainage, water-supply, and water-power 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 Business Management, 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 irrigation farming, forage crops, climatology, farm drainage, and soil physics together with their relations to the growth of crops on irrigated lands.

Equipment. The excellent equipment of the Civil 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 courses in Drainage and Irrigation give access to the equipment of that department.

COURSE IN IRRIGATION ENGINEERING

The prescribed courses of the freshman and sophomore years of the courses in Irrigation, Civil, and Highway Engineering are identical.

	Semester	
	1st	2nd
Senior Year		
Engineering Seminar (C. E. 605, 606).....	1	1
Reinforced Concrete (C. E. 557).....	3	
Contracts and Specifications (C. E. 607).....		2
Roofs and Bridges (C. E. 513).....	4	
Drainage Engineering (I. E. 502).....		3
Hydrology (I. E. 303).....	1	
Soil Surveying (Soils 13).....		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	
Electives (Approved)	3	3
	<hr/> 16	<hr/> 16

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 other lifting devices.

Elective for seniors in Agriculture; senior year; first semester; 2 credits; 2 lectures. This course can be taken only in conjunction

with Experimental Engineering 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 dams and gates, velocity and discharge through orifices, tubes, pipes, and flumes; stream-lines, fluid friction, losses of head; time of emptying reservoirs; and waterhammer.

Prerequisite: M. E. 251. Required of juniors in Civil, Highway, Irrigation, Electrical, and Mining Engineering; junior year; second semester; 3 credits; 3 lecture periods. Text: Daugherty, Elements of 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; elective for all other seniors in Engineering; senior year; first semester; 2 credits; 2 lecture periods. Texts: Daugherty, Hydraulic Turbines. Daugherty, Centrifugal Pumps.

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 Engineering courses; 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 discharges, 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 other Engineering students and

Agricultural students; senior year; first semester; 1 credit; 1 recitation. Text: Hoyt and Grover, River Discharge. Fee \$1.00.

305. Municipal Water Supply. 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. Elective for seniors in Engineering; senior year; first semester; 3 credits; 2 lecture periods; 1 laboratory period. Fee \$1.00. Text: Turneaure and 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, Conveyance of Water, Vol. II.

402. Irrigation Construction. 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. Text: Etcheverry, Irrigation Structures, Vol. III.

502. Drainage Engineering. Surveys for, and design of, large drainage systems; the study of run-off and drainage coefficients;

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. Required of seniors in Irrigation Engineering; senior year; second semester; 3 credits; 2 lectures and 1 laboratory period. 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.

Elective for seniors in Irrigation Engineering. Text: Davis, The Law of Irrigation.

702. Sanitary Engineering. Drainage systems of populous districts, including chemical and bacterial purification of sewerage; 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.

Elective for seniors in Civil Engineering. **Prerequisite:** I. E. 102. Senior year; second semester; 3 credits; 2 recitations; 1 laboratory period. Fee \$1.00. Text: Merriman, Elements of Sanitary Engineering.

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 azimuth 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.**

ELECTRICAL ENGINEERING

RICHARD HAROLD DEARBORN, Professor
LAWRENCE FISHER WOOSTER, Assistant Professor
WILLIS DHU AINE PEASLEE, Instructor
JOHN HOOPER, Assistant

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 high-voltage 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 $6\frac{1}{2} \times 15$ 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 factor meter; a frequency meter, and synchroscope; a set of synchronizing lamps; circuit breakers; switches; and a large number of plug terminals, the leads of which extend to the four machine platforms; two slate panels with instruments and switches for direct-current machines; and two arc light regulating panels. 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; two seven-and-one-half kilowatt rotary converters for parallel operation 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; three seven and one-half kilowatt revolving field alternators with three additional rotors for parallel operation, and one seven-and-one-half kilowatt revolving field alternator, from all of which current of one-, two-, three-, four-, and six-phases may be taken; two five-arc light constant current, one ten-volt 1000-ampere welding, one five-kilowatt 15,000 volt wireless, three seven-and-one-half 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, three 110 to 440 volt, and a number of ordinary transformers and compensators.

In addition to these the department is particularly well equipped to handle high-voltage testing with one ten-kilowatt 110,000-volt transformer, and one 100-kilowatt 350,000-volt Thor-darsen transformer.

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 watt-meter with five and ten ampere range.

DEGREE COURSE IN ELECTRICAL ENGINEERING

	Semester	
	1st	2nd
Freshman Year		
College Algebra (Math. 21).....	2	
Trigonometry (Math. 11).....	3	
Elementary Analysis (Math. 31).....		5
General Physics (Phys. 1, 2).....	3	3
Mechanical Drawing (M. E. 151).....	2	
Descriptive Drawing (M. E. 152).....		3
Foundry (Ind. Arts 171).....	2	
Patternmaking (Ind. Arts 131).....		2
Library Practice (Libr. 1).....	$\frac{1}{2}$	
Hygiene (Phys. Ed. 10).....	$\frac{1}{2}$	
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).....	$\frac{1}{2}$	$\frac{1}{2}$
	<hr/> 17 $\frac{1}{2}$	<hr/> 17 $\frac{1}{2}$

* By special permission a student may elect beginning German or French, (Modern Language 201, 202, or 101, 102).

ELECTRICAL ENGINEERING

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	Semester	
	1st	2nd
Sophomore Year		
Differential and Integral Calculus (Math. 51, 52).....	4	4
Electrical Physics (Physics 105).....	3	
Electrical Measurements (Phys 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).....	$\frac{1}{2}$	$\frac{1}{2}$
	<hr/> 17 $\frac{1}{2}$	<hr/> 17 $\frac{1}{2}$

Junior Year		
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
Heat Engines and Boilers (M. E. 318).....	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
	<hr/> 17	<hr/> 17

Senior Year		
Electrical Engineering (E. E. 103, 104).....	4	3
Electrical Design (E. E. 105).....		1
Electrical Laboratory (E. E. 203).....	4	
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	3	5
	<hr/> 16	<hr/> 16

Suggested Options	Semester	
	1st	2nd
Power Plant Design (M. E. 316).....	3	
Concrete Laboratory (Exp. E. 241).....	2	
Public Service Regulation (E. E. 317).....	2	
Periodical Literature (E. E. 301).....	1	
Practical Public Speaking (English 105).....	3	
Technical English (English 141).....	2	
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
Seminar (E. E. 302).....		1

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.

Course 101 must be taken concurrently with 201, and 102 concurrently with 202. Electrical Engineering; junior year; first semester; 4 credits; 4 recitations. Text: Wilson, Electrical Engineering.

102. **Electrical Engineering.** Continuation of course 101.

Electrical Engineering; junior year; second semester; 4 credits; 4 recitations. Text: Wilson, 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. Electrical Engineering; senior year; first semester; 4 credits; 4 lectures.

104. **Electrical Engineering.** A continuation of course 103.

Electrical Engineering; 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.

Electrical Engineering; 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.

Electrical Engineering; 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.

Electrical Engineering; sophomore year; second semester; 1 credit; 1 recitation. Text: Norris, An introduction to the Study of Electrical Engineering.

201. Electrical Engineering Laboratory. 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.

Must be taken concurrently with course 101.

Electrical Engineering; 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. 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.

Must be taken concurrently with course 102.

Electrical Engineering; 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.

Prerequisites: E. E. 101, 102, 201, 202. Electrical Engineering; senior year; first semester; 4 credits; 1 lecture; 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. Electrical Engineering; 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.

Electrical Engineering; senior year; first semester; 1 credit; 1 recitation. Text: Current Periodicals.

302. **Seminar.** A continuation of course 301 with a more complete analysis and discussion of recent developments.

Electrical Engineering; senior year; second 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.

Electrical Engineering; senior year; second semester; 2 credits.

308. **High Voltage Engineering.** A study and experimental investigation of high voltage and high frequency phenomena.

Electrical Engineering; senior year; second semester; 2 credits; 2 recitations. Text: Peek, Dielectric Phenomena in High Voltage Engineering.

309. **Electric Railways.** A general study of the application of electricity to street and interurban railways, covering traffic conditions, speed time curves, and rolling stock.

Electrical Engineering; senior year; first semester; 2 credits; 2 recitations. Text: Harding, Electric Railway Engineering.

310. **Electric Railways.** Continuation of courses 309. A study of conditions governing the electrification of trunk lines; systems of electrification and transportation economics.

Prerequisite: E. E. 309. Electrical Engineering; 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.

Prerequisite: E. E. 102. Electrical Engineering; 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.

Electrical Engineering; 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.

Electrical Engineering; 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. Organization, operating problems, public policy, cost accounting, rate study, etc.

Electrical Engineering; senior year; second semester; 2 credits; 2 recitations.

403. **Study of Electric Machinery.** Class room and laboratory study of electrical instruments, current, electromotive force and power relations; the operation, care, and management of familiar types of generators and motors, both alternating and direct current, and transformers.

Prerequisites: Elementary Chemistry, Physics, Calculus, Mechanics. Mechanical, Mining, and Logging Engineering; junior or senior year; either semester; 3 credits; 1 recitation; 1 laboratory period. Fee \$2.50. Deposit \$3.00. Text: Gray, Principles and Practice of Electrical Engineering.

406. **Electric Lumbering Machinery.** A special study of the application of electricity to the lumbering and logging industry.

Prerequisite: E. E. 403. Logging Engineering; 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. Mining Engineering; 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. Mechanical Engineering; senior year; second semester; 2 credits; 2 recitations.

EXPERIMENTAL ENGINEERING

SAMUEL HERMAN GRAF, Professor
BURTON SYLVESTER ORR, Assistant Professor
* RAY BOALS, Instructor
GEORGE EMIL HECK, 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-

* On leave of absence.

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, flue 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, Parr and Emerson fuel calorimeters, flue 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 flash point apparatus, viscosimeters, 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 Gouls triplex pump, 12-inch Doble laboratory water motor, two hydraulic rams, 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 addition 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, $\frac{1}{2}$ credit; laboratory, 1 credit; report, $1\frac{1}{2}$ credits. Fee \$3.00. Text: Carpenter and 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 and 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. Texts: Carpenter and Diederichs, Experimental Engineering. G. B. Upton, Materials of Construction.

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 an application 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 and 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: Math. 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.

225. General Materials Testing Laboratory. An elective course designed especially for students in Chemical Engineering, and for others desiring a general course dealing with a wide range of materials, methods, and equipment. The purpose is to cover those tests on materials which the industrial chemist in a commercial or city testing laboratory is required to make. Methods standardized by the American Society for Testing Materials and other recognized organizations, are used throughout. The work consists of fifteen exercises including tests on cement, bituminous and non-bituminous road materials, structural materials, lubricating oils, and fuels.

Prerequisite: M. E. 252. Course in Chemical Engineering; senior year; first semester; or elective to suitably prepared students in other courses; 3 credits, apportioned as follows: laboratory, 1 credit; preparation and report, 2 credits. Fee \$3.00. Text: Assigned references.

231. Cement and Highway Laboratory. An experimental study of Portland cement; standard A. S. T. M. and other methods of cement testing; examination of sands, grading of aggregates, determination of voids, etc., abrasion, hardness, toughness, cement-

ing value, and other tests on macadam rock; tests of paving brick; standard tests on bituminous compounds and paving aggregates.

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 Civil, Highway, 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 and Scofield, Laboratory Manual for Testing Materials. U. S. Office of Public Roads' Bulletins, No. 314 and 347. Hubbard, Laboratory Manual of Bituminous Materials.

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 Civil, 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 and Scofield. Laboratory Manual for Testing Materials. Mills, Materials of Construction.

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. Text: Hubbard, Laboratory Manual of Bituminous Materials. Assigned reference.

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. Second semester; 2 credits: laboratory, 1 credit; report, 1 credit. Fee \$3.00. Text: Mills, Materials of Construction.

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, shearing, 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-hours 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.

241. Concrete Laboratory. An elective course designed for those desiring instruction in the testing and proportioning of concrete-making materials. The first half of the course is the same as that of course 231 including principles of sampling, testing of cement and sands, grading of aggregates, etc. The latter part of the course includes tests on reinforcing steel, reinforced beams, water-proofing compounds, thermal conductivity of concrete, and concrete analysis.

Prerequisites: Physics 101 and 102, and Math. 51 and 52. Especially designed as an elective for seniors in Electrical and Mechanical Engineering, but suitable for students in other courses as well. First semester; 2 credits, apportioned 1 to laboratory and

1 to report. Fee \$3.00. Text: Taylor and Thompson, Concrete, Plain and Reinforced. Assigned references.

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-hours 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 Drainage and Irrigation. 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 pumps. 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 Drainage and Irrigation; senior year; first semester; 1 credit. Fee \$2.00.

272. Gas-Engine Laboratory. Study of internal combustion engine fuels, mechanical details of engines, battery and magneto ignition systems, carburetors, and methods of governing. Analysis of gas engine cycles from indicator diagrams. Mechanical efficiency, regulation, and fuel economy tests. Economy, power, and tractive effort of automobiles.

The work is covered in ten 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 \$200. Text: Streeter, Internal Combustion Motors. Carpenter and Diederichs, Experimental Engineering.

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.

293. 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 McCULLY PORTER, Instructor
AMBROSE ELLIOTT RIDENOUR, Instructor
CHARLES GEORGE WILTSHIRE, Instructor
DARWIN GREENE THAYER, Instructor
DAVID ELLSWORTH REED, Instructor
MARTIN LEWIS GRANNING, 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 rip saws, cutoff saws and backsaws, planes, chisels, 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 hand saw, one jig saw, 24-inch surface planer,

16-inch glue joiner, 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, two electric glue heaters. The power is furnished by two three-phase induction motors of 15- and 5-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-horse-power 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 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).....	$\frac{1}{2}$	
Hygiene (Phys. Ed. 10).....	$\frac{1}{2}$	
Drill (Military 1, 2).....	1	1
Gymnasium (Phys. E. 15, 16).....	$\frac{1}{2}$	$\frac{1}{2}$
	<hr/> 16 $\frac{1}{2}$	<hr/> 17 $\frac{1}{2}$

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).....	$\frac{1}{2}$	$\frac{1}{2}$
Electives	3	3
	<hr/> 16 $\frac{1}{2}$	<hr/> 16 $\frac{1}{2}$

INDUSTRIAL ARTS

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	Semester	
	1st	2nd
Junior Year		
Modern Language or Approved Elective.....	3	3
General Psychology (Ind. Ed. 101).....	3	
Principles of Education (Ind. Ed. 131).....		3
Educational Psychology (Ind. Ed. 102).....		2
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).....		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	6	7
	16	16

The following courses are offered:

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; either 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; either semester; 3 credits; 3 laboratory periods.

Fee \$4.50. Deposit \$2.00. Text: Griffith, Essentials of Woodwork.

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.

Elective, 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.

Industrial Arts and elective; sophomore 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; either 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 and Electrical Engineering; freshman year; first or second semester; 2 credits; 2 laboratory periods. Fee \$3.00. Deposit \$2.00. Text: International Correspondence School pamphlets.

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: International Correspondence School pamphlets.

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.

138. Wood Turning. This course consists of a series of exercises in wood turning intended to familiarize the student with the various uses of the lathe tools, methods of centering and chucking, segment work, staining, and polishing. Small pieces of furniture such as vases, bowls, rings, trays, tables, and stools will be worked out.

Elective Industrial Arts course; 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.

Elective; 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 period. Fee \$3.00.

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 or second 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 machinery. This work is given by instructors in the plumbing and machine shops, and in the electrical laboratory.

Dairy Manufacturers; senior or junior year; second semester; 1 credit; 1 laboratory period. Fee \$1.50.

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: Ind. Ed. 171. 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 drawing 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	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).....	$\frac{1}{2}$	$\frac{1}{2}$
	<hr/> 17 $\frac{1}{2}$	<hr/> 17 $\frac{1}{2}$

* Shop Work. The student will choose the general line of shop work which he desires to pursue from the following: Cabinetmaking, Patternmaking, Machine Shop Work, Plumbing, Blacksmithing, and Foundry Work.

	Semester	
	1st	2nd
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).....	$\frac{1}{2}$	$\frac{1}{2}$
	<hr/> 17 $\frac{1}{2}$	<hr/> 17 $\frac{1}{2}$
Third Year		
Geometry and Trigonometry (Math. T).....	4	
Elementary Industrial Problems (Com. J).....		3
Business Law (Com. P).....	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
	<hr/> 18	<hr/> 17

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 detail roof construction. This work will be developed through the construction of parts of houses, barns,

* Shop Work. The student will choose the general line of shop work which he desires to pursue from the following: Cabinetmaking, Patternmaking, Machine Shop Work, Plumbing, Blacksmithing, and Foundry Work.

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 section 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: International Correspondence School pamphlets.

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: International Correspondence School pamphlets.

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, shapers, 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 is 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 whif-

fle trees 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 rammer 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 gagers, 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 for a heat 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.

MECHANICAL ENGINEERING

GRANT ADELBERT COVELL, Professor
MARK CLYDE PHILLIPS, Associate Professor
OTTO BERGER GOLDMAN, 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, accompanied 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 Experimental 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

Freshman Year	Semester	
	1st	2nd
Modern English Prose (English 81, 82)*.....	3	3
Trigonometry (Math. 11).....	3	
College Algebra (Math. 21).....	2	
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).....	$\frac{1}{2}$	
Hygiene (Phys. Ed. 10).....	$\frac{1}{2}$	
Drill (Military 1, 2).....	1	1
Gymnasium (Phys. Ed. 15, 16).....	$\frac{1}{2}$	$\frac{1}{2}$
	<hr/> 17 $\frac{1}{2}$	<hr/> 17 $\frac{1}{2}$

* 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.

MECHANICAL ENGINEERING

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	Semester	
	1st	2nd
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).....	$\frac{1}{2}$	$\frac{1}{2}$
	<hr/> 17 $\frac{1}{2}$	<hr/> 17 $\frac{1}{2}$
Junior Year		
Statics and Dynamics (M. E. 251).....	5	
Strength of Materials (M. E. 252).....		3
Elements of Thermodynamics (M. E. 319).....	3	
Thermodynamics (M. E. 320).....		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
Hydraulics (I. E. 102).....		3
Military Science (Theo. Inst. 1, 2).....	1	1
Drill (Military 5, 6).....	1	1
	<hr/> 17	<hr/> 17

* 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.

Senior Year	Semester	
	1st	2nd
Machine Design (M. E. 205, 206).....	4	3
Power Plant Engineering (M. E. 321).....	2	
Electrical Machinery (E. E. 403).....	3	
Power Plant Design (M. E. 323).....		3
Advanced Mechanics Laboratory (Exp. E. 203).....	3	
Advanced Power Laboratory (Exp. E. 204).....		3
Gas Engine Laboratory (Exp. E. 272).....		2
Power Plant Engineering (M. E. 322).....		2
Heating and Ventilating (M. E. 331).....	3	
Seminar (M. E. 351, 352).....	1	1
Elective		2
	16	16

The following courses are offered:

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 devoted 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-hours laboratory periods. The course in Logging Engineering; junior year; second semester; 3 credits; 2 recitations; 2 two-hours 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; 3 recitations; 1 laboratory period. Text: Kimball and 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 and 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; strength 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.

254. Elementary Mechanics. A study of some of the general principles and applications of mechanics without the use of the calculus. The relations of force, mass and velocity are discussed with special reference to their application in finding stresses in framed structures, and cables. Work, energy, and power are also briefly considered.

The course in Logging Engineering; senior year; second semester; 3 credits; 3 recitations.

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.

310. The Practice of Engineering and Design. The application of cost analysis to practical engineering problems. The design

of power plants with special reference to economy of investment and operation, together with a study in the choice of size of units for given load variation for best plant efficiency, growth and load factors, contracts, specifications, and the purchase and sale of equipment according to best American practice.

Primarily for graduates. Prerequisite: Power Plant Design, M. E. 323, must be taken in conjunction unless credit therein has already been obtained. Elective senior year. Three credits; two-drawing periods and one recitation; second semester.

317. Heat Engines and Boilers. An elementary course in the fundamentals of steam and gas engines, boilers and auxiliaries, together with the principles of combustion.

Course in Logging Engineering; junior year; first semester; 2 credits; 2 recitations. Text: Allen and Bursley, Heat Engines.

318. Heat Engines and Boilers. A more advanced course than 317, covering the elements of thermodynamics, of steam and gas engines, turbines, boilers and power plant auxiliaries, together with the principles of combustion.

Course in Electrical Engineering; junior year; first semester; 3 credits; 3 recitations. Text: Allen and Bursley, Heat Engines.

319. Elements of Thermodynamics. A thorough study of the thermodynamics of perfect gases, gas cycles, and combustion, together with a study of fuels, furnaces, draft apparatus, boilers and boiler auxiliaries, and steam generation.

Prerequisite: Diff. and Int. Calc. Math. 51 and 52. Course in Mechanical Engineering; junior year; first semester; 3 credits; 3 recitations.

320. Thermodynamics. A continuation of course 319. A thorough study of the thermodynamics of vapors, steam engine cycles, together with a study of steam and gas engines, turbines, compressors, engine valve gear, governors and auxiliaries.

Prerequisite: Elements of Thermodynamics, M. E. 319. Course in Mechanical Engineering; junior year; second semester; 3 credits; 3 recitations.

321. Power Plant Engineering. A study in the choice and coordination of power equipment and its assembly, of foundations and buildings, and the combination of power plant machinery with other equipment, together with elementary cost study.

Prerequisite: M. E. 319 and 320. Course in Mechanical Engineering; senior year; first semester; 2 credits; 2 recitations. Text: Handbook M. E., also Cambria.

322. Power Plant Engineering. A more thorough study of the assembly of power plant machinery, foundations and building, elevating and conveying machinery, water treating plants together with a more advanced study of cost analysis.

Prerequisite: M. E. 321. Course in Mechanical Engineering; senior year; second semester; 2 credits; 2 recitations. Text: M. E Handbook, also Cambria.

323. Power Plant Design. The complete design and layout of power plants, elevating and conveying machinery, foundations and buildings, alone and in combination with other machinery, in accordance with best practice, and from blue prints of actual power plants machinery as built by the best American manufacturers.

Courses in Mechanical Engineering; second semester; 3 credits; 3 laboratory periods.

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 Engines. A study of gas cycles and the losses in the actual engines. Consideration of the various types of engines and their adaptation in practice together with a close study of the value of the internal combustion engines as power producers, as compared with other prime movers.

Elective; senior year; second semester; two credits; two 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.

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.

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.

SCHOOL OF FORESTRY

GEORGE WILCOX PEAVY, Dean School of Forestry
 JOHN POMOROY VAN ORSDEL, Professor Logging Engineering
 HAROLD STEPHENSON NEWINS, Associate Professor of Forestry
 CHARLES JUNIUS CONOVER, Instructor
 _____, Assistant in Logging Engineering

NON-RESIDENT LECTURERS LOGGING ENGINEERING

- L. J. WENTWORTH, Vice President and General Manager, Portland Lumber Co., Portland, Ore.: "Employer and Employee Relationship."
- H. C. CLAIR, General Manager Clark County Logging Co., Portland, Ore.: "Logging Management."
- J. S. O'GORMAN, Manager Wisconsin Timber & Logging Co., Portland, Ore.: "Labor Management."
- J. M. MEANY, Western Representative, Clyde Iron Works, Portland, Ore.: "Cylde Skidders."
- DR. D. J. SHIELDS, American Red Cross Society, Washington, D. C.: "First Aid."
- M. R. COLBY, Colby Engineering Co., Portland, Ore.: "Lumber Handling Devices."
- E. B. HAZEN, General Manager, Bridal Veil Lumber Co., Bridal Veil, Ore.: "Planing Mill Practice and Management."
- GEO. M. CORNWALL, Editor The Timberman, Portland, Ore.: "Your Relation to Your Future Employer."
- A. G. LABBE, Vice President, Willamette Iron & Steel Works, Portland, Ore.: "Donkey Engines."
- C. B. PADDOCK, Chief Inspector Hartford Steam Boiler Inspection and Insurance Co., Portland, Ore.: "Steam Boilers."
- DR. J. D. HILL, Holt Tractor Co., Portland, Ore.: "Auto Log Tractors."
- G. K. WENTWORTH, Jr., Treasurer Portland Lumber Co., Portland, Ore.: "Auto Lumber Tractors."
- A. J. RUSSELL, Manager Santa Fe Lumber Co., San Francisco, Cal.: "Lumber Salesmanship."
- W. W. PEED, President Pacific Logging Congress, Eureka, Cal.: "Red Wood Logging."
- A. J. KARR, Manager Columbia River Log Scaling and Grading Bureau, Portland, Ore.: "Log Scaling."
- E. V. VACHON, Seattle Car and Foundry Co., Portland, Ore.: "Logging Railroad Rolling Stock."
- A. M. HAGEN, Superintendent of Manufacture, Booth-Kelly Lumber Co., Eugene, Ore.: "Lumber Manufacture."
- MR. DONALDSON, Secretary Willamette Valley Lumber Manufacturers' Association: "Lumber Rates and Tariffs."
- AUSTIN CARY, U. S. Forest Service: "Lumbering in the Northeastern United States."
- E. O. SIECKE, Deputy State Forester: "State Forest Policy."
- T. T. MUNGER, U. S. Forest Service: "Management of Western Yellow Pine."
- C. S. CHAPMAN, Secretary Oregon Forest Fire Association: "Association Methods in Fire Control."
- J. V. HOFFMAN, U. S. Forest Service: "The Problem of Forest Replacement."
- O. P. M. GOSS, Consulting Engineer, West Coast Lumbermen's Association: "Structural Timbers."

ALUMNI ADVISORY COMMITTEE

- J. C. EVENDEN, Chairman, U. S. Bureau of Entomology, Coeur d' Alene, Idaho.
- WALT DUTTON, U. S. Forest Service, Unity, Ore.
- PAUL E. FREYDIG, Logging Engineer, Cathlamet Timber Co., Cathlamet, Wash.
- S. A. WILSON, Portland, Ore.
- T. J. STARKER, U. S. Forest Service, Sumpter, Ore.

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 538 billion feet, board measure. Over 11 million acres of timber land, carrying 404 billion board feet of timber are privately owned and 13 million acres, carrying 134 billion board feet, are in the National Forests. The timber in private hands is being cut as the interest 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. The work of harvesting the timber crop 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. 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 industry is being forced. It has become 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 efficient 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 to be of use in 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.

Advantages of the West. 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. Thus, an immense laboratory for observation and field work is at the very doors of the School of Forestry. In the spring of each college year students in both forestry and logging engineering go out on some timber tract for a period of two weeks of practical field-work. The men are divided into small crews and an area of several thousand acres of timber is carefully surveyed, cruised, and mapped under the supervision of experienced men. Advanced students make special trips for the purpose of studying the various types of logging and milling operations. 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 Oregon is the ideal place to study general forestry and logging engineering.

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 consequently becoming broader. The State, too, is feeling the need of trained men in forest-protection work. As time goes on this field will be more extensive.

The work in both branches of forestry, that is, in general forestry and in logging engineering, is in charge of technically trained men, all of whom have had practical experience in their respective lines of work. In neither course, however, are technical subjects 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.

To give those students who so desire an opportunity to secure a broader foundation in subjects basic to logging engineering, as well as to provide time for cultural work and advanced professional training, a five-years course in logging engineering is offered for the first time.

Equipment. The School of Forestry is now provided with suitable space in which to do its work. A three story building, eighty feet wide and one hundred and thirty-six feet long, has been constructed to house the work of the school. This building contains roomy laboratories for work in silviculture, dendrology, mensuration, forest protection, timber technology, drafting, timber grading, and logging devices and equipment. Through the kindness of the manufacturers of logging equipment and lumber manufacturing concerns, much valuable material has been assembled for demonstration purposes.

In addition to the laboratories, class rooms, and offices, space is devoted to a collection of manufactured wood products, designed to show the various uses, to which wood may be put, and to educate students in the proper utilization of Oregon's greatest natural resource. All available publications dealing with general forestry, logging, or lumber manufacture are provided for the use of students.

DEGREE COURSE IN GENERAL FORESTRY

The following subjects are recommended for students who desire to work for a degree in general forestry. For graduation the College requires the student to complete 136 credit hours. Of this number he is expected to take 60 hours of professional work, 25 hours of science, and 6 hours in mathematics. The balance of the required 136 hours may be made up of subjects outlined in the recommended course or of those approved by the Dean of the School. Only in exceptional cases will the outlines for the freshman and sophomore years be modified.

	Semester	
	1st	2nd
Freshman Year		
Modern English Prose (Eng. 83, 86).....	2	2
Trigonometry (Math. 14).....	3	
Elementary Analysis (Math. 34).....		3
General Forestry (For. 101, 102).....	3	2
Elementary Mensuration (For. 304).....		3
Plane Surveying (C. E. 234).....		3
General Chemistry (Chem. 100, 101).....	3	3
Forest Geology (Min. 161).....	3	
Library Practice (Libr. 1).....	$\frac{1}{2}$	
Hygiene (Phys. Ed. 10).....	$\frac{1}{2}$	
Gymnasium (Phys. Ed. 15, 16).....	$\frac{1}{2}$	$\frac{1}{2}$
Drill (Military 1,2).....	1	1
First Aid (Phys. Ed. 23).....	1	
	<hr/> 17 $\frac{1}{2}$	<hr/> 17 $\frac{1}{2}$

Sophomore Year		
Blacksmithing (Ind. Arts. 151).....		2
General Physics (Phys. 1, 2).....	3	3
Mensuration (For. 305).....	3	
Topographic Surveying (C. E. 235).....	3	
Silviculture (For. 201, 202).....	3	3
Forest Botany (Bot. 30, 31).....	3	3
Forest Protection (For. 505).....		3
Elementary Forest Mapping (For. 303).....		2
Gymnasium (Phys. Ed. 17, 18).....	$\frac{1}{2}$	$\frac{1}{2}$
Drill (Military 3, 4).....	1	1
	<hr/> 16 $\frac{1}{2}$	<hr/> 17 $\frac{1}{2}$

SCHOOL OF FORESTRY

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	Semester	
	1st	2nd
Junior Year		
National Government (Com. 320).....	3	
State and Municipal Government (Com. 322).....		3
Advanced Mensuration (For. 301).....	5	
Log Scaling (For. 307).....		2
Identification of Woods (For. 508).....		3
Forest Entomology (Ento. 304).....		3
Advanced Silviculture (For. 203, 204).....	3	2
Elementary Economics (Com. 210).....	3	
Forest History and Economics (For. 103).....		3
Uses of Wood (For. 507).....	2	
Military Science (Theo. Inst. 1, 2).....	1	1
Military Drill (Military 5, 6).....	1	1
	18	18
Senior Year		
Forest Finance (For. 401).....		4
Economics of Lumber Industry (For. 403).....	4	
Dendrology (For. 501).....	5	
Lumbering Management (For. 407).....		4
Forest Improvement (For. 405).....	3	
Timber Technology (For. 502).....		4
Timber Testing (Exp. E. 238).....		1
Forest Appraisals and Reports (For. 306).....	3	
Seminar (For. 408, 409).....	1	1

Suggested Electives

Dendrology (For. 503).....		3
Forest Pathology (Bot. 37).....		1
Economic Zoology (Zool. 108, 109).....	3	3
Labor Problems (Com. 213).....		3
Range and Pasture Botany (Bot. 36).....	3	

DEGREE COURSE IN LOGGING ENGINEERING
(Four-Years Course)

The following subjects are recommended for those students in logging engineering who desire to devote the customary four years to their college course. For graduation the College requires the student to complete 136 credit hours. Of this number he is expected to complete 60 hours in professional work, 10 hours in general

science, 10 hours in mathematics, and the balance of the required 136 hours in the general subjects as outlined or as approved by the Dean of the School. Only in exceptional cases will the outlines for the freshman and sophomore years be modified.

	Semester	
	1st	2nd
Freshman Year		
Modern English Prose (Eng. 85-a, 86-a).....	2	2
Trigonometry, College Algebra (Math. 11, 21).....	5	
Elementary Analysis (Math. 31).....		5
Chemistry (Chem. 100).....	3	
General Forestry (For. 101, 102).....	3	2
Plane Surveying (C. E. 234).....		3
Elementary Mensuration (For. 304).....		3
Wood Working (Ind. Arts 110, 111).....	2	2
Library Practice (Libr. 1).....	$\frac{1}{2}$	
Hygiene (Phys. Ed. 10).....	$\frac{1}{2}$	
Gymnasium (Phys. Ed. 15, 16).....	$\frac{1}{2}$	$\frac{1}{2}$
Drill (Military 1, 2).....	1	1
	<hr/> 17 $\frac{1}{2}$	<hr/> 18 $\frac{1}{2}$

Sophomore Year		
Engineering Physics (Phys. 101, 102).....	4	4
Topographic Surveying (C. E. 235).....	3	
Mensuration (For. 305).....	3	
Blacksmithing (Ind. Arts 151).....		2
Toolmaking and Tempering (Ind. Arts 152).....		1
Machine Shop (Ind. Arts 202).....		1
Railroad Surveying (C. E. 274).....		4
Silvics (For. 205).....	3	
Tree Identification (For. 206).....		4
Principles of Economics (Com. 210).....	3	
Drill (Military 3, 4).....	1	1
Gymnasium (Phys. Ed. 17, 18).....	$\frac{1}{2}$	$\frac{1}{2}$
	<hr/> 17 $\frac{1}{2}$	<hr/> 17 $\frac{1}{2}$

SCHOOL OF FORESTRY

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	Semester	
	1st	2nd
Junior Year		
National Government (Com. 320).....	3	
State and Municipal Government (Com. 322).....		3
Adv. Mensuration (For. 301).....	5	
Log Scaling (For. 307).....		2
Advanced Forest Mapping (For. 317).....	2	
Logging Machine Design (For. 316).....		2
Efficiency Systems (For. 313).....		2
Timber Technology (For. 502).....		4
Timber Testing (Exp. Eng. 238).....		1
Heat Engines and Boilers (M. E. 317).....	2	
Steam Laboratory (Exp. Eng. 255).....	1	
Uses of Wood (For. 507).....	2	
Identification of Woods (For. 508).....		2
Military Science (Theo. Inst. 1, 2).....	1	1
Drill (Military 5, 6).....	1	1
	—	—
	17	18
Senior Year		
Economics of Lumber Industry (For. 403).....	4	
Forest Finance (For. 401).....		4
Topographic Logging Plans (For. 308).....	4	
Logging Devices and Equipment (For. 604, 605).....	4	4
Lumbering Management (For. 407).....		4
Logging Railroads (For. 601).....	4	
Logging Methods (For. 315).....		2
Forest Appraisals and Reports (For. 306).....	3	
Mechanics (M. E. 254).....		3
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	19	17

DEGREE COURSE IN LOGGING ENGINEERING

(Five-Years Course)

Due to the complex character of the work demanded of the logging engineer, and to the desire on the part of many of those who are preparing for the profession for a broader training both in fundamental and general cultural subjects, a five-years course leading to the degree of Logging Engineer is offered for the first time. Students who complete the first four years of this course will receive the degree of Bachelor of Science in Logging Engineer-

ing. Those who complete the full five-years course, and who receive the recommendation of the Dean of the School and the head of the department of Logging Engineering, will be granted the graduate degree of Logging Engineer.

	Semester	
	1st	2nd
Freshman Year		
Modern English Prose (Eng. 85, 86).....	2	2
Trigonometry, College Algebra (Math. 11, 21).....	5	
Elementary Analysis (Math. 31).....		5
General Chemistry (Chem. 100).....	3	
General Forestry (For. 101, 102).....	3	2
Plane Surveying (C. E. 234).....		3
Elementary Mensuration (For. 304).....		3
Wood Working (Ind. Arts 110, 111).....	2	2
Library Practice (Libr. 1).....	$\frac{1}{2}$	
Hygiene (Phys. Ed. 10).....	$\frac{1}{2}$	
Drill (Military 1, 2).....	1	1
Gymnasium (Phys. Ed. 15, 16).....	$\frac{1}{2}$	$\frac{1}{2}$
	<hr/> 17 $\frac{1}{2}$	<hr/> 18 $\frac{1}{2}$

Sophomore Year		
Differential Calculus (Math. 51).....	4	
Engineering Physics (Phys. 101, 102).....	4	4
Blacksmithing (Ind. Arts 151).....		2
Topographic Surveying (C. E. 235).....	3	
Mensuration (For. 305).....	3	
Toolmaking and Tempering (Ind. Arts 152).....		1
Machine Shop (Ind. Arts 202).....		1
Railroad Surveying (C. E. 274).....		4
Silvics (For. 205).....	3	
Tree Identification (For. 206).....		4
Drill (Military 3, 4).....	1	1
Gymnasium (Phys. Ed. 17, 18).....	$\frac{1}{2}$	$\frac{1}{2}$
	<hr/> 18 $\frac{1}{2}$	<hr/> 17 $\frac{1}{2}$

SCHOOL OF FORESTRY

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	Semester	
	1st	2nd
Junior Year		
National Government (Com. 320).....	3	
State and Municipal Government (Com. 322).....		3
Principles of Economics (Com. 210).....	3	
General Geology (Geol. 135).....		3
Advanced Mensuration (For. 301).....	5	
Log Scaling (For. 307).....		2
Adv. Forest Mapping (For. 317, 318).....	2	2
Logging Machine Design (For. 316).....		2
Uses of Wood (For. 507).....	2	
Identification of Woods (For. 508).....		2
First Aid (Phys. Ed.).....		1
Military Science (Theo. Inst. 1, 2).....	1	1
Drill (Mil. 5, 6).....	1	1
	<hr/> 17	<hr/> 17

Senior Year		
Advanced Commercial Law (Com. 309).....	3	
Cost Accounting (Com. 150).....	3	
Economics of Lumber Industry (For. 403).....	4	
Forest Finance (For. 401).....		4
Elementary Mechanics (M. E. 254).....		3
Heat Engines and Boilers (M. E. 317).....	2	
Steam Laboratory (Exp. Eng. 255).....	2	
Elements of Electrical Machines (E. E. 403, 406).....	3	3
Efficiency Systems (For. 313).....		2
Timber Technology (For. 502).....		4
Timber Testing (Exp. Eng. 238).....		1
	<hr/> 17	<hr/> 17

Graduate Year	Semester	
	1st	2nd
Logging Railroads (For. 601).....	4	
Advanced Logging Railroads (For. 606).....		4
Topographic Logging Plans (For. 308).....	4	
Logging Devices and Equipment (For. 604, 605).....	4	4
Lumbering Management (For. 407).....		4
Lumber Manufacture (For. 602).....	2	
Logging Methods (For. 315).....		2
Forest Appraisals and Reports (For. 306).....	3	
Special Problems		2
	17	16

Suggested Electives

Forest Mapping (For. 303).....	2	
Commercial Lectures (For. 411).....	1	
Labor Problems (Com. 213).....		3
Forest Protection (For. 505).....		3

SUGGESTED SHORT COURSE SUBJECTS

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

The following courses are offered:

101. General Forestry. The responsibility of the nation in the conservation of its natural resources. The vital interest of the nation in its timber, coal, iron, water, etc. Appropriate methods of insuring longest and best use of these natural resources.

Forestry; freshman year; first semester; 3 credits; 3 lectures and recitations. Reference text: Van Hise, Conservation of Natural Resources.

102. General Forestry. Preliminary survey of the whole field of forestry. Forest regions of the United States and the commercial trees native to those regions. Forest ownership, private,

state, and national. Elements of state and national forest policy. Economic importance of the forests of the state and nation.

Freshman year; second semester; 2 credits; 2 lectures and recitations. Reference text: Moon and Brown, Elements of Forestry.

103. **Forest History and Economics.** The development of European forestry. Progress of American forestry. The economic importance of forest products. Transportations 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. Silviculture systems of cutting, such as, selection, clear cutting, and coppice. Marking trees for various cuttings. Silvicultural management.

Forestry; sophomore year; first semester; 3 credits; two-hours lecture; three-hours field work. Reference text: Graves, Handling of Woodlands. Fee \$1.50.

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; three-hours field work. Reference text: Graves, Handling of Woodlands. Fee \$1.50.

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, climatic 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 \$1.50.

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 \$1.50.

205. Silvics. Influence of the forest on stream flow and climate. Geographical and local distribution of trees by species. Tree reproduction. Tolerance. The relationship between trees and their environment.

Logging Engineering; sophomore year; first semester; 3 credits; 2 lectures; 1 field period. Fee \$1.50.

206. Tree Identification. Field characteristics and classification of timber trees of United States, their commercial range, local occurrence, size, growth, form, climatic soil and moisture requirements, resistance, relative tolerance and reproduction. The fundamental purpose of this course is to teach the student to know commercial timber trees.

Logging Engineering; sophomore year; second semester; 4 credits; 3 lectures; 1 field period. Reference text: Sudworth, Trees of the Pacific Slope. Fee \$1.50.

301. Advanced Mensuration. Log rules. Scaling of logs in board feet. Cord measure. Amount of timber required to make 1000 shingles. Shingle bolts, and units of measures used by all by-products. Piling specifications and values compared with other products. Making of volume tables and form factor tables for timber estimating purposes. Growth studies. Volume growth percent. Yield tables. Complete valuation surveys including application of methods learned in connection with forest appraisals in course 304 and 305 to areas of timber land. Comparison between values derived in logging and mill cuts and estimates of standing timber. 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. Advanced work in the execution of topographic surveys on timbered areas. Costs of such work.

Prerequisites: For. 304 and 305, C. E. 234 and 235. General Forestry and Logging Engineering; junior year; first semester; 5 credits; 3 recitations; 2 field periods of three hours each. Reference text: Graves, Forest Mensuration. Fee \$2.00.

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 and other standard legend. Making of final reconnaissance and land classification maps.

Forestry; elective; freshman year, second semester; sophomore year, first semester; 2 credits; two laboratory periods. Fee \$2.00.

304. Elementary Mensuration. Use of instruments employed in cruising timber; aneroid and barograph, box compass, jacob staff compass, Locke hand level, Abney hand level, Forest Service topographic hand level, trail tapes, etc. Cavalry sketching board. Principles and practice of pacing. Standardizing pace to all kinds of ground. Methods of covering ground in making timber appraisals, both in Forest Service and commercial timber holdings. History and theory of surveying public lands. Federal rectangular survey system. Private land grant boundary. Donation land claims. This last to be confined to a foundation on which the field work will be built. British Columbia land laws and methods of surveys. Mexican land grants. South American land laws and grants.

General Forestry and Logging Engineering; second semester; 3 credits; 2 recitations; 1 three-hours field period. Text: U. S. Manual of Public Land Surveys. Fee \$2.00.

305. Mensuration. The use of Forest Service and other hypsometers, Biltmore stick, Forest Service cruisers' sticks, calipers, diameter tape. Methods of estimating and measuring heights and diameters of trees without special instruments. Topographic surveying of forested areas. Keeping field notes. Approved methods of traversing. Practice in surveying with aneroid barometer with the use of barograph as a checking instrument. Combination of methods. Execution of public land surveys. Retracing surveyed lines. Section subdivisions. Re-establishing obliterated corners. British Columbia, Mexican and South American surveys. Photographic surveys. Costs.

Prerequisites: For. 304 and C. E. 234. General Forestry and Logging Engineering; sophomore year; first semester; 3 credits; 1 recitation; 2 three-hours field or laboratory periods. Fee \$2.00.

306. Forest Appraisals and Reports. Commercial timber land examinations as made by commercial cruising companies. Cruising

methods required by bonding companies, bankers, purchasers and operators. Preparation of the report which should cover such examinations. The various cruising methods and their relative merits. In this course the student will be required to work out and report on a problem which will be of practical value to some logging concern.

Prerequisite: For. 301. Logging Engineering; senior year; first semester; 3 credits; 2 lectures; 1 field or laboratory period of three hours. Fee \$3.00.

307. Log Scaling. Log Scaling as practiced in the United States generally and in the Pacific Northwest and in British Columbia in particular. The theory of board measure and the merits and demerits of the different scale rules. Allowances for log defect. The keeping of records. Scaling with reference to log grades as practiced on the Pacific Coast in different kinds of timber. Rules governing the sale of logs in different districts. Rules of log scaling and grading bureaus. Students will be required to scale at mills and logging camps. Laws governing scaling.

Prerequisites: Forestry 304 and 305. General Forestry and Logging Engineering; junior year; second semester; 2 credits; 1 lecture; 1 field period of three hours. Fee \$1.50.

308. Topographic Logging Plans. Plans for logging operations. Students will be required to make a topographic map of a timbered area. The timber will be cruised and a complete set of plans worked out, showing the proper location of the main line logging railroads, railroad spurs, rollways or landings, pole roads, swing settings, logging area lines. An estimate will be made of the cost of logging the tract.

Prerequisites: For. 301 and C. E. 235. Logging Engineering; graduate year; first semester; 4 credits; 2 recitations; 2 field periods of three hours each. Fee \$4.00.

313. Efficiency Systems. General discussions of efficiency systems. Special application to the lumber industry. Cost-keeping systems and their comparative values. Organization. Cost keeping versus bookkeeping. Bonus, merit, profit-sharing and piece systems. Labor problems as applied to the logging industry. Present day labor management as practiced in modern logging operations.

Logging Engineering; senior year; second semester; 2 credits; 2 lectures.

315. Logging Methods. The yarding, skidding and loading of logs by all known methods. Falling and bucking of timber. The relative merits of various methods will be considered. All known methods of handling timber from the standing tree to the mill will be discussed, not only with regard to Northwestern methods but methods used all over the United States and Canada.

Logging Engineering; graduate year; second semester; 2 credits; 2 lectures.

316. Logging Machine Design. Designing logging equipment, tools and rigging. Instruction in the preparation of working plans for machine shop and foundry construction. Students will make a set of drawings of standard woods tools and railroad equipment which are constructed in mill and camp shops.

Prerequisite: For. 317. Logging Engineering; junior year; second semester; 2 credits; 2 laboratory periods of three hours each. Fee \$2.00.

317. Advanced Forest Mapping. A course in the method and construction of relief maps made from topographical data obtained by each student in the field; a study of their use in planning logging operations and value of the same for such purposes. Costs of constructing relief maps. Free hand field sketching. Drill in lettering and finishing maps.

Prerequisites: For. 301 and 303. Logging Engineering; junior year; first semester; 2 credits; 1 laboratory and 1 field period of three hours each. Fee \$2.00.

318. Advanced Forest Mapping. A continuation of course 317.

Logging Engineering; junior year; second semester; two credits; 1 laboratory and 1 field period. Fee \$2.00.

401. 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; 4 credits; 4 lectures and recitations. Reference text: Chapman, Forest Valuation.

403. Economics of the Lumber Industry. A brief history of lumbering in the United States. Stumpage prices. Prices of manufactured lumber. Shifting centers of production. Transportation.

Freight rates. The Inter-State Commerce Commission and the lumber industry. Substitutes and their effects. Lumbermen's Associations. Present rate of consumption and the future supply. Function of the government in the future of the industry.

General Forestry and Logging Engineering; senior year; first semester; four credits; four lectures.

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 year; from 1 to 5 credits.

407. Lumbering Management. A series of lectures dealing with the lumber industry from the manager's standpoint. Trade, selling grades, and utility will be considered. Major accounting of interest to the manager. Lumber associations, bonds, taxation. Lumber rates and tariffs. Rate zones, control by Inter-State Commerce Commission. Rates by rail and water. Low towage.

Logging Engineering; graduate year; second semester; four credits; 4 lectures.

408. Seminar. Preparation and discussion of reports of special subjects. Current forestry and lumbering literature. Each student is required to prepare a report on some assigned subject.

Forestry; senior year; first semester; 1 credit.

409. Seminar. Continuation of course 408.

Forestry; senior year; second semester; 1 credit.

411. Commercial Lectures. A series of lectures by men engaged in the various phases of the lumber industry.

Forestry; elective; junior and senior years; second semester; 1 credit; 1 lecture period.

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. Timber Technology. Fundamental principles underlying the seasoning and kiln drying of woods. Kiln drying methods and their relative merits. Preservative treatment of timber, methods and results. Manufacture of wood pulp. Production of fiber products. Manufacture of alcohol, turpentine, resin, tar and other chemical products from wood. Closer utilization of wood waste. Grading rules for the various kinds of manufactured wood products.

General Forestry and Logging Engineering; senior year; second semester; 4 credits; 2 lectures; 2 laboratory periods. Fee \$3.00.

503. Advanced Dendrology. A continuation of course 501.

Forestry; senior year; elective; second semester; 3 credits; 2 recitations; 1 laboratory period. 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 \$2.00.

507. Uses of Wood. Study of wood structure and the adaptation of the wood to commercial uses. The chief wood-using industries and the relative amounts of the principal commercial species used annually. Adaptation of wood to special purposes. The substitutes for wood. Minor uses of wood such as pulp, fiber board, etc. By-products.

General Forestry and Logging Engineering; junior year; first semester; 2 credits; 1 lecture; 1 laboratory period. Reference text: Kellogg, Lumber and Its Uses. Fee \$2.00.

508. Identification of Wood. Identification of all the important commercial woods. Special emphasis is placed on the woods of the Pacific Northwest. Physical and structural properties. All woods in the vicinity of the School are collected during field trips and later prepared in the laboratory for microscopic examination. At the conclusion of the course a key to the identification of these woods is required.

Logging Engineering; junior year; second semester; 2 credits; 1 lecture; 1 field or laboratory period. Reference text: Record, Economic Woods. Fee \$2.00.

601. Logging Railroads. Railroads especially adapted to logging operations. Difference between logging railroads and common carrier railroads. Grades. Alignment. Railroad operation as applied to the logging railroads. Economic theory of location and construction. Structures and materials used in logging railroads. Costs of surveys, construction, operation and maintenance.

Prerequisite: C. E. 274. Logging Engineering; graduate year; first semester; 4 credits; 2 lectures; 1 field and 1 laboratory period of 3 hours each. Reference text: Welbroughton, Economic Theory of Railway Location. Fee \$4.00.

602. Lumber Manufacture. Discussion of the various types of modern mills. Manufacture of secondary products. Electrical versus steam mills. Lumber handling devices. Examinations of up-to-date mills and reports on them will be made.

Logging Engineering; graduate year; first semester; 2 credits; 1 lecture; 1 laboratory period.

604. Logging Devices and Equipment. Flume and chute construction. Rigging. Types of railroad locomotives, logging cars

and trucks. Donkey engines. Skidding and loading devices. Camp buildings, shops, dwellings. Machine shop machinery and tools. Woods tools. Railroad track equipment and fixtures. Oil, grease, packing and waste. Water supply systems. Explosives. Construction equipment. Boilers, aerial tramways, snubbing devices. Incline railroads.

Logging Engineering; graduate year; first semester; 4 credits; 2 lectures; 2 laboratory periods of three hours each. Fee \$4.00.

605. **Logging Devices and Equipment.** A continuation of course 604. Blocks and hooks, log flumes, wire rope, logging dams, electrical machines used in logging. Detailed investigation of costs and makes of equipment. Aerial and high lead systems. Economic value of using efficient equipment.

Logging Engineering; graduate year; second semester; 4 credits; 2 lectures; 2 laboratory periods of three hours each. Fee \$4.00.

606. **Advanced Logging Railroads.** A continuation of course 601. Bridge and tunnel construction. Economics of construction and railroad operation. Economics of railroad motive power, rolling stock and other materials. Railroad management and financing.

Prerequisite: For. 601. Logging Engineering; graduate year; second semester; 4 credits; 3 lectures; 1 laboratory period. Fee \$4.00.

SHORT COURSE SUBJECTS IN GENERAL FORESTRY

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 construction 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.

SCHOOL OF HOME ECONOMICS

EXECUTIVE COMMITTEE

MARY ELIZA FAWCETT, Dean of Women, Chairman
HELEN BRYCE BROOKS, Professor of Domestic Art
AVA BERTHA MILAM, Professor of Domestic Science

The School of Home Economics offers the following courses of study: a graduate course leading to the degree of Master of Science, with majors in the departments of Domestic Science and Domestic Art in such special fields as House Administration; Institutional Management, including dietetics; Applied Design; and Education; two four-years courses, each of which leads to the degree of Bachelor of Science; a two-years course for dietitians; 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, and a course of twelve weeks for women of mature years.

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 increasingly 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.

With the establishment of the College Practice House, Household Administration is being more effectively taught than was formerly possible without this equipment. (See description under Course 530, Domestic Science.)

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.

REQUIREMENTS FOR GRADUATION IN THE 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 13 credits.

Science group at least 6 credits.

Home Economics group at least 22 credits.

Free electives 22 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 at the beginning of the junior year the courses begin to differentiate in the direction of the aim of each course. The junior and senior years 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 22 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	
	1st	2nd
Freshman Year		
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
Foods and Cookery, (D. S. 106, 107).....	4	4
Design and Color, (Art 204).....	2	
Household Physics, (Phys. 133, 134).....	2	2
Household Bacteriology, (Bact. 300).....		3
Modern Language	3	3
Gymnasium, (Phys. Ed. 7, 8).....	1	1
	16	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 13 credits must be chosen from this group selected from departments such as:

English, at least 6 credits.
 Economics
 Political Science } at least 7 credits
 Sociology
 Psychology at least 3 credits
 History
 Language
 Mathematics
 Art.

Science Group

Zoology
 Chemistry
 Botany
 Bacteriology
 Physics

Home Economics Group

A minimum of 22 credits must be chosen from this group.

	Semester	
	1st	2nd
(a) Domestic Science		
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
Home Nursing, (D. S. 511).....	3	either semester
Practice Housekeeping, (D. S. 530).....	3	either semester
(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	

* Juniors 1917-18 must elect Foods and Cookery, (D. S. 107); 4 credits.

	Semester	
	1st	2nd
(c) House Administration		
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	
Foods and Cookery, (D. S. 107).....	4	or 4
Advanced Textiles, (D. A. 601).....		2
Dressmaking, (D. A. 201, 202).....	3	3
Home Nursing, (D. S. 511).....	8 credits either semester	

(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
Foods and Cookery, (D. S. 107).....	4	or 4

(e) Applied Design		
Basketry, (D. A. 402).....	2	
Hand Work and Weaving, (D. A. 405).....		2
Design, (Art 205 or 305 or 306).....	2	
Clay Modeling, (Art 413, 414).....	2	2
Metal Work (Art 600, 601).....	2	2

Industrial Education Group

General Psychology, (Ind. Ed. 101).....	3	either semester
Educational Psychology, (Ind. Ed. 102).....	2	either semester
Principles of Education, (Ind. Ed. 131).....	3	either semester
Special Methods in Home Economics, (Ind. Ed. 160)	3	either semester
Special Methods in Domestic Art, (Ind. Ed. 164.)	2	either semester
Special Methods in Domestic Science, (Ind. Ed. 165)	2	either semester

Industrial Education 160 is prerequisite to Industrial Education 164 and 165.

Psychology, (Ind. Ed. 101) and Principles of Education, (Ind. Ed. 131) are open to juniors, Industrial Education 160 is open to juniors in the second semester.

Free Electives

An aggregate of 22 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 the home, and at the same time afford them abundant opportunity, by the freedom of election in the junior and senior years, for the gratification of individual inclination through a study of Art, English, Modern Languages, the Sciences, Horticulture, including Floriculture and Landscape Gardening, Pharmacy, Mines, Physical Education, etc. Group II does not prepare students for positions as teachers or dietitians.

Freshman Year	Semester	
	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).....		$\frac{1}{2}$
Hygiene, (Phys. Ed. 10).....	$\frac{1}{2}$	
Gymnasium, (Phys. Ed. 5, 6).....	1	1
	<hr/> 17 $\frac{1}{2}$	<hr/> 17 $\frac{1}{2}$

Sophomore Year

General Science, including Physiology, Bacteriology, Physics	4	4
Foods and Cookery, (D. S. 106, 107).....	4	4
Design and Color, (Art 204).....		2
English	3	3
Modern Language	3	3
Household Accounting (Com. 120).....	1	
Gymnasium (Phys. Ed. 7, 8).....	1	1
	<hr/> 16	<hr/> 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 selected from departments such as:

Economics	}	at least 7 credits
Political Science		
Sociology		
Psychology, at least 3 credits.		
English, at least 6 credits.		
History		
Language		
Mathematics		
Art		

Science Group

A minimum of 6 credits must be chosen from this group selected from departments such as:

Physiology. Physiology 207 prerequisite for dietetics.
 Zoology
 Chemistry
 Botany
 Bacteriology
 Physics

Home Economics Group

A minimum of 12 credits must be chosen from this group.

(a) Domestic Science	Semester	
	1st	2nd
* Dietetics, (D. S. 203).....	4	
Foods and Cookery, (D. S. 107).....	4	or 4
House Sanitation, (D. S. 301).....	2	
Housewifery, (D. S. 510).....		2
House Administration, (D. S. 501).....		3
Home Nursing, (D. S. 511).....	3 credits either semester	
Practice Housekeeping, (D. S. 530).....	3 credits either semester	

* Juniors 1917-18 elect D. S. 107.

	Semester	
	1st	2nd
(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) House Administration		
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	
Foods and Cookery, (D. S. 107).....	4	or 4
Advanced Textiles, (D. A. 601).....		2
Dressmaking, D. A. 201, 202).....	3	3
Home Nursing, (D. S. 511).....	3 credits either semester	
Practice Housekeeping, (D. S. 530).....	3 credits either semester	
(d) Institutional Management		
Dietetics, (D. S. 203).....	4	
Institutional Management, (D. S. 504).....	3	
Catering, (D. S. 210).....		2
Foods and Cookery, (D. S. 107).....	4	or 4
(e) Applied Design		
Basketry, (D. A. 402).....	2	
Hand Work and Weaving, (D. A. 405).....		2
Design, (Art 305).....	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.

DIETITIANS' COURSE

The course outlined below is intended for young women who desire competent training to fit themselves to become dietitians in hospitals, institutions under State, county, charity, or private management where large numbers of people are housed and fed, or dietitians under military or Red Cross auspices. Students matriculating for this course must be at least twenty-one years of age, and graduates of a four-years high-school course of study or its equivalent. To secure a dietitian's certificate, sixty-eight credits are required, including three months of practical field work.

	Semester	
	1st	2nd
First Year		
Household Chemistry, (Chem. 12, 13).....	3	3
College Rhetoric, (Eng. 31, 32).....	3	3
Physiology, (Zool. 207, 208).....	3	3
Home Economics Bacteriology, (Bact. 304).....		3
Foods and Cookery, (D. S. H, I).....	5	5
Sanitation and Care of the Home, (D. S. K).....	2	
	16	17
Second Year		
Nutritional Physiology, (Zool. 205).....	3	
Dietetics, (D. S. 203).....	4	
Dietetics, (D. S. 202).....		2
Home Nursing, (D. S. 511).....	3	
House Administration, (D. S. 501).....		3
Institutional Management, (D. S. 504).....		3
English	3	3
Psychology, (Ind. Ed. 101).....		3
Home Economics Bacteriology, (Bact. 305).....	3	
Elective		2
	16	16

Field Work, to be arranged, 3 credits.

VOCATIONAL COURSES

The one-year Vocational course, established 1914, 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.

Vocational Course	Semester	
	1st	2nd
Foods and Cookery (D. S. H and I).....	5	5
Care of Children (D. S. J).....		1
Hand Sewing and Garment Making, Dressmaking (D. A. K and L).....	4	4
Sanitation and Care of the Home (D. S. K).....	2	
Elementary Physiology (Zool. A).....	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).....	$\frac{1}{2}$	
Gymnasium (Phys. Ed. 1, 2).....	1	1
	<hr/> 15 $\frac{1}{2}$	<hr/> 15

DOMESTIC ART

HELEN BRYCE BROOKS, Professor
GRACE GILLET, Instructor
BARBARA MOORE, Instructor
CORA ELIZABETH PLATT, Instructor
HELEN PEER, Instructor
JUNE SEELEY, Instructor
LOUISE ALBERTA SCHNEIDER, Instructor
MARGARET MOREHOUSE, Instructor

The following courses are offered:

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 \$1.00.

102. Garment Making. Continuation of course 101 in which the making of cotton dresses 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 \$1.00.

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 wool dress. The textile work will be a study of wool.

Prerequisites: Domestic Art 101, 102; Art 102, 103. Junior year; first semester; 3 credits; 1 recitation; 3 laboratory periods. Fee \$1.00.

202. Dressmaking. Continuation of course 201. The textile work will be a study of silk and linen.

Prerequisite: Domestic Art 201; Art 204. Elective; 3 credits; 1 recitation; 3 laboratory periods. Fee \$1.00.

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. Modeling and making of elaborate gowns. Emphasis on color combinations, technique, suit-

ability 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 \$1.00.

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 periods. Fee \$1.50.

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. Text: Robinson, Domestic Architecture.

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 materials 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 \$1.00.

701. **Costume Design.** Study of the figure; sketching of garments, hats, and gowns; modeling 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 \$1.50.

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.

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, Instructor
SIBYLLA HADWEN, Instructor
MINNIE KALBUS, 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.

With the leasing of a furnished eight-room house in close proximity to the College, a new and significant feature was added to the Home Economics course in September, 1916. In groups of eleven, advanced students are afforded the opportunity of living in the house for six weeks under the supervision of a Domestic Science faculty woman. The problems of housekeeping, including the purchasing, care, and cooking of food, the planning of meals, the care of the house and family laundry, are conducted by the students. The economic side is given particular attention, and the fees paid by the students in this course cover the entire operating expenses of the house.

Equipment has been installed in the cafeteria for the use of classes in Institutional Management.

The following courses are offered:

* 106. **Foods and Cookery.** An introduction to the subject of foods in their scientific and economic aspect, selection, preparation, and use. The process of digestion, absorption, and assimilation.

Prerequisites: General Chemistry 102, 103; Principles of Botany 20, 21; parallel, Organic Chemistry 200, or Household

* These two courses, 4 credits each, take the place of D. S. 101, 102, 104, 105, 3 credits each. Students having completed courses 101 and 102 are to take course 107.

Chemistry and Physiology. Domestic Science; sophomore year; first semester; 4 credits; 2 lectures; 2 three-hours laboratory periods. Fee \$6.00.

* 107. **Foods and Cookery.** A continuation of course 106; canning and preserving of foods, menu making, and table service.

Prerequisites: Food and Cookery 106; parallel, Chemistry of Foods 402. Domestic Science; sophomore year; either semester; 4 credits; 2 lectures; 2 three-hours laboratory periods. Fee \$7.00.

110. **Experimental Cookery.** A study of individual problems. Each student selects some piece of work concerned with foods or related subjects. Oregon products often furnish the material for these experiments. Detailed records and reports demanded.

Prerequisite: D. S. 106, 107. Domestic Science; senior elective; either semester; 2 credits; 2 three-hours laboratory periods. Fee \$2.00.

120. **Methods of Demonstrations.** A course preparing students to give public demonstrations in food selection and preparation. Types of demonstrations, equipment required, organization of plans, general method of procedure, results to be obtained from demonstrations. Illustrative demonstrations by instructor. Student demonstrations.

Prerequisite: D. S. 106, 107. Domestic Science; senior elective; second semester; 1 credit; 1 three-hours laboratory period. Fee \$1.50.

180. **Foods and Cookery.** 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.** Instructions 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.

* These two courses, 4 credits each, take the place of D. S. 101, 102, 104, 105, 3 credits each. Students having completed courses 101 and 102 are to take course 107.

Domestic Science elective; junior or senior men in Forestry, Agriculture, Engineering, and Commerce courses; second semester; 1 credit; 1 laboratory period. Fee \$2.50.

191. Cookery for Men. A course for men who are planning and preparing their own meals or who are acting as managers of clubs. The uses of food in the body, factors affecting food requirements, making of menus suited to the needs of individuals under various living conditions. The practical work includes the making of numerous dishes and the serving of well-balanced meals at reasonable cost.

Domestic Science; elective to all men of the College; first semester; 1 credit; 1 three-hours laboratory period. Fee \$2.50.

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 metabolism. 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 106 and 107; Physiology 207. 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. Food for the young child. Invalid diets. Disease as affected by foods.

Prerequisite: Home Nursing 511; Dietetics 201, or 203. Domestic Science; senior year; second semester; 2 credits; 1 lecture; 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; Domestic Science 106, 107; (or H. and I. for Dietitians and Physiology 207.) Elective; second semester of senior year; 4 credits; 2 recitations; 2 laboratory periods. Fee \$4.00.

210. Catering. Designed for students who are interested in the management of tea rooms and lunch rooms and in catering for

private entertainments. The work includes the purchase, preparation, and service of refreshments at such functions as afternoon teas, luncheons, and small banquets. The students are expected to devote at least six hours a week to the course.

Prerequisite: Domestic Science 106 and 107, or the equivalent, for degree courses. 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 of general sanitary conditions from a practical and scientific standpoint with special reference to the needs of the community, household, and school.

Junior year; either semester; 2 credits; 2 recitations. Text: Talbot, House Sanitation (as guide).

501. Household Administration. The organization and control of the home. The economic relations of the household, applying scientific and economic principles to its problems. A study of family income and its equivalent in productive labor within the household. Family expenditures and their regulation. The budget as a measure of standards of living. The domestic service problem and efficiency of the household.

Prerequisite: (for degree students) Economics 211. Domestic Science; senior year; either semester; 3 credits; 3 lectures.

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: (for degree students) Domestic Science 106 and 107, Economics 211, (for Dietitians H. and I.). Parallel or prerequisite: Household Administration. Senior year; either semester; 3 credits; 3 laboratory periods of three hours each.

510. Housewifery. Efficiency in the care of the home, from the chemical, economic, and practical standpoint. The treatment of floors, walls, and woodwork. The removal of stains. The cleaning of rugs and carpets. Laundering of household linen and clothing. The selection of cleaning apparatus and machinery.

Prerequisites: General Chemistry 100, 101. Domestic Science; junior year; either semester; 2 credits; 1 lecture; 1 three-hour laboratory period. Fee \$0.50. Text: L. Ray Balderston, Laundering. E. G. Osman, Cleaning and Renovating at Home.

511. Home Nursing. Care of patient under home conditions. Symptoms. First aid to the injured. Management of communicable diseases.

Prerequisites: Physiology 207; Bacteriology 300. Domestic Science; senior year; first semester; 3 credits; 3 lectures. Text: Maxwell and Pope, Practical Nursing.

530. Practice Housekeeping. This course deals with the problems of homemakers. The students put into actual practice and apply to real home conditions the Principles of Cookery, Housewifery, Household Management, and Methods of Laundering studied in their college course. Each girl does every duty concerned in the management of the house during the time she is a resident there. Special attention is given to the economic side of the question. The students carry their regular college work during the time they live in the practice house.

Prerequisites: Domestic Science 104 or its equivalent. Domestic Science 105 is also desirable. Domestic Science elective; junior and senior years; either semester; $\frac{1}{2}$ credit a week. Fee \$5.00 a week living expenses.

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.

701. Special Research in Cookery. In assigning research problems for graduate students, both the previous training and the student's 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.

H. Foods and Cookery. The study of foods, source, economical purchase, storage, and cookery. Gives the student a working knowledge of the nutritive value of foods. Offers extended experience in practical cooking, with careful estimation of cost and quantity, special attention being given to preservation of foods.

Vocational course; first semester; 5 credits; 2 recitations; 3 laboratory periods. Fee \$6.00.

I. Foods and Cookery. A continuation of course H. This course aims to present the fundamental principles of human nutrition and to teach their application under varying physiological, economic, and social conditions. Special attention given to making of menus and preparation and service of meals.

Vocational course; second semester; 5 credits; 2 recitations; 3 laboratory periods. Fee \$6.00.

J. Care of Children. Physical and mental development. Proper feeding and clothing. General care 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 study of home problems, the choice of site for the house, construction, lighting, heating, plumbing, disposal of waste, and general care of home. The study of modern labor saving devices, the best cleaning agents, care of floors and woodwork, and the common laundry operations. This course is optional with English.

Vocational course; first semester; 2 credits; 2 lectures; 1 laboratory period. Fee \$0.50.

M. Home Nursing and Invalid Cookery. Observation of symptoms. Administration of food and medicine. Care of the sick under home conditions. Preparation of food for the invalid. Manner of service.

Vocational course; second semester; 2 credits; 2 lectures; 1 laboratory period. Text: Aiken, Home Nurses' Handbook of Practical Nursing. Fee \$2.00.

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 discov-

ery, 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 on 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 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.

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 geological 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

Freshman Year	Semester	
	1st	2nd
College Algebra (Math. 21).....	2	
Trigonometry (Math. 11).....	3	
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. 153).....		3
Mod. Eng. Prose (Eng. 91, 92).....	2	1
Forging and Tool Dressing (Ind. Arts 158).....		2
Drill (Military 1, 2).....	1	1
Gymnasium (Phys. Ed. 15, 16).....	$\frac{1}{2}$	$\frac{1}{2}$
	<hr/> 17½	<hr/> 17½

MINING ENGINEERING

315

	Semester	
	1st	2nd
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).....	$\frac{1}{2}$	$\frac{1}{2}$
	<hr/> 17 $\frac{1}{2}$	<hr/> 17 $\frac{1}{2}$
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).....		2 $\frac{1}{2}$
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
	<hr/> 16	<hr/> 16 $\frac{1}{2}$
Senior Year		
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	
	<hr/> 16	<hr/> 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. Junior year; second semester; 3 credits; 2 recitations; 2 laboratory periods. Deposit \$2.00.

222. Mine Economics. A detailed 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 collection 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, textbook, 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. 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. 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.

Junior year; first semester; 2 credits; 2 lectures; 1 laboratory period, for School of Mines students. 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 rock. 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; 2 laboratory periods. 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 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 magnetic 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 courses; 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 products 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 iron-ware, 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 con-

trolled; 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 COURSE IN CERAMIC ENGINEERING

The freshman and sophomore years are identical with the first two years of the Degree Course in Mining Engineering.

	Semester	
	1st	2nd
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. 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
	<hr/> 17	<hr/> 17

Senior Year		
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
	<hr/> 16	<hr/> 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. Ray Materials Testing. Continuation of the laboratory work of Cer. E. 303. Lectures at intervals as required.

Prerequisites: Cer. E. 303 and Chem. E. 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. E. 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. E. 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. E. 299.

With the consent of the heads of the departments 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.

	Semester	
	1st	2nd
Junior Year		
Statics and Dynamics (M. E. 251).....	5	
Strength of Materials (M. E. 252).....		3
Hydraulics (I. E. 102).....		3
Fire Assaying (Chem. E. 401).....	4	
Organic Chemistry (Chem. 201, 202).....	3	3
General Geology (Geol. 135).....	2	
Chemical and Metallurgical Processes (Chem. E. 431).....		3
Drill (Military 5, 6).....	1	1
Military Science (Theo. Inst. 1, 2).....	1	1
Fuels, Metallurgy of Iron and Steel (Chem. E. 410).....		2½
	16	16½
Senior Year		
Electrical Machinery (E. E. 403).....	3	
Physical Chemistry (Chem. 410).....	3	
Thermo-Chemistry (Chem. E. 452).....		3
Chemical Technology (Chem. E. 461, 462).....	4	4
Electro-Chemistry (Chem. 407).....	3	
Electro-Metallurgy (Chem. E. 442).....		3
*Approved Electives	3	6
	16	16

401. Fire Assaying. The crushing and sampling of 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;

* 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.

2 half days in the laboratory. Text: Fulton, Manual of Fire Assaying. Deposit \$20.00.

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. E. 401. Senior year of Mining Engineering course; second semester; 2 credits; 3 recitations.

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. E. 401. Senior year of Mining Engineering course; first semester; 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. E. 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; second 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. Senior year; second semester; 3 credits; 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. E. 431. Senior year; first semester; 4 credits; 4 recitations; 2 laboratory periods.

462. Chemical Technology. A continuation of Chem. E. 461.

Prerequisite: Chem. E. 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. E. 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 themselves 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 department 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 in 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 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.

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 chemistry necessary for the drug business and the various phases of pharmaceutical manufacturing.

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 few strictly cultural subjects, but deals with all phases of Chemistry, Materia Medica, Prescription dispensing, and U. S. Pharmacopoeia. 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, con seal 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.

DEGREE COURSE IN PHARMACY

	Semester	
	1st	2nd
Freshman Year		
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).....	$\frac{1}{2}$	$\frac{1}{2}$
Library Practice (Libr. 1).....	$\frac{1}{2}$	
Hygiene (Phys. Ed. 10).....	$\frac{1}{2}$	
	<hr/> 17 $\frac{1}{2}$	<hr/> 17 $\frac{1}{2}$
Sophomore Year		
Organic Chemistry (Chem. 201, 202).....	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
Business Law (Com. 311).....		3
Drill (Military 3, 4).....	1	1
Gymnasium (Phys. Ed. 17, 18).....	$\frac{1}{2}$	$\frac{1}{2}$
	<hr/> 16 $\frac{1}{2}$	<hr/> 16 $\frac{1}{2}$
Junior Year		
Theoretical Pharmacy (Phar. 116).....	3	
Pharmacy 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. 404, 405).....	2	2
Pharmaceutical Calculations (Phar. 123).....		2
Drill (Military 5, 6).....	1	1
	<hr/> 18	<hr/> 18

PHARMACY

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	Semester	
	1st	2nd
Senior Year		
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
	<hr/> 16	<hr/> 16

TWO-YEARS COURSE IN PHARMACY *

First Year		
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).....	$\frac{1}{2}$	$\frac{1}{2}$
Elective		2
	<hr/> 17½	<hr/> 17½

* This course leads to the degree of Graduate in Pharmacy. Students entering the course must have completed the full four-years high-school training.

	Semester	
	1st	2nd
Second Year		
Organic Chemistry (Chem. 201, 202).....	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

VOCATIONAL COURSE IN PHARMACY *

First Year		
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).....	$\frac{1}{2}$	$\frac{1}{2}$
	16 $\frac{1}{2}$	16 $\frac{1}{2}$

* Entrance to this course requires two years of high-school preparation or its equivalent.

	Semester	
	1st	2nd
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).....	$\frac{1}{2}$	$\frac{1}{2}$
Drill (Military 3, 4).....	1	1
Electives		2
	<hr/> 17½	<hr/> 17½

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 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 Theoretical 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: Sturmer, 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, 201, 202. Senior year; first semester; 3 credits; 3 recitations. Text: 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: Army, Principles of 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, sirups, 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: Army, Principles of Pharmacy. Ruddiman, Why's in Pharmacy.

118. Pharmaceutical Preparations. The object of this course is to teach students to put into practice the principles of Theoretical 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-hours laboratory periods. Text: U. S. Pharmacopoeia. National Formulary. Laboratory Notes. 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; 2 lectures and 2 two-hours laboratory periods. Text: Army, Principles of Pharmacy. Fee \$4.00.

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 in 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. 201, 202. 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 prescriptions 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, 201, 202. 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.

Prerequisite: Phar. 150. Senior year; second semester; 3 credits; 3 recitations. Text: Ruddiman, Incompatibilities in Prescriptions.

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. 201, 202, 300. Senior year; second semester; 2 credits; 2 three-hours laboratory periods. Text: Scoville, Art of Compounding. Fee \$6.00. Deposit \$1.00.

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. For students not registered in the department, the work is exclusively sign-card painting.

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-hours laboratory periods. Text: U. S. Pharmacopoeia. Fee \$6.00. Deposit \$1.00.

VOCATIONAL COURSES

A. Pharmacopoeia and National Formulary. The object of this course is carefully to study all official drugs and preparations as found in the U. S. Pharmacopoeia, as well as all preparation in the National Formulary. Particular attention is given to their source, method of preparation, composition, percentage strength, etc. 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. Pharmacopoeia; National Formulary.

B. Pharmacopoeia and National Formulary. A continuation of course A. 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: Army, Principles of 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: Army, Principles of 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 year; first semester; 4 credits; 3 lectures; 2 two-hours laboratory periods. Texts: Army, Principles of Pharmacy. Laboratory Notes. Fee \$4.00.

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 K. 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. K. 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. Lecture Notes. Fee \$1.00.

N. Therapeutics and Toxicology. A continuation of course M and as a special feature of the course the subject of First Aid to the Injured will be taught by demonstration and actual practice. Typical 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.

Prerequisites: Phar. D, E, and registration in Chem. 200. Second year; first 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.

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. Laboratory Notes. Fee \$6.00. Deposit \$1.00.

ART AND RURAL ARCHITECTURE

FARLEY DOTY McLOUTH, Professor
LAWRENCE EUGENE ROBINSON, Assistant Professor
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, two draughting rooms on the second floor of Science Hall, a metal-working laboratory and a clay-modeling and pottery studio in Waldo Hall. The studios have north light, are well heated and ventilated and are equipped with suitable studio furniture and accessories, such as casts, still life prints, potter's wheel, tools, and benches. 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 the work 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 ornaments; 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 204, 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. Advance 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 204. 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 from written descriptions.

The degree course in Industrial Arts; freshman year; second semester; 2 credits; 3 studio periods of two hours. Elective;

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 \$2.00.

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 \$2.00.

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 landscape gardening subjects, detail, and decoration.

Fee \$0.50.

506. Water Color Rendering. A continuation of course 505, followed by full color drawings of landscape gardening subjects. Later in the semester opportunity is given for out-of-door sketching in color.

Elective; degree course in Landscape Gardening; sophomore year; second semester; 2 credits; 2 studio periods of three hours each.

The following courses are open to other students who have completed courses 102 and 103 or their equivalents and to Industrial Arts students having completed 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, and repousse.

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 enameling.

Prerequisites: Art 102, 103, and 600. Elective; the degree course in Home Economics; or any student having the desired prerequisites; second semester; 2 credits; 2 studio periods of three hours each. 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-hours 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-hours 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:

518. Perspective Drawing. A study of mechanical perspective.

Elective; sophomore year; second semester; 1 credit; 1 draughting room period. Fee \$0.50. Text: Frederick, Simplified Mechanical Perspective.

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. Text: Howe, Agricultural Drafting.

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.

Agriculture; elective; first semester; 1 credit; 1 draughting room period. Fee \$0.50. Text: Howe, Agricultural Drafting.

537. Farm Structures. Advanced drawing of concrete and frame structures. Details of construction, sanitation, and economic 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.

Industrial Arts; junior year; first semester; 3 credits; 3 draughting room periods. Fee \$0.75.

702. Advanced House Planning. A continuation of course 701.

Industrial Arts; junior year; second semester; 3 credits; 3 draughting room periods. Fee \$0.75.

D. A. 501. House Construction and Decoration. (See page 304, School of Home Economics.)

Fee \$0.50. Text: Robinson, Domestic Architecture.

D. A. 502. Advanced House Construction. A continuation of D. A. 501.

Domestic Art; elective; second semester; 2 credits; 2 draughting room periods of two hours each. Fee \$0.50. Text: Robinson, Domestic Architecture.

CHEMISTRY

JOHN FULTON, Professor
* HERMAN VANCE TARTAR, Associate Professor
RENTON KIRKWOOD BRODIE, Associate Professor
MILO REASON DAUGHTERS, Assistant Professor
RAYMOND ADAMS DUTCHER, Assistant Professor
MILTON JOHN SEELEY, Instructor
ROBERT ANDREW DUNCAN, Instructor
SYLVESTER BOYER, Instructor
HARRY GEORGE MILLER, 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.

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 department of Rural Architecture. 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 1917-18.

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 quantitative 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 room as nearly an actual chemical work room as possible.

In the balance room there are 23 analytical balances.

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 Quantitative Analysis (advanced), 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.

COURSE IN AGRICULTURAL CHEMISTRY

For the prescribed group courses for the freshman and sophomore years in the School of Agriculture consult pages 75 to 77.

	Semester	
	1st	2nd
Junior Year		
Agricultural Economics (Com. 219).....	3	
Agricultural Chemical Analysis (Chem. 505).....	3	
Organic Synthesis (Chem. 305).....		3
Trigonometry (Math. 11).....	3	
College Algebra (Math. 21).....	2	
Elementary Algebra (Math. 31).....		5
Drill (Military 5, 6).....	1	1
Military Science (Theo. Inst. 1, 2).....	1	1
Electives	4	7
	17	17
Senior Year		
National Government (Com. 320).....	3	
State and Municipal Government (Com. 322).....		3
Advanced Agricultural Analysis (Chem. 507, 508).....	4	4
Elementary Physical Chemistry (Chem. 410).....	3	
Thermo and Electro Chemistry (Chem. 411).....		3
Seminar in Chemistry (Chem. 511, 512).....	1	1
Physiological Chemistry (Chem. 409).....		3
Electives	6	3
	17	17

Electives may be taken in Chemistry, Physics, Botany, Zoology, Plant Physiology, Animal Physiology, Mathematics, Modern Language, Anatomy, Geology, etc.

Graduate Courses. The following courses may be taken by graduate students as major or minor electives with full credit: Chemistry 104, 302 to 316 inclusive, and 502 to 512 inclusive. The department reserves the right to require additional work in certain cases before credit for these courses be awarded toward an advanced degree.

The following courses are offered:

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.

Fee \$3.00. Deposit \$2.00. Text: Smith, General Chemistry for College (Revised.)

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. Elementary Household Chemistry. A continuation of 12.

Freshman year; second semester; 3 credits; 2 recitations; 2 laboratory periods of 2 hours each. Fee \$3.00. Deposit \$2.00.

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. Fee \$3.00. Deposit \$2.00. Text: Smith, General Chemistry for Colleges.

101. General Chemistry. Non-metallic and metallic elements 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

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.

periods. Fee \$3.00. Deposit \$2.00. Text same as for Chemistry 100.

102. **General Chemistry.** This course is especially arranged for the students of the School of Home Economics.

Freshman year; first semester; 2 recitations; 2 laboratory periods of two hours each. Fee \$3.00. Deposit \$2.00.

103. **General Chemistry.** A continuation of course 102.

Freshman year; second semester; 2 recitations; 2 laboratory periods of two hours each. 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.

105. **General Chemistry for Mining, Chemistry, Chemical Engineering, 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.

106. **General Chemistry.** 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. Fee \$5.00. Deposit \$2.00. Text: Baskerville and Curtman, Qualitative Analysis.

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. Fee \$4.00. Deposit \$2.00. Text: Cohen, Organic Chemistry.

200-a. **Elementary Organic Chemistry.** A course of lectures in Organic Chemistry for those desiring lectures alone and having no time for laboratory work. This course is designed primarily for

agricultural students, and should be taken before or with Agricultural Chemistry. It may be taken also by students of other departments who wish to extend their chemical studies in this direction.

Prerequisite: Chemistry 101 or 103. Elective; sophomore year; either semester; 2 credits; 2 lectures.

201. Organic Chemistry. Asphaltic compounds; hydrocarbons, alcohols, ethers, esters, aldehydes, acids, fats, ketones, amines, carbohydrates. Preparation and identification of typical and simple compounds.

Prerequisite: Chemistry 11 or 101. Course in Pharmacy; sophomore year; and Chemical Engineering; junior year; first semester; 3 credits; 2 recitations; 2 laboratory periods. Fee \$3.00. Deposit \$2.00. Text: Cohen, Organic Chemistry.

202. Organic Chemistry. Aromatic Compounds; cyclic hydrocarbons, nitro derivatives, amines, diazo compounds, phenols, dyes, proteins, alkaloids.

Prerequisite: Chemistry 201. Course in Pharmacy, sophomore year; and Chemical Engineering, junior year; second semester; 3 credits; 2 recitations; 2 laboratory periods. Fee \$3.00. Deposit \$2.00. Text: Cohen, Organic Chemistry.

203. Textile Chemistry. Consists of identification of the different materials used in the textile industries.

Junior year; second semester; 2 credits; 1 lecture; 2 laboratory periods of two hours each. **Prerequisite:** Chemistry 200. Fee \$2.00. 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. Fee \$3.00. Deposit \$2.00. Texts: Smith, Chemistry. Baskerville and Curtman, 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 three hours each. Fee \$5.00. Deposit \$2.00. Texts: Smith, Chemistry. Baskerville and Curtman, Qualitative Analysis.

301-a. Qualitative Analysis. A general course for all students desiring to complete this number during the first semester.

Prerequisite: Course 100. Three credits; 3 laboratory periods of three hours each. Fee \$3.00. Deposit \$2.00.

301-b. Qualitative Analysis. A continuation of 301-a consisting of investigation of the properties of the rarer metals.

Prerequisite: Course 100. Three credits; 1 lecture; 2 laboratory periods of three hours each. 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 three 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. Fee \$3.00. Deposit \$2.00.

305. Organic Synthesis. The synthesis of the more complex organic compounds of both the aliphatic and aromatic series, coupled with such reference work as may be to the advantage of the student. The class work in the course will be in the form of a seminar.

Prerequisites: General, qualitative, quantitative, and beginning organic chemistry. Elective for Agricultural Chemistry, Pharmacy, and other students having sufficient training. Senior year; first semester; 3 credits; one seminar and 2 three-hours laboratory periods. Fee \$3.00. Deposit \$2.00.

400. Quantitative Analysis. A course designed for students in Pharmacy, and consisting of instruction in both gravimetric and volumetric analysis of pharmaceutical products.

Prerequisite: Course 105. Sophomore year; first semester; 4 credits. Fee \$4.00. Deposit \$2.00.

400-a. Elementary Quantitative Analysis. A course designed for all students desiring to extend their chemical studies.

Prerequisite: Chemistry 300 or 301-a. Required of all Agricultural students; sophomore year; first semester; 3 credits; 1 lecture; 2 laboratory periods. Fee \$3.00. Deposit \$2.00.

400-b. **Elementary Quantitative Analysis.** A course along same lines but slightly extended.

Prerequisite: Chemistry 300 or 301 or 301-a. Required of Pharmacy students; sophomore year; first semester; 4 credits; 1 lecture; 3 laboratory periods of three hours each. Fee \$4.00. Deposit \$2.00.

400-c. **Elementary Quantitative Analysis.** Similar to 400-a and 400-b, but more extended.

Required of all Chemical and Mining Engineering students; sophomore year; first or second semester; 5 credits; 1 lecture; 4 laboratory periods of three hours each. Fee \$5.00. 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. Fee \$5.00. Deposit \$2.00. Text: Frank and Clemens.

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. 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. Fee \$2.00. Deposit \$2.00.

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 a week in laboratory. Fee \$3.00. Deposit \$2.00. Text: Thompson, Applied Electro-Chemistry. Laboratory Outline of Electro-Analysis.

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. Fee \$2.00. Deposit \$2.00.

409. **Physiological Chemistry.** Chemical study of the fats, carbohydrates, and proteins; discussion of enzyme action, digestion, absorption, and excretion; analysis of blood, gastric juice, and both normal and pathological urine; and demonstrations and assigned reading.

Prerequisites: General and organic chemistry. Pharmacy, Domestic Science, and Agricultural Chemistry; senior year; second semester; 3 credits; 2 lectures and 2 two-hours laboratory periods. Fee \$2.00. Deposit \$2.00.

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. Fee \$3.00. Deposit \$2.00. Text: Senter, Outlines of Physical Chemistry. Findlay, Practical Physical Chemistry.

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 a week in laboratory. Fee \$3.00. Deposit \$2.00. Texts: Otswold-Luther, Physico-Chemical Messungen. Findlay, Practical Physical Chemistry. Thomsen, Thermochemistry. Leblanc, Electro-chemistry. Senter, Outlines of Physical Chemistry.

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. Fee \$3.00. Deposit \$2.00. Text: Sidener, Quantitative Metallurgical Analysis.

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.

414. Chemical Technology. A continuation of course 413.

The course in Chemical Engineering; senior year; second semester; 2 credits. Text: Thorpe, Industrial Chemistry.

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 textbooks, 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. Illustrated with lantern slides.

Prerequisite: Chemistry 402. Elective; junior or senior year; second semester; 2 credits; 2 recitations. Fee \$2.00. Deposit \$2.00. Text: Vulte and Vanderbilt. Food Industries.

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. Fee \$1.00. Deposit \$2.00.

418. Elementary Glass Blowing and Repairing. A course in the elements of the art of welding, cutting, and grinding glass. For upper classmen only, especially for those who expect to become instructors in science in High Schools.

Junior or senior year; 1 credit; 1 laboratory period of three hours. Fee \$2.00. Each person procuring his own glass and files. Text: Woollatt, Laboratory Arts, or Frary, Glass Blowing.

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. Fee \$3.00. Deposit \$2.00. Text: Tartar and Dutcher, Lecture Notes on Chemistry in its Relation to Agriculture.

501. Agricultural Chemistry. A continuation of course 500.

The course in Agriculture; sophomore year; second semester; 3 credits; 2 recitations; 2 laboratory periods of two 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. Fee \$3.00. Deposit \$2.00. Text: Bulletin 107, U. S. Bureau of Chemistry. Lincoln and Walton, Quantitative Chemical Analysis. Assigned reading.

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 special 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; properties, 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.

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.

512. Seminar. A continuation of course 511.

Second semester; 1 credit.

Before taking up the subject of chemistry, students are advised to review thoroughly the elementary principles of physics, especially those related to the mechanics of gases, liquids, and solids with reference to their densities, specific gravities, solubilities, rates of diffusion, etc. Excellent summations are given in Black and Davis' Practical Physics, of which a two-weeks review is given before entering upon any of the elementary courses in Chemistry. This review will consist of lectures and demonstrations, and assignments of problems.

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. Fee \$3.00. Deposit \$2.00. Text: McPherson and Henderson, Elementary Chemistry.

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.

ENGLISH LANGUAGE AND LITERATURE

FREDERICK BERCHTOLD, Professor
IDA BURNETT CALLAHAN, Associate Professor
SIGURD HARLAN PETERSON, Assistant Professor
LOREN BURTON BALDWIN, Instructor
GERTRUDE EWING McELFRESH, Instructor
GRACE CHRISTINE ROSAEN, Instructor
CHARLES JARVIS McINTOSH, 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.

The following courses are offered:

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 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 the student writes in other departments.

Prerequisite: Three years of English in an accredited high school. Courses in Home Economics and Industrial Arts; freshman year; first semester; 3 credits; 3 recitations. Text: Boynton, Principles of Composition.

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, and 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. Courses in Home Economics and Industrial Arts; freshman year; second semester; 3 credits; 3 recitations. Text: Boynton, Principles of Composition.

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 structure and technique of the drama as a distinct literary type. A survey of the rise and development of the tragedy, the comedy, and the historical play. Study of setting, plot, and character as they are employed in the drama. Reading of plays in class; collateral readings; reports on assigned topics.

Prerequisite: Eng. 31, 32. Courses in Home Economics; sophomore year; second semester; 3 credits; 3 recitations. Text: Woodbridge, *The Drama: Its Laws and Technique*.

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. Field of study: English literature from its beginning to the end of the eighteenth century.

Elective in all courses; first semester; 3 credits; 3 recitations. Text: Crawshaw, *The Making of English Literature*.

62. **The History of English Literature.** A continuation of course 61. A study of the master minds of the nineteenth century. Lectures, readings, and discussions; critical reports on assigned topics required from all the students.

Elective in all courses; second semester; 3 credits; 3 recitations. Text: Crawshaw, *The Making of English Literature*.

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. Text: Wendell and Greenough, *History of Literature in America*.

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 and Greenough, *History 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, Mechanical Engineering, Highway Engineering, Irrigation Engineering, Commerce, Industrial Arts, and Pharmacy. Freshman year; first semester; 3 credits; 3 recitations. Texts: Lomer and Ashmun, *The Study and Practice of Writing English*. *The Independent*; *The Outlook*; *The Literary Digest*. Woolley, *Handbook of Composition*.

85. Modern English Prose. A course designed for students in Forestry and Logging Engineering. It includes composition and letter writing; practice in reporting lectures, exercises in the elaboration of field notes, drills looking to the popularization of technical matters, practice in oral delivery and parliamentary procedure, and exercises in elementary Business English with particular application to Forestry and Logging Engineering.

Freshman year; first semester; 2 credits; 1 recitation; 1 laboratory period. Text: Lomer and Ashmun, *The Study and Practice of Writing English*. Collateral reading: *American Forestry*.

86. Modern English Prose. A continuation of English 85.

Prerequisite: Eng. 85. Freshman year; second semester; 2 credits; 1 recitation; 1 laboratory period. Text: Lomer and Ash-

mun, The Study and Practice of Writing English. Collateral reading: American Forestry.

91. **Modern English Prose.** The frame work of this course is the same as that employed in English 81. In its details, however, constant reference is had to the particular needs of the student in Mining Engineering.

Freshman year; first semester; 2 credits; 2 recitations. Text: Lomer and Ashmun, The Study and Practice of Writing English. Supplement: The Electrical and Mining Engineering Journal.

92. **Modern English Prose.** A continuation of course 91.

Prerequisite: Eng. 91. The course in Mining Engineering; 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, his Dean, or major professor, will require him 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. This course carries no credits.

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; 3 credits; 3 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 expository 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.

Prerequisite: 6 credits of college English. The courses in Engineering, Soils, and Farm Management; elective in all other courses; junior or senior year; second semester; 2 credits; 2 recitations. Text: Earle, *Theory and Practice of Technical English*.

142. **Technical Business English.** The preparation of the manuscript and copy for the printer. The study of and extensive

practice in proof-reading. The study of the advertising circular, students being required to plan and complete circulars for various advertising purposes. Practice of writing informal trade agreements, specifications, and other business forms.

Prerequisite: Eng. 143 or its equivalent. The course in Commerce; freshman year; second semester; 3 credits; 3 recitations.

143. **Advanced Commercial Correspondence.** Review of the essentials of correct and effective English: clearness, interest, proper punctuation, grammatical correctness, effective diction. The business letter in detail, special attention being given to letters of application, letters of inquiry and information, circular letters, letters of complaint, sales letters, follow-up letters, and collection letters. Study of postal regulations.

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, affectation, 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. Required as a condition of eligibility for leading positions on student publication staffs.

Elective in all courses; junior year; both semesters; 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; both semesters; 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 in all courses; second semester; 2 credits, 2 recitations.

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-books course in English Composition, used in the high schools of Oregon.

Prerequisite: Course J or its equivalent. The vocational course; first semester; 3 credits; 3 recitations. Text: Long, English Literature.

F. Junior Secondary English. 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.

Prerequisite: Eng. E. or its equivalent. The vocational course; second semester; 3 credits; 3 recitations. Courses in Home Economics and Industrial Arts; freshman year; first semester; 3 credits; 3 recitations. Text: Canby et al, Composition in Theory and Practice.

G. Vocational English. Review of English Grammar. The purpose of the work in English Grammar, as prescribed in Course G 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 course; first year; first semester; 3 credits; 3 recitations. Text: Baskervill and 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 objects. Narrative writing. Oral composition will treat current events and subjects listed for written composition.

Prerequisite: Eng. G. Vocational course; first year; second semester; 3 credits; 3 recitations. Text: Huntington, *Elements of English Composition*. 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 etymology 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. I. Vocational course; second year; first semester; 3 credits 3 recitations. Text: Webster, *English for Secondary Schools*. 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*.

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 exper-

iences. Letter writing. Oral composition involving conversations on problems in business and actual life.

Prerequisite: Eng. I. Vocational course; second year; second semester; 3 credits; 3 recitations. Text: Gardiner, Kittredge and Arnold, Manual of Composition and Rhetoric. Books for reading: Kaufman, The Efficient Age. MacLean, Wage Earning Women.

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. Text: Lewis, Business English.

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 textbooks 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:

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 and 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: Hazen, *Europe Since 1815*.

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: Green, 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: Bassett, 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 percent 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 comprises 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.

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.

INDUSTRIAL EDUCATION

EDWIN DEVORE RESSLER, Professor
HELEN BRYCE BROOKS, Professor of Domestic Art
AVA BERTHA MILAM, Professor of Domestic Science
FRANK HENRY SHEPHERD, Assistant Professor
HERBERT TOWNSEND VANCE, Assistant Professor of Stenography and Office Training.
JESSE FRANKLIN BRUMBAUGH, 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. 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 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. The 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 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 are offered:

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; either 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 educa-

tion in Europe and America, and its place in the social and political life of the country.

Sophomore or junior year; either 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.

Elective 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; either 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.

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 students majoring in Agriculture for teachers. Junior year, second semester; or senior year, first semester; 2 credits; 2 recitations.

154. Special Method in Agriculture. Continuation of course 152.

Prerequisites: Ind. Ed. 101, 132, 152. Required of seniors majoring in Agriculture for teachers; senior year; either semester; 3 credits; 1 recitation; practice teaching.

164. Special Method in Domestic Art. Same as course 152, applied to the public school course in Domestic Art.

Prerequisites: Ind. Ed. 101, 132. Required of students preparing to teach Domestic Art. Junior year, second semester; or senior year, first semester; 2 credits; 2 recitations; 1 laboratory period. Fee \$0.50.

165. Special Method in Domestic Science. Same as course 152, applied to public school course in Domestic Science.

Prerequisites: Ind. Ed. 101, 132. Required of students preparing to teach Domestic Science; junior year, second semester; or senior year, first semester; 2 credits; 2 recitations; 1 laboratory period. Fee \$1.50.

166. Special Method in Domestic Art. Continuation of course 164.

Prerequisites: Ind. Ed. 101, 132, 164. Required of students preparing to teach Domestic Art; senior year; either semester; 3 credits; 2 recitations; practice teaching. Fee \$0.50.

167. Special Method in Domestic Science. Continuation of course 165.

Prerequisites: Ind. Ed. 101, 132, 165. Required of students preparing to teach Domestic Science; senior year; either semester; 3 credits; 2 recitations; practice teaching. 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.

174. Special Method in Manual Training. Continuation of course 172.

Prerequisites: Ind. Ed. 101, 132, 172. Industrial Arts; senior year; first or second semester; 3 credits; 1 recitation; practice teaching.

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; either 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: Com. 102, 402, 412; Ind. Ed. 101, 132. Required of students preparing to teach Commercial branches; senior year; first semester; 2 credits; 2 recitations.

182. Special Method in Commerce. Continuation of course 180.

Prerequisites: Com. 102, 402, 412; Ind. Ed. 101, 132, 180. Senior year; second semester; 3 credits; 1 recitation; practice teaching.

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.

Prerequisites: Ind. Ed. 101, 132. 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.

Prerequisites: Ind. Ed. 101, 132. 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.

Prerequisites: Ind. Ed. 101, 102, 132. Elective for advanced or graduate students; second semester; 2 credits; 2 recitations.

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.

Prerequisites: Ind. Ed. 101, 132. 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, Assistant Librarian
LILLIAN MABEL GEORGE, In charge Continuations Dept.
BERTHA HERSE, In charge Circulation Dept.
LILA GRACE DOBELL, Assistant
BLANCHE MARIE CLAUSMEYER, Assistant
ETHEL ALLEN, 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 six 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 30,000 volumes of standard work 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 50,000 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 departments 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; $\frac{1}{2}$ 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

The following courses are offered:

8. **Commercial Mathematics.** 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; first three-fifths first semester; 3 credits; 5 recitations. Text: Wentworth and Smith, Plane Trigonometry.

12. **Plane Trigonometry.** The course in Industrial Arts, second semester; 3 credits; 4 recitations. Text: Wentworth and Smith, Plane Trigonometry.

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. Text: Wentworth and Smith, Plane Trigonometry.

15. **Spherical Trigonometry.** The courses in Highway and Irrigation Engineering; freshman year; first semester; one credit;

one recitation. Text: Wentworth and Smith, Spherical Trigonometry.

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; last two-fifths of first semester; 2 credits; 5 recitations. Text: Hawkes, 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, and Touton, Second Course in Algebra.

25. Practical Agricultural Mathematics. A course on the essentials of Advanced Arithmetic and Trigonometry. The Arithmetic includes a thorough drill in both common and decimal fractions; proportion; percentage, embracing interest, partial payments, discount, etc.; mensuration, including problems necessary for an agriculturist. The Trigonometry includes use and application of logarithms, the solving of problems in both right and oblique triangles, finding angles, distances, areas, etc.

The course in Agriculture; freshman year; either semester; 3 credits; 3 recitations.

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 and 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 Maclaurin'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. Elective for juniors and seniors in other courses; 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. Elective for juniors and seniors in other courses; 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.

A. **Algebra.** The work of the course includes a drill in the fundamental operations, use of parentheses, special rules of multi-

plication 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, and 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, and 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, and 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 and 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 and 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 and 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; $1\frac{1}{2}$ credits; 2 recitations.
Text: Wentworth and Smith, Plane Geometry.

H. Plane Geometry. A continuation of course G.

Freshman year; second semester; $1\frac{1}{2}$ credits; 2 recitations.
Text: Wentworth and Smith, Plane Geometry.

K. Plane Geometry. A continuation of course D, covering the last three books of Plane Geometry. Many original exercises are 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 and 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 and 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 and Swartzel, Farm Arithmetic.

T. Geometry and Trigonometry.

The course in Mechanic Arts; third year; first semester; 4 credits; 5 recitations.

RESERVE OFFICERS' TRAINING CORPS

Since the College catalogue has been issued, the President of the College has been officially notified by the Adjutant General of the United States War Department, Washington, D. C., that the provisions of General Order 49 of the War Department, providing for the establishment of Reserve Officers' Training Corps at the land-grant colleges, are now in operation at the Oregon State Agricultural College. The essential provisions of this order may be summarized as follows:

1. **Object.** The primary object of the Reserve Officers' Training Corps is to qualify students by systematic and standard training methods for reserve officers, so that in time of national emergency men graduating from the College will be able to lead intelligently the units of large armies upon which the safety of the country will depend.

2. **Eligibility.** All physically fit students of the College are eligible to membership.

3. **Basic Course.** The basic course, which comprises the first two years of military instruction at the College, is for all underclassmen—vocationals, freshmen, or sophomores. Men taking this course do not bind themselves by any obligations not already required of them as College students. All members of the basic course are furnished, free of cost, by the Government, a complete military uniform, which includes the following articles, all of the regular-army quality of material: 1 pair breeches, 1 cap, 1 coat, 1 pair leggins, 1 set cap and collar ornaments, 1 pair russet shoes.

4. **Advanced Course.** The advanced course is for those students who have had at least two years of military training. Men

joining this course bind themselves to devote five hours a week to military training during the remainder of their stay in College, and to attend training camps for a period of not more than six weeks at the end of each college year. Four of the five hours required of students in the advanced course will be the regulation military work; the fifth hour required will, it is expected, be satisfied by various technical courses of military value which may be pursued by the student in his regular collegiate course. Cadets in the advanced course are allowed by the Government, in addition to the complete military uniform, a monetary allowance for subsistence at the rate of 30 cents a day or \$9 a month, and transportation to and from training camps, with all necessary expenses while at the training camp. Members of the advanced course are furnished the following additional equipment allowances: 1 service hat and cord, 2 pairs cotton breeches, 2 flannel shirts. The monetary allowance for subsistence will be paid quarterly.

5. **Monetary Value of Reserve Officers' Training Corps Perquisites.** The War Department has not yet definitely advised whether the allowance for subsistence will be for nine, ten, or eleven months. On the basis of subsistence allowance being for eleven months, the amount received by the student for this purpose would be approximately \$100 a year. The clothing supplied free by the Government should meet the needs of the student for the entire year for practical school purposes. On the basis of retail prices, the value of the clothing furnished the student by the Government would no doubt represent a value of upwards of \$25 a year. Membership in the basic division of the Reserve Officers' Training Corps represents, therefore, a consideration of at least \$25 a year to each student; while membership in the advanced division represents a consideration of from \$125 to \$150 a year to each student.

MILITARY SCIENCE AND TACTICS

VERNON A. CALDWELL, Lieutenant-Colonel, Infantry, U. S. Army,
Commandant, Professor of Military Science and Tactics.
RONALD DEVORE JOHNSON, First Lieutenant, Cavalry, U. S. Army,
Assistant Commandant, Assistant Professor of Military Science and
Tactics.
CYRUS FRANKLIN DUGGER, Post Commissary Sergeant, U. S. Army,
Retired, Assistant Commandant, Post Adjutant.
DENIS HAYES, Regimental Sergeant Major, U. S. Army, Retired,
Assistant Commandant, Post Quartermaster.

The General Government founded Agricultural and Mechanical Colleges to meet the conditions of both peace and war. The education of the citizen, indeed, to be complete, requires him to be trained for both peace and war. In putting this into practice the General Government has acted on the theory that a college training is a military asset, that college men are training themselves for leadership, and that the training at Agricultural and Mechanical Colleges coordinates closely with military training. The cadet is taught that military training is both mental and physical. That mental military training is: first, to determine the objective; second, to analyze, organize, and systematize action by putting in practice the Five General Tactical Principles that state what lines of action must be followed in gaining any objective, either in peace or war; third, to study and think out the methods — technical or otherwise — that best put into practice the lines of action laid down in the Five General Principles. The mental habits thus formed are as necessary in peace as in war and in this way military training coordinates with and is helpful to the training in other courses. Discipline is based on control; control is based on training; training is based on team work. The cadet is taught that acts of authority as well as acts of obedience are acts to promote team work. This impersonal teaching is of utmost value to the cadet, teaching him that authority has no arrogance and that obedience is not servility. The greater part of the cadets' life will be passed in obeying, or commanding, so this training is for every-day use. The cadet is taught that a poor physical appearance comes from, or is caused by, a poorly or improperly developed physique. Military service has always required a good all-round physique and so from the first military training has been designed to develop and better the physical condition.

The objective of the military course is to train the cadet to be able to perform the duties of an officer in enlisting, feeding, equipping, caring for, drilling, and training a company. His ability as a tactical instructor is the most important factor.

The College, conforming to the spirit of law, has provided an efficient system of military instruction for training cadets to become officers. 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 officers for citizen soldiers. The object of the law, therefore, was to provide well-trained officers for citizen soldiers.

The military body of this College consists of one regiment of infantry, a hospital corps, signal corps detachment, and a band of fifty instruments. The drill training and administration are about the same as for officers in the Regular Army.

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, 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, or the U. S. Government.

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, 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; Sergeants from seniors or juniors, or cadets having two or more years drill; Corporal from juniors or sophomores, or cadets having had one or more years drill. All appointments and promotions of commissioned officers 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.

Paragraph 24, General Orders No. 70, War Department, November 18, 1913, directs that, "Upon occasions of Military Ceremony, 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 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, (students enrolling in the Reserve Officers' Training Corps are uniformed free by the Government), 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, a pair of canvas puttee leggings of the new design, a pair of olive-drab gloves, a pair of tan shoes, 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.

THEORETICAL INSTRUCTION

Military Science 1. Junior year; first semester; 1 credit; 1 hour a week, lecture or quiz and tactical problem.

Military Science 2. Junior year; second semester; 1 credit; 1 hour a week, lecture or quiz and tactical problem.

Military Science 3. Elective; senior year; first semester; 1 credit; 1 hour a week on duties pertaining to their office or on tactical problem work.

Military Science 4. Elective; senior year; second semester; 1 credit; 1 hour a week on duties pertaining to their office or on tactical problem work.

The course of training given below is the minimum course for all cadets of the Oregon Agricultural College, except those specializing in some military study or those not physically qualified. It is the Reserve Officers Training Course. Joining the Reserve Officers' Training Corps is optional.

In joining this corps freshmen and sophomores bind themselves to nothing, except proficiency in their year of the course. They are issued, for their military use at the expense of the United States, a complete uniform for which they are responsible.

Juniors and seniors to enter this corps for their years must have completed two academic years of service in this course, (the U. S. has credited this college for the college years 1914-15, and 1915-16, as having been substantially equivalent to the basic course for the Reserve Officers' Training Corps) and have been selected for further training by the President of the institution and by its Professor of military science and tactics, and who have agreed in writing to continue in this corps for the remainder of their course at the institution and to pursue the course in camp training of two summer camps of not over six weeks each as prescribed by the Secretary of War. Cadets so selected and appointed may be furnished by the Government with commutation of rations (about \$10.00 per month) during the remainder of their service in this

corps. For the prescribed summer camps transportation to and from, rations and all necessary expenses are furnished by the U. S. Government free to the cadet. Before being appointed an officer in the Reserve Corps at least one camp must be attended.

COURSE OF TRAINING FOR INFANTRY UNITS OF THE SENIOR DIVISION

Freshmen, Military Art 1 and 2; Sophomores, Military Art 3 and 4; Juniors, Military Art 5 and 6; Seniors, Military Art 7 and 8.

1. Military art.

Three hours a week (counting 14 units).

(a) Practical. Weight 10.

Physical drill (Manual of Physical Training — Koehler); Infantry drill (U. S. Infantry Drill Regulations), to include the School of the Soldier, Squad and Company, close and extended order. Preliminary instruction sighting position and aiming drills, gallery practice, nomenclature and care of rifle and equipment.

(b) Theoretical. Weight 4.

Theory of target practice, individual and collective (use of landscape targets made up by U. S. Military Disciplinary Barracks, Fort Leavenworth, Kans.); military organization (Tables of Organization); map reading; service of security; personal hygiene.

2. Military art.

Three hours a week (counting 14 units).

(a) Practical. Weight 10.

Physical drill (Manual of Physical Training — Koehler); Infantry drill (U. S. Infantry Drill Regulations), to include School of Battalion, special attention devoted to fire direction and control; ceremonies; manuals (Part V, Infantry Drill Regulations); bayonet combat; intrenchments (584-595, Infantry Drill Regulations); first-aid instruction; range and gallery practice.

(b) Theoretical. Weight 4.

Lectures, general military policy as shown by military history of United States and military obligations of citizenship; service of information; combat (to be illustrated by small tactical exercises); United States Infantry Drill Regulations, to include School of Company; camp sanitation for small commands.

6. Military art.

Five hours a week (counting 24 units).

(a) Practical. Weight 13.

Same as (a) course 5. Military sketching.

(b) Theoretical. Weight 11.

Minor tactics (continued); map maneuvers. Weight 8.

Elements of international law. Weight 2.

Property accountability; method of obtaining supplies and equipment (Army Regulations). Weight 1.

7. Military art.

Five hours a week (counting 24 units).

(a) Practical. Weight 13.

Duties consistent with rank as cadet officers or noncommissioned officers in connection with the practical work and exercises scheduled for the unit or units. Military sketching.

(b) Theoretical. Weight 11.

Tactical problems, small forces, all arms combined; map maneuvers; court-martial proceedings (Manual for Courts-martial).

International relations of America from discovery to present day; gradual growth of principles of international law embodied in American diplomacy, legislation, and treaties.

Lectures: Psychology of war and kindred subjects.

General principles of strategy only, planned to show the intimate relationship between the statesman and the soldier (not to exceed 5 lectures).

8. Military art.

Five hours a week (counting 24 units).

(a) Practical. Weight 13.

Same as course 7 (a).

(b) Theoretical. Weight 11.

Tactical problems (continued); map maneuvers. (Rifle in war.

Lectures on military history and policy.

MODERN LANGUAGES

LOUIS BACH, Professor
MELISSA MARGARET MARTIN, Instructor
CARL HENNINGER, 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 bring 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.

All the courses offered may be taken up at the beginning of either semester.

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.

Prerequisite: 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 FOR MEN

ALFRED DAVID BROWNE, Director, Professor of Physical Education
JOSEPH AMOS PIPAL, Professor
JAMES GEORGE ARBUTHNOT, Assistant Professor
THOMAS EVERETT MAY, Instructor

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 purpose of this department is:

- (a) To maintain and improve the health of the student.
- (b) To maintain and develop the physical efficiency of the student.
- (c) To provide wholesome physical recreation.
- (d) To develop social and ethical values.

These four aims involve five main lines of activity; namely, (1) Individual Instruction, (2) Intercollegiate Athletics, (3) Intramural Athletics, (4) Gymnasium Classes, and (5) Teachers' Course in Physical Training.

Individual Instruction. This is given in the form of advice based upon the health examination of the student. Health examinations are given during the freshman and sophomore years. The examinations are utilized for the purpose of finding defects whose proper treatment may add to the health efficiency of the student. Advice given at this time is recorded and when a student reports for conference the advice on file is followed up. Students found with remedial physical defects are given special work of such a nature as the condition demands.

Physical Training. All students may elect any one of the three divisions in physical training.

Intercollegiate Athletics. All intercollegiate athletic contests are under the jurisdiction of the Board of Control composed of three members of the faculty, four members of the student body, and one alumnus. The department is responsible to the Board of Control for conducting varsity athletics. Representative teams are organized for baseball, basketball, cross-country running, football, soccer, tennis, track, and wrestling. Participation during the whole season of sport is accepted for one semester credit in physical training.

Intramural Athletics. The division of Intramural Athletics is supervised by a council consisting of the Director of Physical

Education, Colonel of the Cadet Regiments, President of the Student Body, Editor of the Student Barometer, and a representative elected by each group of the Fraternities, Clubs, and Independents.

The department has organized this division so that every student who is physically fit to take part in athletic contests has the opportunity to participate in competitive scheduled sports. "Every O. A. C. man an athlete" is the slogan of the College.

For credit, attendance of two hours each week is required of all freshmen and sophomores who elect this subject. This division includes: fall sports; football, soccer, cross country running, field events, swimming, tennis, fall baseball; winter sports; basketball, track and field events, wrestling, boxing, hand ball, volley ball, swimming, and advanced gymnastics; spring sports; baseball, track and field events, tennis, swimming, and cross country running.

Gymnasium Classes. Individual and class instruction. Students who are unfit (determined by examination and tests) for work in the intercollegiate or intramural divisions, are assigned to the gymnasium classes, in which the students are given work for correcting defects, and for developing physical efficiency and muscular power.

Attendance of two hours each week is required of all freshmen and sophomores assigned to this division.

Teachers' Course in Physical Training. 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.

A special Teacher's Course in Physical Training is therefore offered as a minor in this department. The course is designed for those students who are looking forward to positions as teachers of physical training or as coaches of athletic teams.

The subjects treated are:

Physical Diagnosis.

Organization and Administration, and Physical Department Methods.

Aid to the Injured.

School Hygiene and Sanitation.

Program of Class Room, Gymnasium and Playground Exercise and games.

Methods of teaching: Football, Baseball, Track, Basketball, Wrestling and Advanced Gymnastics.

Equipment. The new Men's Gymnasium, two units of which have been completed, is equipped with all modern gymnastic apparatus and facilities for properly carrying on the work of physical education and recreation. The main floor, 90x150 feet in dimensions, furnishes ample space for the most efficient type of gymnasium and indoor athletic work.

Features of the new gymnasium are: the large floor space providing for three regulation basketball courts, the large lobby for receptions, locker rooms and lockers to accommodate the men students, and shower bath and dressing rooms, rooms for accommodating the varsity and varsity teams. The new east wing provides an auxiliary gymnasium for apparatus work, three hand ball courts, two wrestling and boxing rooms, and one large room for volley ball.

The O. A. C. field for athletics comprises a new quarter-mile track, varsity football field with bleachers for seating eight thousand spectators, one varsity baseball field, and six football, soccer, and baseball fields for intramural athletics.

Four tennis courts are now being constructed and will be completed this spring.

The Armory, one of the largest of its kind in the United States, provides fine facilities for winter training during inclement weather in football, track, baseball, and various other sports. An indoor clay track, banked at the turns, which is but eight laps to the mile, and the extension clay floor space and high dome roof furnish facilities for conducting large winter track and field meets.

The swimming pool in the Y. M. C. A. building is under the direction of the department and is supervised by an instructor.

The Treasurer's receipt for the \$1.50 physical-training fee entitles the holder to registration for full privileges of the department including: health examination, strength tests, locker, use of shower rooms, towels and soap, athletic fields, gymnasium, etc.

COURSES IN PHYSICAL EDUCATION FOR MEN

The following courses are offered:

11. First year Vocational, physical training; first semester; 2 periods; $\frac{1}{2}$ credit.
12. First year Vocational, physical training; second semester; 2 periods; $\frac{1}{2}$ credit.
13. Second year Vocational, physical training; first semester; 2 periods; $\frac{1}{2}$ credit.

14. Second year Vocational, physical training, second semester; 2 periods; $\frac{1}{2}$ credit.
15. Freshman year; physical training; first semester; 2 periods; $\frac{1}{2}$ credit.
16. Freshman year, physical training; second semester; 2 periods; $\frac{1}{2}$ credit.
17. Sophomore year, physical training; first semester; 2 periods; $\frac{1}{2}$ credit.
18. Sophomore year, physical training; second semester; 2 periods; $\frac{1}{2}$ credit.
19. Hygiene. This course consists of a series of lectures on personal and impersonal hygiene, sources and modes of infectious diseases, immunity, industrial and occupational diseases, etc.; $\frac{1}{2}$ credit.
21. First semester, Teachers' Course in Physical Training; 1 credit.
22. Second semester, Teachers' Course in Physical Training; 1 credit.
23. First semester, First aid to the injured — Red Cross certificate; 2 periods.
24. Second semester, First aid to the injured — Red Cross certificate; 2 periods.

PHYSICAL EDUCATION FOR WOMEN

MIRIAM THAYER-SEELEY, Professor of Physical Education
for Women.

CHARLOTTE LEWIS NELSON, Instructor

IRENE TELFORD, Instructor

LAURA CAMPBELL, 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 and personal hygiene and cooperate with the resident physician in all cases.

Requirements. Work in physical education is required of all women four periods a week in all full-years, special, optional, music and vocational courses, regardless of the student's course or classification. One credit a semester is granted for this work. For juniors and seniors who have completed courses 5, 6, 7, and 8, (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 \$3.50. 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 and has 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 out-door basketball, field hockey, soccer, tennis, baseball, and cross-ball.

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.

COURSES IN PHYSICAL EDUCATION FOR WOMEN

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 Physical Education is divided as follows:

Two periods a week in practical gymnastics, plus 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. 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.

Required of all students who have need of remedial work.

10. Hygiene.

Required of all freshmen. One lecture a week; $\frac{1}{2}$ credit.

B. Elective Courses.

I. Practice

Credit in these elective courses is given according to the number of periods taken each week, $\frac{1}{4}$ 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.

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. (School hygiene is included in this course.)

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.

45. **History of Physical Education.** This is planned for students specializing in Physical Education and is supplementary to the History of Education.

1 credit; 1 semester.

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.

57, 58. **Massage and Medical Gymnastics.** Practical work in Corrective Clinic.

Prerequisites: Courses 47 and 48. Three periods a week; 1 credit each semester; 57 first semester, 58 second semester.

49, 50. **Physical Examination and Prescription of Exercises.** Open to students specializing in Physical Education. (Personal and Sex Hygiene are included in this course.)

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; 53 first semester, 54 second semester.

61, 62. **Special Methods in Physical Education.** Lectures, recitations, and advanced teaching.

Prerequisites: Courses 41, 42, 51, 52. Two periods a week; 2 credits each semester; 61 first semester, 62 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 as a minor, 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), Basketry, 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), Archery, 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, in 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:

1. **General Physics.** A course in general physics, descriptive rather than mathematical in character, covering the subjects of mechanics and heat.

Prerequisite: 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. Fee \$2.00. Text: Anderson, Physics, Vol. I.

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. Fee \$2.00. Text: Anderson, Physics, Vol. II.

101. **Engineering Physics.** A course in mechanics and heat.

Prerequisite: Trigonometry. The course in Highway Engineering, Logging Engineering, Mechanical Engineering, and Mining Engineering; sophomore year; first semester; 4 credits; 2 lectures; 2 recitations; 1 laboratory period. Fee \$2.00. Text: Reed and Guthe, Physics.

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. Fee \$2.00. Text: Reed and Guthe, Physics.

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; 1 recitation; 1 three-hours laboratory period. Fee \$2.00.

133. **Household Physics.** A brief descriptive course with such applications as are of greatest interest to students in Home Economics extending over subjects of mechanics and heat.

The course in Home Economics; sophomore year; first semester;

2 credits; 1 lecture; 1 recitation; 1 laboratory period. Fee \$2.00.
Text: Lynde, Household Physics.

134. Household Physics. A continuation of course 133 and extending over subjects of electricity, light and sound.

The course in Home Economics; sophomore year; second semester; 2 credits; 1 lecture; 1 recitation; 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-hours 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.

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.

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.

During the session, a two-weeks course in Agriculture and Home Economics is given for boys and girls of the upper grammar grades and high school. Most of those attending are winners of local, county, or state prizes in the School Industrial Club contests. A limited number of boys and girls not prize winners is also admitted. A special bulletin gives particulars.

A large faculty, chiefly regular College instructors, supplemented by a number of specialists from other institutions and from other states, the extensive equipment in class rooms, laboratories, libraries, shops, and experimental fields, are at the service of the students.

RAILROAD RATES

To those attending the summer school, the transportation 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 about three hundred students with board and lodging. A charge of six 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 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 four and one-half dollars a 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 \$33.00 for board and room, \$5.00 registration fee, and \$1.00 for drayage on baggage, \$11.00 for laundry and incidentals, the minimum cost for the entire six weeks need not exceed \$50.00, exclusive of railroad fare. Those who take courses requiring textbooks and laboratory fees must make some additional allowance.

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, gymnasium, and other recreational 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, dairy-men, mechanics, or of women in the home.

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 5 to April 12.

Special short courses on particular subjects may be announced from time to time. 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.

Business Law. The course in Business 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 of 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, manifold, 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.

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 a 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.

The courses outlined below are essentially those that are usually sought by patrons of the Short Course. Some variation, to meet the special needs of each session or to conform to the teaching program of the School of Home Economics, will doubtless be advisable. Consult the special circular and program of courses issued each year for the Winter Short Course.

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.

Household 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 the 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 choosing 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) 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 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 State Agricultural College, organized in 1908 under the present management by authorization of the Board of Regents, in response to insistent demand therefor from the student body.

The School of Music serves the State as efficiently as possible at no greater expense to students than is necessary, rates of tuition being no greater than in other similar standard colleges and universities.

The studious atmosphere, wholesome discipline, adequate modern musical equipment, and attractive environment of Oregon State Agricultural College are favorable alike to those just beginning music study and to advanced students, all of whom may enter at any time and advance to graduation as rapidly as consistent with creditable scholarship.

The time required for completion of the various courses offered is somewhat dependent upon the age, temperament, talent, ability, and character of work of each student.

The members of the faculty are accomplished performers. As instructors they are skilled in the psychology, and experienced in the practice of teaching. In undertaking these courses students may confidently anticipate maximum gain in musical efficiency at minimum expenditure of time and money.

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 Buritt, New York; Karlton Hackett, Chicago; William Frederic Gaskins, Chicago; John Dennis Mehan, New York.

THE SCHOOL OF MUSIC

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**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; Victor Garwood, American
Conservatory, Chicago; Oliver Willard Pierce, Indianapolis.

GUSTAV DUNKELBERGER, Mus. Bach.

Instructor.

Graduate of Bethel College Conservatory; Graduate student of
American Conservatory, Chicago; student of Heniot Levy,
Arthur Oluf Anderson, Adolph Weidig, Chicago.

**DEPARTMENT OF ORGAN
GENEVIEVE BAUM-GASKINS**

Instructor.

Student of Wilhelm Middleschulte, Chicago.

DEPARTMENT OF STRING INSTRUMENTS

ANDREAS GOETTEL

Instructor.

Student of Albert Kuenzlein, Conrad Becker, and William Berwald,
of Syracuse University Conservatory, New York

DEPARTMENT OF THEORY

WILLIAM FREDERIC GASKINS, Mus. Bach.

Theory of Music. History of Music.

GUSTAV DUNKELBERGER, CORINNE BLOUNT *

Harmony, Counterpoint, Harmonic Analysis, Composition

ANDREAS GOETTEL

Orchestration.

DEPARTMENT OF BAND INSTRUMENTS

HARRY LYNDEN BEARD

Student of Herbert L. Clarke of Sousa's Band.

Instructor in Theory and Art of Playing Band Instruments.

Band Conducting.

* On leave of absence while continuing advanced study in Leschetizky
methods of pianoforte playing with Oliver Willard Pierce, Indianapolis.

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 hour daily; harmony, courses 10 and 11; 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 and performance at recitals and rehearsals required, unless otherwise instructed by the Director.

Required: Two lessons a week in voice; practice with instrument one or two hours daily; harmony, courses 12 and 13; two hours a week each; German, Italian, or French; physical education.

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 and performance 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 harmony, courses 14, 15, and 16; 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. Orchestration, course 18. 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. Easy studies by Bertini, Duvernoy, Loeschhorn, and others. Selections from easier works of Clementi, Haydn, Beethoven, and other easy appropriate compositions.

Required: Two lessons a week in piano; practice with instrument, one to three hours daily.

6. Piano. Scales and arpeggios. Exercises for endurance, speed, accent, and rhythm. Etudes from Czerny, Cramer, Moszkowski, and others. Easy sonatas of Haydn, Mozart, and Beethoven. Easy compositions of Mendelssohn, Schubert, Schumann, Grieg, and others.

Required: Two lessons a week in piano; two lessons a week in harmony, course 10; two lessons a week in music history for thirty-six weeks; practice with instrument, two to four hours daily. Physical education.

Prerequisite: Course 5 or its equivalent.

7. Piano. Scales in various forms and technical exercises adapted to the particular needs of the student. Etudes of Czerny, Cramer, Ruthardt, and others. Suites and inventions by Bach. Mozart, Beethoven, and Weber sonatas of moderate difficulty. More difficult selections from Mendelssohn, Schumann, Chopin, Liszt, and others. Transposition of easy hymns, sight reading, and memory training.

Required: Two lessons a week in piano; two lessons a week in harmony, course 11; two lessons a week in ear-training, course

13; practice with instrument, three to five hours daily. German or French. Physical education.

Prerequisite: Course 6 or its equivalent.

To complete this course satisfactorily the student must fulfill the requirements above outlined and perform in public when requested by the instructor and approved by the Director.

8. Piano. Exercises based on the technical difficulties in compositions studied in this course. A limited number of etudes by Rubinstein, Henselt, Harberbier, and others. Well-tempered clavier. The more difficult sonatas of Beethoven and solos by Mendelssohn, Chopin, Schumann, Grieg, Liszt, Brahms, and others. Concertos by Mozart, Mendelssohn, Beethoven, and Moscheles.

Required: Two lessons a week in piano; two lessons a week in harmony, course 12; two lessons a week in piano; two lessons a week in harmony, course 12; two lessons a week in counterpoint, course 14. German or French. Physical education.

Prerequisite: Course 7 or its equivalent.

To complete this course satisfactorily the student must fulfill the requirements above outlined and perform in public when requested by the instructor and approved by the Director.

9. Piano. Comprehensive study of the principal classic and romantic composers. Etudes by Chopin and Moszkowski. Solo works of modern composers. Concertos by Schumann, Chopin, Rubinstein, and others.

Required; two lessons a week in piano; two lessons a week each in harmonic analysis, course 16, composition, course 17, and orchestration, course 18; practice with instrument, three to five hours daily. Public performances under conditions approved by the Director.

Prerequisite: Course 8 or its equivalent.

For graduation, students are required to perform publicly 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. A diploma will be issued upon the satisfactory completion of this course.

Theory. The courses 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.

10. **Harmony.** Consideration will be given to the theories of acoustics, the formation of the diatonic scale, to intervals, chord construction, the relative importance of triads within one key, connection of primary triads, rhythm, the elements of melodic construction, and part writing. Harmonization of melodies and unfigured basses. Original periods.

11. **Harmony.** Key relations. Chords of the seventh. Direct and extraneous modulation. Altered and mixed chords.

Prerequisite: Course 10.

12. **Harmony.** Inharmonic tones. Accompaniment. Original work. Study of the various modern harmonic theories.

Prerequisite: Course 11.

13. **Ear-training.** Aural recognition of intervals demonstrated orally and in writing. Singing of diatonic and chromatic intervals from given tones. Writing at dictation of moderately difficult melodies and harmonic progressions.

14. **Counterpoint.** Simple counterpoint in five species employing from two to eight parts. Original exercises. Contrapuntal chorale elaborations.

Prerequisite: Course 11 or its equivalent.

15. **Counterpoint.** Double, triple, and quadruple counterpoint. The canon, invention, and the various species of fugue, single and double.

Prerequisites: Courses 12, 13, and 14.

16. **Harmonic Analysis.** Detailed analysis of representative works of the masters and other compositions. Harmonic memorizing of moderately difficult selections.

Prerequisites: Courses 12 and 13.

17. **Composition.** The application of harmonic material in original exercises in the various forms of composition, including the primary forms, the vocal song, theme with variations, etude, rondo forms, sonatina and sonata.

Prerequisites: Courses 12, 13, and 14.

18. **Orchestration.** The arrangement of music for orchestra. The theoretical study of orchestral instruments and their functions.

19. **Violin.** This course is preparatory, and designed to develop correct fingering, free bowing, and accuracy as to pitch and rhythm and intonation.

Studies. Sevcik School, Greenberg, major scales, minor scales in the first position; studies by Hohman, Kayser, and others, elementary solos; special sight reading duos by Mazas and Dancila. 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 20.

Students must appear in public recitals when required by the Director, playing from memory.

Required: Two lessons a week, harmony, music history, as in courses 10 and 11.

20. 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, courses 11 and 12, and Counterpoint, course 14.

Prerequisite: Course 19.

21. This course consists of advanced studies by Dancila, Fiorillo, Singer, Rode, Gavinies, Paganini; solos by Dvorak, Brahms, Vieuxtemps, 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 string 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, Grounor, Verdi, Mendelssohn, Beethoven, Elgar, Wagner, Offenbach, Strauss, and others.

Ensemble: Sonatas for violin and piano; string tries; 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, whose instruments 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:

22. Cornet. Methods by Arbon; characteristic studies by St. Jacome.

23. Clarinet. Methods by Dieppo; studies by Dieppo and Blume.

24. French Horn. Methods by Franz; studies by Franz and Hayffman.

25. 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.

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 consulted for the arrangement of 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 part 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 17, 1917.

Tuition. 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 Babbit-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.....	\$15.00
Two lessons a week, a term.....	30.00

Piano — Instructor Dunkelberger, private instruction:

One lesson a week, a term.....	\$15.00
Two lessons a week, a term.....	30.00

Violin, Violoncello, Viola — Instructor Goettel, 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 Goettel, private instruction:

One half-hour lesson a week, a term.....	\$15.00
Two half-hour lessons a week, a term.....	30.00

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
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Theory—Courses 10 to 18 inclusive, Instructors Dunkelberger,

Blount, Goettel, as assigned by the Director; each course, a term.....	\$ 7.50
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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. They have steam heat, good ventilation, electric light for night practice, and good janitor service and 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, Soils 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-acres tilled 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, (3) 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 two 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. (15) Personal advisory work by correspondence.

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 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 practical, 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.

EXTENSION SERVICE

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SUMMARY OF ALL EXTENSION STAFF ACTIVITIES OTHER THAN COUNTY AGENT WORK

	No.	1915-1916
		No. People reached through this service
Lecture Work (one lecture to two-day engagements arranged by requests from communities)	649	58,357
Club Work (lecture engagements).....	481	44,393
Demonstrations by Specialists.....	543	30,297
Farmers' and Home Makers' Week.....	1	1,283
Demonstration Train.....	1	3,220
Movable Schools (three- to five-day engagements)	16	11,155
Fair (Exhibitions and Judging).....	44	35,040
Conferences.....	1,579	7,632
Farms visited for personal advisory work.....	1,498	3,756
Letters written.....	33,397	33,397
Press articles prepared.....	1,106	\$221,200
Correspondence courses.....	19	23
Publications—		
New Bulletins.....	12	
Number pages.....	194	
Number issued.....	110,500	\$221,000
Reprints.....	9	
Number pages.....	55	
Number issued.....	29,000	\$58,000
Barn and silo blueprints.....	2	37
Miles traveled—		
By rail.....	146,028	
Otherwise.....	32,172	
Total number people reached—		
Directly.....		228,590
Indirectly.....		\$500,200

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 in 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 their County Agent, should there be one in the county in which the work is desired, or with the Extension Service, Oregon Agricultural College, Corvallis, Oregon, as far as possible in advance of the time the appointment is desired. Short-notice requests may

not find the College 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

* EDWARD BLODGETT FITTS
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, vege-

* Half time devoted to Dairy Husbandry work.

tables, 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 — 12 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.

CO-OPERATIVE FARM DEMONSTRATION WORK

PAUL VESTAL MARIS, State Leader
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 considerable 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 percent 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
EDGAR LeROY WESTOVER, 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 raising 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

* Half time spent in Animal Husbandry work.

Associations, Farmers' Cooperative Creameries, Farmers' Cooperative Cheese Factories, and Farmers' Cooperative Cream Selling Agencies.

FARM MANAGEMENT DEMONSTRATIONS

WALLACE LA DUE KADDERLY, Farm Management Demonstrator

The purpose of the department of Farm Management Demonstrations 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 materials 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.

Improvement 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 MARKETS

HECTOR MACPHERSON, Extension Specialist in Organization and
Markets
GUILFORD LANSING HURD, Field Organizer

The Extension Service Bureau of Organization and Markets 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 least 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. The monthly "Extension News" containing seasonal information in popular language is sent to the entire Extension mailing list consisting of some 20,000 names and to all newspapers and other periodicals of Oregon, and to a select list of about four hundred publications in the Northwest and other parts of North America. This information reminds farmers and other operators of the need of certain practice, and instructs 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

Student 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 students, 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, 1916-17.

COMMANDANT OF CADETS

Lieutenant Colonel VERNON A. CALDWELL, Infantry, U. S. Army

ASSISTANT COMMANDANTS OF CADETS

First Lieutenant RONALD D. JOHNSON, Cavalry, U. S. Army.

Post Commissary Sergeant CYRUS F. DUGGER, U. S. Army,
Retired.

Regimental Sergeant Major DENIS HAYES, U. S. Army, Retired.

CADET OFFICERS

Field Staff and Special Assigned

L. D. YATES, Colonel

C. A. FERTIG, Lieutenant Colonel.

P. R. SESSIONS, Captain and Adjutant.

T. C. VAN ORSDEL, Captain and Quartermaster.

A. D. HURLEY, Captain and Commissary.

A. G. SKELTON, Captain, Inspector of Competitive Drills.

P. E. CLARK, Captain, Asst. Instructor of Engineering.

F. H. CRANE, Lieutenant and Range Officer.

HEADQUARTERS COMPANY

P. R. Sessions, Captain

SUPPLY COMPANY

T. C. Van Orsdel, Captain

R. Gardner, Lieutenant

MACHINE GUN COMPANY

W. H. Ball, Captain

C. W. Meyers, Lieutenant

W. S. Caldwell, Lieutenant

FIRST BATTALION

Field and Staff

D. P. Spalding, Major

W. S. Zimmerman

Captains

F. A. Hayes, Co. "A"

H. M. Reynolds, Co. "B"

F. B. Brown, Co. "C"

N. C. Carnie, Co. "D"

Lieutenants

G. W. Vilas, Co. "A"

H. V. Leverage, Co. "B"

E. E. Grubbe, Co. "C"

H. W. Cooper, Co. "D"

W. W. Boon, Co. "A"

I. French, Co. "B"

C. A. McCullum, Co. "C"

R. F. Shaw, Co. "D"

J. E. Proebstel, Co. "A"

ROSTER OF OFFICERS

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SECOND BATTALION

Field and Staff

W. P. Arens, Major
D. M. Mayne, Lieut. and Adjt.

Captains

W. V. Clark, Co. "E"
F. W. Walton, Co. "F"
H. H. Hilton, Co. "G"
J. B. Wilson, Co. "H"

Lieutenants

J. M. Franklin, Co. "E"
H. Fellows, Co. "F"
H. E. Thomas, Co. "G"
W. Anderson, Co. "H"
C. G. Tanner, Co. "E"
C. R. Noles, Co. "F"
V. I. Basler, Co. "G"
L. S. Leavell, Co. "H"
L. C. Boldenweck, Co. "F"

THIRD BATTALION

Field and Staff

O. A. Mulkey, Major
W. H. Averill, Lieut. and Adjt.

Captains

C. L. Meyers, Co. "I"
J. D. McKay, Co. "K"
A. G. Seiberts, Co. "L"
W. A. Bailey, Co. "M"

Lieutenants

W. Wootan, Co. "I"
G. L. Kane, Co. "L"
C. A. Thompson, Co. "M"
W. L. Powell, Co. "I"
W. D. Brown, Co. "K"
G. M. Gragg, Co. "L"
J. T. Stephens, Co. "M"

NON-COMMISSIONED STAFF

Regimental Sergeant Major, Joseph Supple
Regimental Quartermaster Sergeant, L. W. Coleman
Regimental Commissary Sergeant, C. R. Hazeltine
Regimental Supply Sergeant, C. Shankland
Regimental Color Sergeant, L. C. Paine
Regimental Color Sergeant, R. Selph
Battalion Sergeant Major, V. Ramsdell
Battalion Sergeant Major, C. T. Gammon
Battalion Sergeant Major, D. F. McEwen

Company "A"

Sergeants

1st, H. H. Taylor
G. Estell (clerk)
L. K. Couch
C. L. Atwood
F. H. Benham
E. V. Storm

Corporals

W. H. Lankenau
E. G. Kirkwood
C. Steusloff
A. Friedenthal

Company "B"

Sergeants

1st, J. H. Clark
D. J. Bates
T. P. Cramer
W. J. Kocken
A. O. Leech
G. S. Strome

Corporals

W. W. Ball
L. G. Lyman
A. Ostrander
R. M. Bond
H. S. Christensen

Company "C"

Sergeants

1st, J. M. Underwood
M. O. Kurtz
R. K. Wilmot

Corporals

O. L. Byers
M. A. Davis
C. M. Moist

Company "D"**Sergeants**

1st, G. L. Jessup
D. A. Burleigh
F. M. Curry
E. A. Coe
A. C. L. Jetley
H. W. Thomas
J. Wilson

Corporals

J. O. Bettis
E. P. Frink
C. L. Palmer
J. B. Lorence
B. Holker

Company "E"**Sergeants**

1st, T. J. Porter
C. DuRette
E. Englund
A. Woodcock
S.H. Meyers

Corporals

D. W. Dye
P. E. English
F. Entermille
F. H. Nichols
J. H. Owens
M. S. Wright
F. B. Flannery
W. F. Lucas

Company "F"**Sergeants**

1st, L. T. Chellis
W. Johnson
W. S. Carpenter
F. S. Cramer
L. R. Guthrie
A. W. Oliver

Corporals

A. E. McClain
E. P. Hammond
W. H. Tuhlesing
A. M. Roseman
T. M. Walker
F. A. Roehrig
M. H. Ellisted

Company "G"**Sergeants**

1st, E. Porter
W. E. Gurkey
G. B. Sommers

Corporals

C. L. Annawalt
W. Dettering
F. A. Gilfilan
R. T. Kruzey
C. S. Nesbit

Company "H"**Sergeants**

1st, L. Happold
L. C. Chapman
H. F. Godel
C. O. Harris
C. H. Keil
J. G. Paul
E. C. Willey

Corporals

A. C. Brandes
R. C. Bodine
C. W. Grenfell
E. E. Hayslip
J. L. Holden
H. Mason
F. L. Reed
M. Wharton

Company "I"**Sergeants**

1st, W. D. Pine
H. W. Ferguson
C. F. Beatie
M. Newman

Corporals

R. A. Boss
J. D. Moberg
E. E. Radcliff
G. W. Thomas
O. E. Hartman
H. C. Ray

Company "K"**Sergeants**

1st, O. E. Osborn
A. O. Muen
S. W. Hanns
H. E. Ohara
H. E. Wheeler
A. G. Schoth

Corporals

J. S. Gloman
J. A. Thayer
E. Hunter
A. Hoffard
E. Chapman
H. Humfeld
A. T. Anderson

Company "L"**Sergeants**

1st, W. H. Gordon
A. H. Davidson
N. Firestone
C. McMIndes
S. C. Richey
J. Watson

Corporals

W. Bellingham
E. C. McKissick
R. I. Nichols
B. Reardon
E. G. Ricketts
G. N. Setterlee
L. Williams

Company "M"

1st, N. W. Reese
L. H. Bissett
Glen Corey
E. F. McCormack
C. E. Fullerton

Corporals

A. P. Agosti
G. Alexander
J. R. Beck
O. P. Dadman
E. C. Jory
L. A. Moss
A. P. Paroni
R. W. Russell

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; Voc., Vocational; Opt., Optional; Spec., Special.)

GRADUATE STUDENTS

Name	Course	Home Address
Abell, Tracy (Montana State College)	Agri.	Corvallis
Ahern, Merrie Ierne (Oregon Agricultural College)	Chem.	Hugo
Allworth, Edward (Oregon Agricultural College)	Opt.	Crawford, Wash.
Alverson, Vida (University of Washington)	Opt.	Corvallis
Blackden, Ralph Silsby (Oregon Agricultural College)	Opt.	Medford
Butler, Owen (Purdue University)	Agri.	Culver, Indiana
Carey, Charles (Pennsylvania State College)	Agri.	Lancaster, Penn.
Cooter, John Edward (Oregon Agricultural College)	Agri.	Corvallis
Corbett, Ruth (Oregon Agricultural College)	H. E.	Corvallis
Curry, Joseph Edmond (Oregon Agricultural College)	Agri.	Olympia, Wash.
Dietsch, Frank John (Oregon Agricultural College)	Agri.	Days Creek
Dobell, Lila Grace (Oregon Agricultural College)	H. E.	Monmouth
Doolittle, Lydia (Oregon Agricultural College)	H. E.	Dodge City, Kansas
Ferguson, Oscar Earl (Oregon Agricultural College)	Agri.	Helix
Finch, Arthur William (Oregon Agricultural College)	Agri.	Gardena, Calif.
Gibson, Vane (Oregon Agricultural College)	Agri.	Little Rock, Ark.
Gilbert, Henry (Oregon Agricultural College)	Agri.	Salem
Hanson, Manette (Oregon Agricultural College)	Opt.	Corvallis
Haverstick, Russell Noah (Oregon Agricultural College)	Agri.	Cashmere, Wash.

OREGON AGRICULTURAL COLLEGE

Name	Course	Home Address
Hawkins, Leon Abbott..... (New Hampshire College)	Agri.....	Holderness, N. H.
Howell, Herbert..... (Oregon Agricultural College)	Agri.....	Portland
Johnson, Anna Marie..... (Oregon Agricultural College)	H. E.....	Albany
Kadderly, Wallace La Due..... (Oregon Agricultural College)	Agri.....	Portland
Kelly, Glenn..... (Oregon Agricultural College)	Agri.....	Portland
Kimmell, Walter..... (University of Oregon)	Ind. Arts.....	Lebanon
King, Charles Allen..... (Oregon Agricultural College)	Ind. Arts.....	Ashland
McCormick, Andrew Cameron..... (Oregon Agricultural College)	Agri.....	Lebanon
McDonald, John Yates..... (University of Virginia)	Agri.....	Shenandoah Junction, W. Va.
Maris, Homer..... (University of Oregon)	Agri.....	Portland
Miller, Eva..... (Oregon Agricultural College)	Opt.....	Fillmore, Ill.
Miller, Fred Wilhelm..... (Ohio State University)	Agri.....	Girard, Ohio
Mix, Ira Delbert..... (Oregon Agricultural College)	Com.....	Independence
Montell, Edgar Whitney..... (Maryland State College)	Agri.....	Cantonsville, Md.
Moore, Merle..... (Oregon Agricultural College)	M. E.....	Corvallis
Olsen, Ruby Irene..... (Oregon Agricultural College)	Opt.....	Corvallis
Parpala, Tainie Armas..... (Oregon Agricultural College)	Agri.....	Astoria
Pavey, R. M..... (Ohio State University)	Agri.....	Columbus, Ohio
Peaslee, Willis Dhu Aine..... (Stanford University)	E. E.....	Grass Valley, Calif.
Reichart, Emanuel Henry..... (Oregon Agricultural College)	Opt.....	Corvallis
Seggel, Louis William..... (Oregon Agricultural College)	Opt.....	Jersey City, N. Y.
Selby, Halbert..... (Oregon Agricultural College)	Agri.....	Bellingham, Wash.
Shattuck, Obil..... (Oregon Agricultural College)	Agri.....	Corvallis
Smith, Ralph Henry..... (Kansas Agricultural College)	Agri.....	Corvallis
Steusloff, Dorathea Emily..... (Oregon Agricultural College)	H. E.....	Salem

UNDERGRADUATE STUDENTS

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Name	Course	Home Address
Stillinger, Charles Roy	Agri.....	Moscow, Idaho
(University of Idaho)		
Storz, Charles	Chem. Eng.....	Portland
(Oregon Agricultural College)		
Tillery, Genevieve	Opt.....	Corvallis
(Oregon Agricultural College)		
True, Mrs. Elsie Gay.....	Opt.....	Corvallis
(Oregon Agricultural College)		
Tufts, Miriam Olive.....	H. E.....	Portland
(University of California)		
Tulley, Stewart Wendell.....	Opt.....	Wallowa
(Oregon Agricultural College)		
Tweed, Robert	Agri.....	Corvallis
(Oregon Agricultural College)		
White, Samuel	Agri.....	Corvallis
(Iowa State College)		
Wight, Howard Marshall.....	Agri.....	Harrison, Maine
(Bates College)		
Woods, Lee Roy.....	For.....	Cottage Grove
(Oregon Agricultural College)		
Uyei, Nao	Agri.....	Oyodo, Japan
(Oregon Agricultural College)		

UNDERGRADUATE STUDENTS

Name	Course	Rank	Home Address
Abbott, Christine Gordon.....	H. E.	Soph.....	Roseburg
Abegg, Fred Auton.....	Agri.	Fr.....	Portland
Absher, Albert.....	Agri.	Fr.....	Mt. Grove, Mo.
Acheson, Fanny.....	Com.	Fr.....	Chehalis, Wash.
Acree, Louis Carlton.....	Agri.	Sr.....	Berkeley Ca.,
Adams, Belva Lee.....	Agri.	Soph.....	Hardman
Adams, Floyd Nelson.....	Agri.	Fr.....	Hardman
Adams, Herbert Gerald.....	Agri.	Fr.....	Portland
Agosti, Alfred.....	Hi. E.	Soph.....	Portland
Ahlson, Charles Boone.....	Agri.	Soph.....	Hillsdale
Akers, Robert.....	Agri.	Sr.....	Jacksonville, Ill.
Alcorn, William Vernon.....	Min.	Soph.....	Corvallis
Alderman, Clifford.....	Min.	Soph.....	McMinnville
Aldrich, Frederick.....	Com.	Fr.....	Albany
Alexander, Constance.....	H. E.	Fr.....	Portland
Alexander, Ethel Marjorie.....	H. E.	Fr.....	Salem
Alexander, Geo. Max.....	Agri.	Soph.....	Salem
Alexander, Harry James.....	Agri.	Fr.....	Chehalis, Wash.
Alicante, Marcos.....	Agri.	Fr.....	Svensen
Allan, Alex.....	Agri.	Soph.....	Dundee
Allen, Frederick John.....	Agri.	Sr.....	Portland
Allen, William Lester.....	M. E.	Spec.....	Sumpter
Allen, Rea.....	Opt.	Fr.....	Corvallis
Alpi, Rudolph.....	M. A.	Voc.....	Pasadena, Cal.

Name	Course	Rank	Home Address
Altimus, Otis Ellsworth	Hi. E.	Fr.	Central Point
Altstadt, George John	For.	Fr.	Portland
Alverson, Calvin	Agri.	Spec.	Corvallis
Ament, Charles Wana	Min.	Soph.	Grants Pass
Amerige, Violette Ann	Opt.	Voc.	Boston, Mass.
Amerman, Warren Neuton	Agri.	Fr.	Mt. Vernon, Wash.
Amis, Albert Hope	Agri.	Jr.	Shandon, Cal.
Amort, Alvina Marie	H. E.	Fr.	Corvallis
Anawalt, Clinton La Verne	Agri.	Soph.	Jordan Valley
Anawalt, Elena	H. E.	Voc.	Jordan Valley
Anderson, Albert Thomas	L. E.	Jr.	Astoria
Anderson, Beverly	Agri.	Fr.	Long Beach, Cal.
Anderson, Ellen Caroline	H. E.	Fr.	Portland
Anderson, Harold Randolph	M. A.	Voc.	Salem
Anderson, Henry	E. E.	Spec.	Aberdeen, Wash.
Anderson, Howard Bradly	Com.	Voc.	Midvale, Idaho
Anderson, Juliette Norma	Agri.	Jr.	Portland
Anderson, Olof Ewart	Hi. E.	Spec.	Astoria
Anderson, Otto Erwin	Agri.	Spec.	Ilwaco, Wash.
Anderson, Virge Ingrid	H. E.	Sr.	Aurora
Anderson, William	C. E.	Sr.	Portland
Anderton, Edwin Cadwell	Agri.	Soph.	Corvallis
Andrews, Abby	H. E.	Fr.	Corvallis
Andrews, James	Com.	Spec.	Myrtle Creek
Andrews, Winfield	Agri.	Sr.	San Luis, Obispo, Cal.
Anttila, John	M. A.	Voc.	Uleaborg, Finland
Archibald, John Raymond	Hi. E.	Soph.	Albany
Arens, Winfried Bernard	Com.	Sr.	New York, N. Y.
Ariss, Dorothy Crosfield	H. E.	Fr.	Portland
Armitstead, Amy Isabella	H. E.	Soph.	Portland
Armstrong, Fay	H. E.	Jr.	Corvallis
Armstrong, Samuel Walter	M. E.	Fr.	Bandon
Asbahr, Katherine	H. E.	Jr.	Cornelius
Ascher, Felix George	I. A.	Fr.	Birnamwod, Wis.
Ash, Minna Carolyn	Com.	Fr.	La Grande
Atwood, Alice Lillian	H. E.	Fr.	Corvallis
Atwood, Cyrus Leslie	Com.	Jr.	Corvallis
Atwood, Ralph Guile	Agri.	Sr.	Corvallis
Aumiller, Mildred	Agri.	Spec.	North Yakima, Wash.
Auterson, Jane Elizabeth	H. E.	Soph.	Portland
Averill, William	Agri.	Sr.	Corvallis
Axtell, Edward	Agri.	Sr.	Corvallis
Axtell, Frances Joy	Opt.		Corvallis
Back, Carl Iver	Hi. E.	Fr.	Marshfield
Bacon, Runa Elizabeth	Com.	Soph.	La Grande
Bagley, Ferris	For.	Fr.	Corvallis
Ba Htwa, Murgean	Agri.	Spec.	Los Angeles, Calif.
Bailey, Willis Arthur	Agri.	Sr.	Canada
Bailiff, Boyd	Com.	Fr.	Corvallis
Bailiff, Edith Dorothy	Com.	Fr.	Corvallis

UNDERGRADUATE STUDENTS

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Name	Course	Rank	Home Address
Bain, Walter Marion	Min.	Fr.	Portland
Baker, Alice Marie	H. E.	Fr.	Salem
Baker, Charles Eugene	Agri.	Fr.	Los Angeles, Calif.
Baker, Claude	Agri.	Spec.	Pilot Rock
Baker, Rufus William	M. E.	Fr.	Oregon City
Balderree, Elmer Wendall	L. E.	Fr.	Dallas
Baldwin, James Daniel	Agri.	Jr.	Blue Lake, Calif.
Ball, Harold	Agri.	Jr.	National City, Calif.
Ball, Waldo Whitney	Phar.	Spec.	Corvallis
Ball, Wilbur Herbert	M. E.	Sr.	Portland
Banks, Reno Parkman	Agri.	Spec.	Brookline, Mass.
Barta, Glenn	Agri.	Jr.	Selah, Wash.
Barker, Alice Cary	H. E.	Fr.	Athens, Maine
Barker, Guy Edwin	Com.	Fr.	Cove
Barker, Mary Elizabeth	H. E.	Jr.	Oakland, Calif.
Barklow, Ervin Earl	Agri.	Fr.	Norway
Barnard, Laurence	Agri.	Soph.	Tehachapi, Calif.
Barnes, Cecile Frances	H. E.	Spec.	Goldendale, Wah.
Barnett, Hollis Benjamin	Agri.	Voc.	Florence
Barratt, Marjorie Marian	H. E.	Soph.	Portland
Barrett, Gerald Joseph	Min.	Soph.	Portland
Bartmess, Marie Louise	Opt.		Hood River
Barton, Bess	H. E.	Jr.	Puyallup, Wash.
Bartruff, Elmer Walter	Agri.	Sr.	Salem
Bartu, Frank	M. E.	Soph.	Crabtree
Barzee, Faye	Com.	Sr.	Corvallis
Bashor, Binnie Lowen	H. E.	Voc.	Corvallis
Basler, Vernon	Agri.	Sr.	Grants Pass
Bass, Chester Allan	Agri.	Sr.	Portland
Bates, Douglas Ivan	E. E.	Jr.	Portland
Baum, Francis Hutchins.	Agri.	Jr.	Shoshone, Idaho
Bayley, Ralph Olaf	Agri.	Sr.	Pittsworth, Australia
Bayly, Carrie Margaret	Com.	Spec.	Eugene
Bayliss, Edwin John Charles	Agri.	Sr.	Carlton
Beagle, Glenn Elwood	Agri.	Fr.	Holland
Beall, Malcolm John	Agri.	Fr.	Portland
Beals, Erma Elizabeth	H. E.	Fr.	Corvallis
Beals, Oliver Kenneth	Agri.	Fr.	Corvallis
Beatie, Charles Fountain	Min.	Soph.	Oregon City
Bechen, Carl George	Agri.	Soph.	Hillsboro
Bechen, Ella	Com.	Soph.	Hillsboro
Bechen, Esther	Com.	Fr.	Hillsboro
Bechen, Martha Henrietta	H. E.	Sr.	Hillsboro
Beck, John George	Min.	Spec.	Astoria
Beck, James Ralph	Agri.	Soph.	Corvallis
Beckwith, Naomi	H. E.	Spec.	Portland
Beebe, Sadie Elizabeth	Com.	Fr.	Central Point
Beers, Ruby Evangeline	H. E.	Sr.	Corvallis
Behnke, Carl Henry	Agri.	Soph.	Sunnyside, Wash.
Bell, Fayne Cleora	Com.	Soph.	The Dalles

Name	Course	Rank	Home Address
Bellinger, Gordon Vankeuran	I. A.	Spec.	Moscow, Idaho
Bellinger, Wilbur Moore	Agri.	Soph.	Moscow, Idaho
Belt, Walter Kipling	Agri.	Fr.	Newport
Bendler, Georgina Bertha	H. E.	Soph.	Cornelius
Benham, Frank Norman	Agri.	Jr.	Seattle, Wash.
Benson, Otto Ingward	Phar.	Spec.	Everett, Wash.
Berchtold, Florence	H. E.	Soph.	Corvallis
Berg, Clifford John	Com.	Fr.	Walla Walla, Wash.
Berven, Edmund Sigurd	Min.	Jr.	Portland
Bettis, James Oliver	Agri.	Jr.	Corvallis
Bianco, Robert	Com.	Voc.	Roslyn, Wash.
Biles, George Albert	Hi. E.	Fr.	Portland
Billetter, Paul Edward	Com.	Fr.	Portland
Birch, Gracia Delle	H. E.	Sr.	Corvallis
Bishop, Leon	Min.	Soph.	Walla Walla, Wash.
Bissell, Rex Ide	I. A.	Soph.	Corvallis
Bissell, Ross Elder	Hi. E.	Jr.	Corvallis
Bissett, Lee Henry	Agri.	Jr.	Hebo
Bixby, Clarence Wilson	Com.	Sr.	Paulina
Bixby, John Snell	Agri.	Fr.	Freewater
Black, Emerson Perry	Agri.	Jr.	North Yakima, Wash.
Black, Kathleen	H. E.	Soph.	Medford
Blackman, Harold	M. E.	Fr.	Hood River
Blagg, Henry	E. E.	Sr.	Hood River
Blake, Marjorie Elizabeth	H. E.	Fr.	Salem
Blakely, Violet Rose	Com.	Voc.	Roseburg
Blanchard, Paul	M. E.	Fr.	Portland
Blomquist, Ruth	H. E.	Fr.	Shelley, Idaho
Boardman, Lucius Woodward	Agri.	Fr.	Chicago, Ill.
Bodine, Roger Campbell	L. E.	Soph.	Pasadena, Calif.
Bodle, Orval McKinley	E. E.	Fr.	Bay City
Boehmer, Karl	L. E.	Fr.	Portland
Boettcher, Lois Ione	H. E.	Voc.	Dorena
Bogard, Troy	Agri.	Jr.	Woodburn
Boguess, John	I. A.	Soph.	Veneta
Bohanon, Harvey Lee	I. E.	Fr.	San Diego, Calif.
Boies, Etta	H. E.	Sr.	Corvallis
Boldenweck, Louis Charles	Agri.	Spec.	Portland
Bolin, Frank Gerald	Agri.	Sr.	Portland
Bollen, Walter Beno	Agri.	Fr.	Portland
Bond, Mona	H. E.	Spec.	Halsey
Bond, Ruel	Agri.	Spec.	Corvallis
Bones, John William	C. E.	Sr.	Carlton
Bonner, George	Agri.	Soph.	London, England
Bonsel, Miriam	Opt.		Fresno, Calif.
Boon, Walter William	Agri.	Jr.	Portland
Boone, Earle	M. E.	Sr.	Toledo, Wash.
Boone, John	M. E.	Sr.	Toledo, Wash.
Boss, Reuben	Agri.	Soph.	Moxee City, Wash.
Both, Julius	Agri.	Sr.	Rainier
Bower, Eva Louisa	Com.	Spec.	Warrenton

UNDERGRADUATE STUDENTS

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Name	Course	Rank	Home Address
Bowes, Mary Jane.....	H. E.	Voc.	Aberdeen, Wash.
Bowie, William Purley.....	Hi. E.	Fr.	Roslyn, Wash.
Boyd, Russell James.....	Min.	Fr.	Bethel, Alaska
Boyer, Will.....	Min.	Sr.	Portland
Brach, August Theodore.....	Agri.	Fr.	Astoria
Bracher, Karl.....	For.	Spec.	Portland
Bracons, Enola.....	H. E.	Fr.	Portland
Bradbury, Harold Gardner.....	Agri.	Fr.	Port Angeles, Wash.
Bradford, Gordon M.....	Agri.	Fr.	Grants Pass
Bradley, Mrs. Pearl Rawson.....	H. E.	Fr.	Corvallis
Bragg, Clarence Harvey.....	Agri.	Soph.	Corvallis
Brainard, Edward Sherman.....	Agri.	Fr.	Long Beach, Calif.
Brandes, Alan Carl.....	Min.	Soph.	Portland
Branstetter, Myrtle Esther.....	Phar.	Fr.	Echo
Branthoover, Lester Lee.....	Com.	Sr.	Payette, Idaho
Braun, Elsie.....	H. E.	Fr.	Portland
Breese, Roy Arthur.....	Agri.	Fr.	Red Bluff, Calif.
Breithaupt, Alva.....	Agri.	Soph.	Portland
Brennan, Andrew Frank.....	For.	Soph.	Boise, Idaho
Brewer, Loulin.....	Agri.	Fr.	Chemawa
Brewer, Ruth.....	H. E.	Fr.	Chemawa
Briggs, Louis Merle.....	Agri.	Soph.	Corvallis
Brinckerhoff, Ethel Anita.....	H. E.	Jr.	Piedmont, Calif.
Brittan, Joe Moore.....	Agri.	Fr.	Wilson, Mont.
Brogden, Cecil Myra.....	H. E.	Sr.	Hillsboro
Brokaw, Harold Hazzard.....	Agri.	Soph.	Whittier, Calif.
Brong, Paul.....	Min.	Fr.	Portland
Brooke, John Rutter.....	Min.	Jr.	Vancouver, Wash.
Brookhouse, Anna Bell.....	Com.	Spec.	Portland
Brown, Edward Guy.....	Com.	Soph.	New York City, N. Y.
Brown, Ellis Oliver.....	Agri.	Fr.	Drewsey
Brown, Francis Bolden.....	Agri.	Sr.	Crystal
Brown, Frances Roberta.....	H. E.	Voc.	Haines
Brown, Frank Kimball.....	Agri.	Fr.	Salem
Brown, Harrington.....	Agri.	Jr.	Los Angeles, Calif.
Brown, Joseph Willard.....	Agri.	Voc.	Shedd
Brown, Lark Olof.....	Agri.	Spec.	Warrenton
Brown, Walter.....	Com.	Soph.	Medford
Bryan, Elaine.....	H. E.	Fr.	Portland
Bryan, Leon Horan.....	Agri.	Fr.	Fort Jones, Calif.
Brye, Irene Anna.....	H. E.	Fr.	Auburn, Calif.
Buchanan, Raymond Dean.....	Com.	Fr.	Halfway
Budelier, Clarence.....	L. E.	Sr.	Rock Island, Ill.
Buell, Chester Albert.....	Com.	Fr.	Forest Grove
Bullis, Deloss Everett.....	Min.	Sr.	Payette, Idaho
Burk, Clifford Glenn.....	Hi. E.	Fr.	Bonanza
Burk, Earl Wager.....	Agri.	Fr.	Oregon City
Burke, Hazel.....	Com.	Voc.	Cambridge, Idaho
Burkhart, George Lake.....	I. A.	Spec.	Goldfield, Nevada
Burleigh, Donald Miller.....	M. E.	Jr.	Redmond

Name	Course	Rank	Home Address
Burley, Stephen Brace	M. A.	Voc.	La Grande
Burnap, Florence De Ette	H. E.	Fr.	Corvallis
Burnside, Julian Bates	Agri.	Jr.	Seattle
Busch, George	Agri.	Fr.	Portland
Bush, Zetta Zeretta	H. E.	Soph.	Hoskins
Buttervich, Vincent Floyd	Com.	Voc.	Fairbanks, Alaska
Byers, Oscar	For.	Jr.	Portland
Bysack, Bhupendra Nath	Com.	Fr.	Calcutta, India
Cady, Allen	Phar.	Soph.	Corvallis
Caldwell, Harold	I. A.	Fr.	Pomona, Calif.
Caldwell, Ruth Florence	H. E.	Soph.	Bend
Caldwell, Wally Strain	Hi. E.	Jr.	Pomona, Calif.
Calkins, Claude Clark	Agri.	Sr.	Dallas
Calvert, Donald Lee	Min.	Fr.	Grants Pass
Campbell, Cora Alice	H. E.	Soph.	Roseburg
Campbell, Donald Neil	Com.	Soph.	Portland
Campbell, Fannie Marie	Com.	Jr.	Roseburg
Campbell, Johnnie Luther	For.	Voc.	Lebanon
Campbell, John Norman	Min.	Fr.	Portland
Campbell, Tom Parker	For.	Soph.	McMinnville
Cantrall, Otto Lamar	E. E.	Fr.	Ruch
Carl, Wilbur	Com.	Fr.	Portland
Carlson, Arthur Albert	E. E.	Fr.	Portland
Carlson, Howard	Com.	Fr.	Butte, Mont.
Carnes, Deirdre	H. E.	Fr.	North Powder
Carnie, Norval Craigie	Agri.	Sr.	Chicago, Ill.
Carpenter, George Washington	M. E.	Jr.	Washougal, Wash.
Carpenter, Philip Lorenzo	I. A.	Fr.	New Plymouth, Idaho
Carpenter, Walter Squire	Agri.	Jr.	Ashland
Carroll, Richard Eldon	Phar.	Fr.	Harrisburg
Carson, Willard Franklin	M. E.	Fr.	Toledo
Carswell, John William	Hi. E.	Soph.	Roseburg
Carter, Claire Mary	H. E.	Soph.	Aberdeen, Wash.
Carter, Hallie Lenore	H. E.	Sr.	Corvallis
Carter, Harold Samuel	Hi. E.	Fr.	Drain
Carter, Lloyd Frank	E. E.	Fr.	Portland
Carver, Fay	Opt.		Phoenix
Case, Mary Leota	Agri.	Fr.	Corvallis
Case, Theodore Dwight	Agri.	Sr.	Klamath Falls
Castater, Ralph Martin	Phar.	Spec.	Parma, Idaho
Castle, Carrie Ethel	H. E.	Jr.	Wauseon, Ohio
Chambers, Dorothy	H. E.	Soph.	Newberg
Chapman, Earl Hoyting	For.	Soph.	Rivera, Calif.
Chapman, John Cecil	Min.	Jr.	Sheridan
Chase, Elmo Barry	Agri.	Soph.	Eugene
Chatterjee, Nripen	M. E.	Soph.	Darjerling, India
Chellis, Lawrence True	I. A.	Jr.	Astoria
Childs, Dorothy Ellen	H. E.	Spec.	Independence
Chipman, Merlin Robert	Phar.	Fr.	Corvallis
Christensen, Hazel	H. E.	Soph.	Portland

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Name	Course	Rank	Home Address
Christensen, Henry Noris.....	Agri.	Soph.	Portland
Christian, Gertrude.....	H. E.	Fr.	Portland
Christian, William Arthur.....	Agri.	Fr.	Placerville, Calif.
Christiansen, Lulu Marie.....	H. E.	Fr.	Chinook, Mont.
Church, Leighton.....	E. E.	Fr.	Grizzly Bluff, Calif.
Churchill, Leigh Howard.....	Agri.	Jr.	Corvallis
Churchman, Tressa.....	Com.	Sr.	Corvallis
Clark, Doris Aileen.....	H. E.	Jr.	Portland
Clark, James Holbert.....	Agri.	Jr.	Mattoon, Ill.
Clark, Ola LaMoine.....	H. E.	Sr.	Salem
Clarke, Percy Elmo.....	I. E.	Spec.	Albany
Clarke, William Victor.....	Agri.	Sr.	Laytonville, Calif.
Clausen, Emma Christina.....	H. E.	Soph.	The Dalles
Close, Wilbur.....	Agri.	Sr.	Lawrenceville
Coe, Earl Alphonso.....	Agri.	Jr.	Portland
Coffey, Wilson Bryan.....	Agri.	Soph.	Portland
Cohen, Benjamin Bernard.....	Agri.	Sr.	Sniela, Russia
Cohill, Victoria.....	H. E.	Fr.	Portland
Cole, Harry Julius.....	Com.	Soph.	Emporia, Kansas
Cole, Maple Lucile.....	H. E.	Fr.	Canby
Cole, William Sidney.....	Agri.	Soph.	Portland
Coleman, Lloyd Wilbur.....	Agri.	Jr.	Berkeley, Calif.
Coleman, Ralph Orval.....	Agri.	Jr.	Newport
Coman, Ellis.....	Log. E.	Soph.	Covina, Calif.
Condit, Craig Cuyler.....	Agri.	Fr.	Fairbanks, Alaska
Conklin, Donald Vernon.....	Agri.	Fr.	Ontario
Conklin, Philip Arthur.....	M. E.	Fr.	Pasadena, Calif.
Conn, George.....	Agri.	Fr.	Cove
Connell, Arthur Wood.....	Agri.	Soph.	Hillsboro
Conner, Edna Clara.....	H. E.	Sr.	Sheridan
Conner, Evangeline.....	Opt.		Corvallis
Coniff, Martin Luther.....	Com.	Spec.	Spokane, Wash.
Cooper, Altha Opal.....	Com.	Soph.	Corvallis
Cooper, Howard Wesley.....	E. E.	Jr.	Milwaukie
Coppock, Jessie.....	Com.	Spec.	Dufur
Corbett, Ruth Lillyn.....	H. E.	Sr.	Corvallis
Cordelle, Howard Albert.....	E. E.	Fr.	Weiser, Idaho
Corey, Glen.....	E. E.	Jr.	Hood River
Corl, Miriam Elizabeth.....	H. E.	Fr.	Corvallis
Cornell, Carroll Milford.....	M. E.	Fr.	Grants Pass
Cornell, Ivan Robb.....	Agri.	Spec.	Portland
Corrie, John Quincy.....	Agri.	Fr.	Corvallis
Corthell, Elden Sweet.....	Agri.	Fr.	Jacksonville
Corum, Curtis Lee.....	Min.	Jr.	The Dalles
Cory, William McKinley.....	Agri.	Soph.	Etna Mills, Calif.
Cottom, Kenneth Klock.....	Agri.	Fr.	Los Angeles, Calif.
Couch, Leo King.....	Agri.	Jr.	Wallowa
Couch, Roy.....	Agri.	Jr.	La Grande
Counts, Wilda.....	H. E.	Jr.	Grants Pass
Covell, Margaret.....	H. E.	Fr.	Corvallis

Name	Course	Rank	Home Address
Cowley, Doris.....	Com.	Fr.	Central Point
Cowley, John Farnum.....	Min.	Soph.	Central Point
Cox, Clifford Bryan.....	Agri.	Fr.	San Bernardino, Calif.
Cramer, Floyd Samuel.....	M. E.	Soph.	Corvallis
Cramer, Olive Viola.....	H. E.	Voc.	Corvallis
Cramer, Theodore.....	Com.	Jr.	Grants Pass
Crane Jr., Fred Hovey.....	Agri.	Spec.	Fairview
Craven, Clair Glen.....	Agri.	Spec.	Meda
Crawford, Beatrice.....	Com.	Fr.	Salem
Crawford, James Arthur.....	For.	Sr.	Burlington, Iowa
Creel, June.....	H. E.	Soph.	Reno, Nevada
Crist, Ivan Paul.....	Com.	Spec.	Lompoc, Calif.
Crittenden, Marjorie.....	H. E.	Soph.	Portland
Cronemiller, Jr., Fred Parks.....	For.	Sr.	Lakeview
Cross, Stella Marie.....	H. E.	Soph.	Oregon City
Croswhite, John.....	Agri.	Sr.	Long Beach, Calif.
Crout, Mildred.....	H. E.	Jr.	Portland
Crowell, Chester Edward.....	Min.	Fr.	Takilma
Cuadra, John Amelius.....	Agri.	Voc.	San Francisco, Calif.
Cummins, Herschel Matthew.....	Phar.	Soph.	Melba, Idaho
Cunning, William.....	Agri.	Sr.	Baker
Cunningham, Bessie Alta.....	Com.	Spec.	Woodburn
Curl, Byron Arden.....	Min.	Fr.	Lebanon
Currin, Mary.....	H. E.	Sr.	Heppner
Currey, Herschel.....	Phar.	Spec.	Baker
Curry, Fred Martin.....	Phar.	Jr.	Albany
Curtis, Frank Griffin.....	Com.	Voc.	Marshfield
Curtis, Irene Lillian.....	H. E.	Fr.	Salem
Dadmun, Orin.....	Hi. E.	Soph.	Independence
Dahl, Ingwald Ferdinand.....	Agri.	Voc.	Vancouver, Wash.
Daigh, Charles Warren.....	Agri.	Fr.	Ontario, Calif.
Dailey, Chester Amos.....	Min.	Fr.	Portland
Dallas, Mabel Tabeaux.....	H. E.	Fr.	Corvallis
Daniel, Clarence.....	For.	Soph.	Monmouth
Daniels, William Chris.....	Agri.	Voc.	Hoquiam, Wash.
Daniells, Hugh Orren.....	Agri.	Soph.	Coeur d'Alene, Ida.
Darby, Una.....	H. E.	Soph.	Silverton
Darland, Zetta Ivy.....	H. E.	Spec.	Tulsa, Oklahoma
Darling, Jessie Ruth.....	Opt.		Corvallis
Darling, Lois Winnifred.....	H. E.	Spec.	Corvallis
Das Gupta, Surenda Nath.....	Agri.	Fr.	Calcutta, India
Davidson, Argus Harold.....	Agri.	Jr.	Meridian, Idaho
Davis, Bertha Marian.....	H. E.	Fr.	Marshfield
Davis, Edgar Willis.....	For.	Soph.	Corvallis
Davis, Kathleen.....	Opt.		Chinook, Wash.
Davis, LaNoel Bernard.....	Min.	Soph.	Salem
Davis, Laura.....	H. E.	Fr.	Gresham
Davis, Lois Grace.....	H. E.	Fr.	Myrtle Creek
Davis, Mabelle Josephine.....	H. E.	Sr.	Corvallis
Davis, Merton.....	Agri.	Spec.	Union

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Name	Course	Rank	Home Address
Davis, Paul Wesley.....	For.	Fr.	Pasadena, Calif.
Dean, Sidney Ceralpha.....	For.	Fr.	Castle Rock, Wash.
Dearmin, Lillian Gertrude.....	Com.	Sr.	Baker
Dezendorf, Nelson Corkish.....	C. E.	Fr.	Portland
Deggendorfer, Aloysius Joseph.....	Agri.	Voc.	Portland
Denman, Augustus Nathan.....	Agri.	Fr.	Tacoma, Wash.
Denniston, Nellie.....	Opt.		McMinnville
Denny, Elwood Jack.....	Min.	Fr.	Sumpter
Detering, William.....	Min.	Soph.	Portland
Dick, Carolyn.....	H. E.	Fr.	Salem
Dickerson, Jesse Earl.....	Agri.	Sr.	Parma, Idaho
Dickinson, Leroy Foster.....	For.	Soph.	Castle Rock, Wash.
Didtel, Kathryn Margaret.....	H. E.	Fr.	Roseburg
Dillord, Wilma.....	H. E.	Fr.	Lebanon
Ding, Albert Poy.....	For.	Fr.	Portland
Ding, Edward Ralph.....	Agri.	Soph.	Portland
Ding, Frank Gow.....	E. E.	Soph.	Portland
Dinges, William.....	M. A.	Voc.	Corvallis
Donnell, Merrill Martin.....	Phar.	Fr.	The Dalles
Doolittle, George Barnett.....	Min.	Soph.	Corvallis
Dorn, Lois.....	H. E.	Fr.	Pasadena, Calif.
Dorris, Zeo.....	Agri.	Jr.	Central Point
Doty, Paul Edward.....	Agri.	Sr.	Pasadena, Calif.
Dougherty, Helen Frances.....	H. E.	Jr.	Baker
Douglas, Alfred Earle.....	Phar.	Soph.	Grants Pass
Douglas, Elizabeth Ruth.....	H. E.	Fr.	Marshfield
Douglas, Olin Eugene.....	Phar.	Sr.	Grants Pass
Doukas, Samuel James.....	E. E.	Soph.	Durham, N. C.
Down, John Roscoe.....	E. E.	Spec.	Joseph
Downey, Clair Jackson.....	Agri.	Fr.	Holloywood, Calif.
Dryden, Winfield Joseph.....	Com.	Spec.	Corvallis
Duggan, Claude Shaw.....	For.	Spec.	Burmester, Utah
Duncan, Earl Ernest.....	Min.	Soph.	Albany
Duniway, Robert Edward.....	M. E.	Soph.	Portland
Dunn, George Edwin.....	Agri.	Sr.	Ashland
Dunn, Mary Jane.....	Phar.	Soph.	Sumpter
Dunn, Ruffus Earl.....	Agri.	Voc.	Meda
Dunn, Wallace Wilkinson.....	Com.	Fr.	Corvallis
Dunning, Eva.....	H. E.	Soph.	Stanfield
Dunning, Marilla Carrie.....	H. E.	Soph.	Stanfield
DuPuy, Fred Kinsey.....	M. E.	Fr.	Portland
DuRette, Cecil Alexander.....	E. E.	Soph.	Gervais
Durham, Lee Lawrence.....	Agri.	Fr.	Hermet, Calif.
Durrell, Frank.....	C. E.	Fr.	Independence
Dutton, George Lawrence.....	Com.	Soph.	Concordia, Kansas
Dye, Evangeline.....	H. E.	Soph.	Oregon City
Dye, Everett Willoughby.....	M. E.	Jr.	Oregon City
Dyer, Reginald Lyon.....	Com.	Fr.	Metcalf, Arizona
Dykes, Thelma.....	H. E.	Fr.	Corvallis
Dyson, Lizzie.....	H. E.	Jr.	Dahlia, Wash.

Name	Course	Rank	Home Address
Eakin, John Bronson	Agri.	Soph.	Dallas
Eakins, Jack Marion	Agri.	Jr.	South Pasadena, Calif.
Eames, DeLin	M. A.	Voc.	Cordova, Alaska
East, Gertrude Dorothy	H. E.	Fr.	Salem
Easton, Cleo	H. E.	Jr.	Fresno, Calif.
Eaton, Frances	H. E.	Soph.	Independence
Eccles, Jack	Log. E.	Fr.	Ogden, Utah
Echdahl, Edward	Agri.	Fr.	Los Angeles, Calif.
Eckley, Mood	Min.	Fr.	La Grande
Eckley, Victor	Agri.	Soph.	La Grande
Edwards, James Homer	Agri.	Sr.	Monroe
Edwards, Lewis Hermon	Min.	Soph.	Monroe
Eikelman, John Albert	Agri.	Fr.	San Bernardino, Calif.
Eilertsen, William Timothy	Agri.	Fr.	Clatskanie
Eilertson, John	Log. E.	Spec.	Clatskanie
Eldredge, Elizabeth Adelaide	H. E.	Fr.	Tacoma, Wash.
Ellestad, Melvin	I. A.	Soph.	Central Point
Elliott, Dorcas May	H. E.	Soph.	Vancouver, Wash.
Ellis, Floyd Belden	Com.	Fr.	Dallas
Elmer, Edna Elmira	H. E.	Voc.	Mulino
Elmer, Elsie	H. E.	Voc.	Mulino
Elmer, Esther Stout	H. E.	Spec.	Corvallis
Elofson, Harry William	For.	Jr.	Salida, Colorado
Emery, Burdette	Agri.	Fr.	Portland
Emery, Jaunita	Com.	Spec.	Eugene
Emmett, Marion	Opt.		Dee
Emmett, Mildred	Opt.		Dee
English, Felix	Hi. E.	Fr.	Salem
English, Pennoyer	Agri.	Soph.	Salem
Englund, Eric	Agri.	Jr.	Portland
Entermille, Fred	Agri.	Soph.	Baker
Epps, Grady David	Min.	Soph.	Hot Springs, Ark.
Ericson, Lars	I. A.	Spec.	Corvallis
Eriksen, Norma Elizabeth	H. E.	Fr.	Hermiston
Esp, Hermann	Agri.	Spec.	Grays River, Wash.
Esselstyn, Morris Earl	E. E.	Fr.	Echo
Estes, Jack Doe	Com.	Voc.	Meridian, Idaho
Etsell, George	Agri.	Jr.	Corvallis
Evans, Dorothy	H. E.	Voc.	Roseburg
Evans, Rolley	M. A.	Voc.	McMinnville
Everett, Verne Frazier	Agri.	Fr.	Portland
Farlow, Elbert Jewett	Phar.	Fr.	Ashland
Farmer, Oliver	Agri.	Voc.	Shedd
Farrior, Jessie Broadhurst	Phar.	Spec.	Portland
Feike, Zelta Fern	H. E.	Soph.	Portland
Fellows, Hurley	Agri.	Jr.	Oregon City
Felton, Donnie Sherman	Com.	Jr.	Corvallis
Ferguson, Alice	H. E.	Soph.	Helix
Ferguson, Arthur Edwin	Agri.	Sr.	Helix
Ferguson, Homer	M. E.	Jr.	Portland
Ferguson, Roy Clayton	Com.	Soph.	Salem

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Name	Course	Rank	Home Address
Ferguson, Vance Thomas	For.	Soph.	Portland
Ferguson, William	Com.	Fr.	Tipton, Iowa
Fertig, Charles Arthur	For.	Sr.	Hood River
Fiedler, Elizabeth Clare	H. E.	Fr.	Corvallis
Field, George Elias	Min.	Spec.	Ottawa, Ont., Canada
Finney, John	Agri.	Jr.	Astoria
Firestone, Chester LaVerne	Agri.	Jr.	Vancouver, Wash.
Fish, Henry	M. E.	Soph.	La Porte City, Iowa
Fisher, Bertha Marie	H. E.	Soph.	Haines
Fisher, Elmer	Min.	Soph.	Orchards, Wash.
Fisher, Harrison	Agri.	Spec.	Cincinnati, Ohio
Fisher, Henry Clay	Min.	Fr.	Orchards, Wash.
Fitts, Grace Elizabeth	H. E.	Spec.	Corvallis
Flaherty, Roland David	Com.	Fr.	Central Point
Flanagan, John William	Agri.	Spec.	San Gabriel, Calif.
Flanery, Floyd	Phar.	Sr.	Corvallis
Fleischman, Carl Julius	Com.	Spec.	Fairbanks, Alaska
Fletcher, Rita	H. E.	Fr.	Corvallis
Flippin, Thomas Joseph	Agri.	Sr.	Rainier
Floydstead, Harry	Com.	Jr.	Tacoma, Wash.
Fluharty, Arthur Lawrence	Agri.	Soph.	Corvallis
Foell, Harold Franklin	Agri.	Fr.	Los Angeles, Calif.
Foley, James Owen	Phar.	Soph.	Corvallis
Forbes, Alice	Com.	Fr.	Medford
Forbes, Ernest Stuart	M. E.	Voc.	Myrtle Creek
Forbis, Robert	Hi. E.	Soph.	Dilley
Ford, Hugh Pillsbury	M. E.	Jr.	Eugene
Ford, Kenneth	Agri.	Fr.	Union
Ford, Neal Kelly	M. E.	Jr.	Eugene
Forest, Bernice	H. E.	Jr.	Eugene
Forrey, Ira Huber	Agri.	Fr.	Pasadena, Calif.
Fortner, Philip Tuthill	Agri.	Jr.	Chicago, Ill.
Fox, LeRoy	Phar.	Fr.	Bend
Fox, Agnes Marie	Com.	Fr.	Bend
Fraley, Laurence Kiny	For.	Fr.	Portland
Franklin, John Morton	Agri.	Sr.	Seattle, Wash.
Franseen, Leonard Edward	Min.	Fr.	Portland
Fraser, Tom Henry	Agri.	Spec.	Corvallis
Frazier, Genevieve	Com.	Sr.	Salem
Freeland, Elaine Olive	H. E.	Spec.	Corvallis
Freeland, Elise Lucille	Agri.	Soph.	Corvallis
Freeland, Eugene Louis	Min.	Soph.	Parkplace
Freeman, Kelvin Burr	I. A.	Voc.	Portland
Freeman, Leonard Jay	Agri.	Fr.	Central Point
Freeman, Lola	H. E.	Fr.	Central Point
French, Irvine	Agri.	Soph.	Joseph
Freyler, Edna May	H. E.	Jr.	Corvallis
Fridley, Nettie May	H. E.	Sr.	Klondike
Friedenthal, Adolph Louis	Agri.	Soph.	Portland
Friedman, David	Agri.	Sr.	St. Charles, Ill.
Frink, Ellis Pearl	Min.	Soph.	Newberg

Name	Course	Rank	Home Address
Frizzell, Elsie Echo.....	H. E.	Voc.	Rickreall
Fu, Paul Chen.....	For.	Soph.	Washington, D. C.
Fudge, Laurence.....	E. E.	Soph.	Ballston
Fullerton, Charles Elwyn.....	Com.	Soph.	Olympia, Wash.
Fulton, Helen Louise.....	H. E.	Fr.	Corvallis
Funk, Anna Maud.....	H. E.	Sr.	Etna Mills, Calif.
Funk, Vera Magdalen.....	H. E.	Fr.	Corvallis
Futtrup, Ellen Marie.....	H. E.	Spec.	Vancouver, Wash.
Gain, Mrs. Mertie.....	Com.	Fr.	Corvallis
Gaither, Beal Mackey.....	Agri.	Fr.	Toledo
Galbraith, Alexander.....	Agri.	Jr.	Drymen, Scotland
Gammon, Earle Thomas.....	Agri.	Jr.	Hod, Calif.
Garbutt, John Donald.....	Agri.	Fr.	Sheridan, Wyoming
Gardner, Helen Corinna.....	H. E.	Fr.	Metzger
Gardner, Isaac George.....	E. E.	Soph.	Lansing, Mich.
Gardner, Vesta Hazyl.....	H. E.	Soph.	Salem
Garner, Robert Frankline.....	Agri.	Fr.	San Bernardino, Calif.
Garrett, Geary Everet.....	Com.	Soph.	Medford
Gatchell, Charles Barnard.....	I. A.	Sr.	Wakefield, Pa.
Gay, Ruth Leah.....	Com.	Fr.	Tipton, Iowa
Geller, Maurice Dave.....	Com.	Fr.	Portland
Genoud, Joseph Orlean.....	Phar.	Voc.	Camas, Wash.
George, Howard Stephens.....	Agri.	Fr.	Lewiston, Idaho
George, Marian Charlotte.....	Com.	Fr.	Lewiston, Idaho
Gibbs, Roy Harry.....	I. A.	Fr.	Gresham
Gildon, Elton Maurice.....	Agri.	Fr.	Albany
Gilfillan, Francois Arch.....	Phar.	Jr.	Delmar
Gilfillan, Hobart Ralph.....	M. E.	Fr.	Grants Pass
Gill, Whitney.....	Agri.	Fr.	Salem
Girard, Grace Winifred.....	H. E.	Fr.	Independence
Glaser, Elizabeth Carolyn.....	H. E.	Sr.	Lebanon
Glines, Emma Ione.....	H. E.	Jr.	Waldport
Glines, Hallie Winifred.....	H. E.	Jr.	Waldport
Gloman, Joseph Storey.....	Agri.	Soph.	Bellingham, Wash.
Glos, Karl Frederick.....	Com.	Spec.	Corvallis
Godard, Sherman Leslie.....	Agri.	Fr.	Corvallis
Godel, Howard Fisher.....	Agri.	Jr.	Portland
Goemanpott, Etta Oekeleine.....	H. E.	Soph.	Renville, Minn.
Golden, Arthur Edward.....	Agri.	Spec.	Corvallis
Golden, Zoe Hazel.....	H. E.	Sr.	Corvallis
Goodman, Linn Llewellyn.....	Agri.	Fr.	Freewater
Goodspeed, Ludella Whittlesey.....	H. E.	Spec.	Corvallis
Gordon, Will Hughes.....	Com.	Jr.	Portland
Gorman, Ralph Lee Roy.....	Min.	Fr.	Miller
Graf, Herman.....	M. E.	Sr.	Portland
Grafton, Jack Holmes.....	Agri.	Fr.	Chehalis, Wash.
Gragg, George Merle.....	Agri.	Sr.	Monroe
Graham, Earl Alvin.....	Phar.	Soph.	Emmett, Idaho
Granning, Burt.....	For.	Fr.	Theif River Falls, Minn.
Grasmoen, Otto Melvin.....	Hi. E.	Soph.	Jerseydale, Calif.
Graves, Leaman.....	Agri.	Jr.	Corvallis

UNDERGRADUATE STUDENTS

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Name	Course	Rank	Home Address
Gray, Donald Monroe	Agri.	Voc.	Philomath
Gray, Mattie	Opt.		Corvallis
Grayheal, Carlyle West	Agri.	Soph.	Cashmere, Wash.
Green, Byron Marshall	Min.	Fr.	Lordsburg, Calif.
Green, Carl Clifford	Agri.	Sr.	Parkdale
Green, Dorr Dudley	Agri.	Sr.	Parkdale
Green, Ellsworth Nelson	Min.	Fr.	Lordsburg, Calif.
Greene, Marjorie May	H. E.	Spec.	Aberdeen, Wash.
Greer, Medric	Agri.	Jr.	Dundee
Gregson, Agnes Irene	H. E.	Fr.	Salem
Gregg, John David	Hi. E.	Soph.	Whittier, Calif.
Grell, Edward	Agri.	Voc.	Albany
Grenfell, Waldo	Min.	Jr.	Portland
Gribskoo, Maren	H. E.	Jr.	Junction City
Grimes, Etta Belle	H. E.	Sr.	Vancouver, Wash.
Grimm, Frank Lawrence	Opt.		Onalaska, Wash.
Grover, Helen Margaret	Phar.	Voc.	Newport, Wash.
Groves, Frank William	Agri.	Fr.	Lebanon
Groves, Roshal Meryl	Agri.	Fr.	Lebanon
Grow, Homer Wallace	Agri.	Jr.	Corvallis
Grubbe, Eugene Erle	Phar.	Jr.	Elkton
Gunn, Henry Martin	Agri.	Fr.	Hermiston
Gurley, Wayne	E. E.	Jr.	Canby
Guthrie, Eunice Jane	H. E.	Spec.	Corvallis
Guthrie, Leroy Roland	M. E.	Jr.	Corvallis
Haberer, Erwin Sam	For.	Soph.	Chicago, Ill.
Hadlock, Florence Beatrice	H. E.	Voc.	Beaverton
Hackett, Joe	Com.	Fr.	Corvallis
Hacking, Esther Lucretia	Opt.		Corvallis
Hagen, Harry	Hi. E.	Soph.	Ferndale
Hagenbuch, Irene	Opt.		Monmouth
Haley, Helen Baldwin	H. E.	Soph.	Olympia, Wash.
Hall, Eleanor Grace	Opt.		Union
Hall, Elmer Edwards	Min.	Spec.	Baker
Hall, John Wesley	For.	Fr.	Myrtle Point
Hall, Phila Henrietta	H. E.	Spec.	Fairfax, Vermont
Hall, Roy Jennings	Com.	Fr.	Olympia, Wash.
Hall, Thorland	Agri.	Fr.	North Yakima, Wash.
Hall, Willard	E. E.	Fr.	Newberg
Hamlin, Lucile Anna	Opt.		Corvallis
Hammond, Edmund	M. E.	Soph.	Portland
Hammond, Josephine Marion	H. E.	Jr.	Silverton
Hancock, Margaret Mae	Com.	Jr.	Forest Grove
Hanley, Muhl Prudley	Agri.	Spec.	Medford
Hanna, Mary Prudence	H. E.	Fr.	Milwaukee, Wis.
Hanns, Rosina	Com.	Fr.	Corvallis
Hanns, Satolli William	I. A.	Jr.	Corvallis
Hansen, William	Min.	Fr.	Portland
Hanson, John Milton	Agri.	Soph.	North Bend
Hanson, Manette	Opt.		Corvallis
Hanthorn, Faith	H. E.	Sr.	Portland

Name	Course	Rank	Home Address
Happold, Louie.....	E. E.	Jr.	Klondike
Harder, Esther.....	H. E.	Spec.	Corvallis
Harder, Lella Viola.....	H. E.	Spec.	Corvallis
Hargrove, Vivian.....	Com.	Fr.	Salem
Harlocker, Hugh.....	Agri.	Fr.	Coquille
Harnett, Frank Berrell.....	Agri.	Fr.	Long Beach, Calif.
Harrington, Harwin Fremont.....	I. A.	Spec.	Denver, Colorado
Harrington, Helen Ruth.....	H. E.	Soph.	Salem
Harris, Clifford Oscar.....	Agri.	Soph.	Portland
Harris, Fred.....	Agri.	Voc.	Butte, Montana
Harris, Herbert Virginius.....	E. E.	Fr.	Oregon City
Harris, James.....	Com.	Fr.	Butte, Montana
Harris, Milton.....	C. E.	Sr.	Portland
Harris, Ralph.....	Phar.	Fr.	Ashland
Harrison, Evadne May.....	H. E.	Soph.	Oregon City
Hart, Opal Frances.....	H. E.	Jr.	Corvallis
Harth, Philip.....	M. E.	Spec.	Roseburg
Hartman, Orville Ernest.....	Agri.	Soph.	Parma, Idaho
Harvey, Endora Mae.....	H. E.	Fr.	Corvallis
Harvey, Nora.....	H. E.	Fr.	Pendleton
Harvey, Paul.....	M. E.	Fr.	Portland
Hatch, Edward Barker.....	E. E.	Spec.	Corvallis
Hatfield, John.....	Com.	Fr.	Dixonville
Haumesser, Elsie.....	H. E.	Spec.	Portland
Hawkins, Joe Cephus.....	Agri.	Sr.	Sayre, Oklahoma
Hawley, Francell.....	H. E.	Fr.	McCoy
Hay, Simon DeLaganean.....	Agri.	Soph.	Kankakee, Ill.
Hay, William Chalmers.....	Phar.	Spec.	Lihae, Hawaii
Hayes, Frank.....	Agri.	Sr.	Pasadena, Calif.
Hayslip, Earl.....	For.	Soph.	Vancouver, Wash.
Hazeltine, Caryl.....	For.	Jr.	Oakland, Calif.
Heffron, Frederick Lee.....	I. E.	Fr.	Dickinson, N. Dak.
Heider, Lorena.....	H. E.	Soph.	Sheridan
Heiss, William.....	Agri.	Soph.	Pasadena, Calif.
Hembree, Lowell Townsend.....	I. A.	Fr.	LaFayette
Henderson, Marguerite.....	H. E.	Fr.	Trester
Henderson, William Wright.....	Agri.	Sr.	Aiea, Hawaii
Henricks, John Joseph.....	Agri.	Fr.	Acme
Henshaw, Merritt.....	E. E.	Fr.	Portland
Hesse, Victor Otto.....	Min.	Fr.	Portland
Hesseltine, Earl Handley.....	Agri.	Fr.	Tulare, Calif.
Hettinger, Harry Howard.....	Agri.	Fr.	Portland
Hewett, Melford Grant.....	E. E.	Fr.	Hubbard
Hewett, Roland Myrle.....	M. E.	Soph.	Hubbard
Heywood, Victor.....	Agri.	Spec.	Portland
Hiatt, Lewis Eugene.....	E. E.	Fr.	Portland
Hicks, Hazel.....	H. E.	Fr.	Weiser, Idaho
Higgins, Winfield Charles.....	Agri.	Jr.	Reno, Nevada
Highland, Clara May.....	Opt.		Goldendale, Wash.
Hildreth, Mrs. F. M.....	H. E.	Fr.	Corvallis
Hill, Merle.....	Agri.	Voc.	Eugene

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Name	Course	Rank	Home Address
Hill, Ralph William	Agri.	Spec.	Fruitvale, Calif.
Hilliard, Agatha Amelia	H. E.	Spec.	London, England
Hillyard, James William	Hi. E.	Fr.	Gresham
Hilton, Harold Henry	Com.	Jr.	Portland
Hindley, Henry Clarence	Agri.	Spec.	Ferndale, Calif.
Hippard, Wesley George	Agri.	Soph.	Belleville, Ill.
Hodgson, Marion	H. E.	Jr.	Ashland
Hoffard, Albert	Agri.	Spec.	Modum, Norway
Holden, Donald Franklin	Agri.	Fr.	Portland
Holden, Jesse Lonson	M. E.	Soph.	Portland
Holgate, Lana Claire	Opt.		Corvallis
Holker, Thomas Booth	Agri.	Soph.	Toston, Montana
Hollingsworth, Esther	Com.	Fr.	Newberg
Holloway, William	Agri.	Spec.	Brownsville
Holmes, Florence	Agri.	Fr.	Portland
Holmes, Henry Percy	Min.	Fr.	Corvallis
Holmes, Joseph Folger	Com.	Fr.	Berkeley, Calif.
Holmes, Paul	Agri.	Soph.	Los Angeles, Calif.
Golroyd, Imojean	H. E.	Fr.	Corvallis
Holt, Grace, Marie	H. E.	Fr.	Salem
Hooper, Byron Jennings	E. E.	Fr.	Seaside
Hooper, John Amos	E. E.	Sr.	Corvallis
Hopkins, Bertha Gertrude	H. E.	Fr.	Tulare, Calif.
Hopkins, Fred Edgar	Agri.	Fr.	Tulare, Calif.
Hopkins, Horace Llewellyn	Agri.	Soph.	Corvallis
Homer, Clyde Dale	Phar.	Voc.	Corvallis
Horning, Gladys Louise	H. E.	Fr.	Corvallis
Houck, Agnes Catherine	H. E.	Soph.	Portland
Houck, Roy Lester	E. E.	Sr.	Dallas
Hout, Frank Helm	Opt.		Corvallis
Howard, Dale	Agri.	Soph.	Astoria
Howard, Mabel	H. E.	Spec.	St. Helens
Howard, Robert	Com.	Fr.	Corvallis
Howe, George Barr	For.	Jr.	Lents
Howells, Marie Katherine	H. E.	Jr.	Medford
Howey, Hazel Delle	H. E.	Voc.	Corvallis
Howey, Iva May	H. E.	Sr.	Corvallis
Howey, Olive Mary	H. E.	Fr.	Corvallis
Hubbard, Clarissa Susan	H. E.	Fr.	Monroe
Hubbard, Clyde	Phar.	Soph.	Weiser, Idaho
Hubbard, Earl	Agri.	Soph.	Medford
Hubbard, Verda	H. E.	Soph.	Rickreall
Huber, Karl	Agri.	Fr.	Chehalis, Wash.
Huff, Arthur	Agri.	Fr.	La Grande
Huffaker, Wilford	Com.	Jr.	Idaho Falls, Idaho
Humfeld, Harry	Agri.	Spec.	Portland
Humphrey, Esther Cynthia	H. E.	Sr.	Portland
Hung, Tung Ming	Agri.	Jr.	Amoy, China
Hunt, Echo	Phar.	Spec.	Salem
Hunt, Esther Hazel	H. E.	Fr.	Cooston
Hunt, John Mudge	Agri.	Spec.	Westport

Name	Course	Rank	Home Address
Hunter, Elmer Dean	Agri.	Soph.	Portland
Hunter, William Gilbert	Agri.	Soph.	Island City
Hurley, Alton	Agri.	Sr.	Seattle, Wash.
Hurner, Frank Joseph	E. E.	Fr.	Carlton
Husbands, Esther Elizabeth	H. E.	Jr.	Hood River
Husbands, Myrtle Blakley	Com.	Soph.	Hood River
Hutchings, Albert	Min.	Soph.	Brownsville
Hutchins, Gladys Georgene	H. E.	Fr.	Portland
Hutchinson, Frank Cochran	For.	Fr.	Salt Lake City, Utah
Hyams, Leo Klein	M. E.	Sr.	Portland
Hyatt, Waldron	For.	Fr.	Willamette
Hyde, James Beazley	Min.	Fr.	Portland
Ide, Fred Stitzel	Agri.	Fr.	Colville, Wash.
Ide, Marion Adeline	H. E.	Voc.	McMinnville
Ide, Russel Sanders	Agri.	Soph.	McMinnville
Imrie, Lillian Mildred	H. E.	Sr.	Melrose
Ingalls, Darwin Albert	E. E.	Soph.	Grants Pass
Ingels, Hollis Glen	H. E.	Jr.	Salem
Ingham, DeEtta	Com.	Sr.	Portland
Ireland, Edith	M. E.	Fr.	Roseburg
Ireland, Orlin LeRoy	Phar.	Spec.	Roseburg
Irving, Ralph	Agri.	Soph.	Harney
Iverson, Esther Hazel	H. E.	Fr.	Portland
Jackson, Edgar Francis	Agri.	Spec.	Portland
Jackson, Helen Perkins	H. E.	Voc.	Troutdale
Jackson, Thomas Scott	I. A.	Spec.	Lorane
Jacobsen, Eve	Opt.		Portland
Jacoby, Carl Charles	For.	Sr.	Toledo, Wash.
Jacoby, Fred	Agri.	Jr.	Portland
Jaeger, Harry	Agri.	Soph.	Portland
Jamison, Joseph Thomas	Agri.	Spec.	Nebraska
Janes, Marjorie	H. E.	Sr.	Portland
Jaquith, Roy	Agri.	Soph.	Laurel
Jenkins, John Donald	Min.	Fr.	Portland
Jeppesen, John	Agri.	Voc.	Bacona
Jernstedt, Leonard	Agri.	Fr.	Carlton
Jernstedt, Maurice	Agri.	Sr.	Carlton
Jessen, Ralph Frank	Agri.	Fr.	Piedmont, Calif.
Jessup, George Leroy	Agri.	Fr.	Portland
Jetley, Arthur Lee	Hi. E.	Jr.	Narrows
Jewel, Eslie Florence	Com.	Sr.	Corvallis
Jewel, Herbert	Com.	Jr.	Portland
Jewel, Paul	Phar.	Fr.	Corvallis
John, Morris	Com.	Sr.	Corvallis
John, Helen	H. E.	Fr.	Corvallis
Johnson, Anna Marie	H. E.	Sr.	Albany
Johnson, Carl Stewart	Agri.	Sr.	Portland
Johnson, Clarence Benjamin	Agri.	Sr.	Hermiston
Johnson, Darrel DeLos	Com.	Sr.	Corvallis
Johnson, Edlie Marjorie	H. E.	Fr.	Hermiston
Johnson, John Iver	Agri.	Soph.	Winlock, Wash.

UNDERGRADUATE STUDENTS

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Name	Course	Rank	Home Address
Johnson, Lillian.....	H. E.	Sr.	Corvallis
Johnson, Loren Albert.....	Agri.	Fr.	Scappoose
Johnson, Louis Merll.....	Com.	Sr.	Portland
Johnson, Mrs. R. D.....	Opt.		Corvallis
Johnson, Ralph Eber.....	Agri.	Fr.	Alliance, Nebraska
Johnson, Willard.....	For.	Jr.	Corvallis
Johnson, Winfield Haaken.....	M. E.	Fr.	Falls City
Johnston, Charles.....	Log. E.	Fr.	Portland
Johnston, Clarence Edwin.....	Log. E.	Fr.	Portland
Johnston, William Waters.....	Agri.	Sr.	Corvallis
Jonasen, Olaf Robert.....	For.	Sr.	Rock Island, Ill.
Jones, Bernice.....	H. E.	Jr.	Santa Maria, Calif.
Jones, Charlotte Louise.....	Com.	Fr.	La Grande
Jones, Clement.....	Agri.	Fr.	Portland
Jones, Edward.....	M. A.	Voc.	Corvallis
Jones, Leon Kilby.....	Agri.	Sr.	Seattle, Wash.
Jones, Margaret Frances.....	H. E.	Spec.	Corvallis
Jones, Ronald Ewart.....	Agri.	Jr.	Brooks
Jory, Elmo Clayton.....	Phar.	Jr.	Salem
Justo, Robert Nolasco.....	Agri.	Soph.	Buenos Aires, Argt.
Kane, Gardner Lewis.....	Agri.	Soph.	Gardena, Calif.
Kaegi, Morrice.....	Phar.	Fr.	Wilbur
Kay, Hazel Etelka.....	Com.	Voc.	Holland
Keene, Roy Servais.....	Agri.	Soph.	Calgary, Canada
Keil, Carl Keoman.....	E. E.	Jr.	Cosmopolis, Wash.
Keith, Gaylord.....	Com.	Fr.	La Center
Keller, Eugene John.....	Agri.	Spec.	Grays Harbor, Wash.
Kellogg, Karl Francis.....	Agri.	Fr.	Eugene
Kellogg, Ralph Lester.....	Min.	Soph.	Portland
Kelly, Eva Emma.....	H. E.	Fr.	Portland
Kelly, Jean McIntyre.....	Agri.	Fr.	Portland
Kelly, Ruth.....	H. E.	Jr.	Portland
Kelsey, Hazel.....	H. E.	Fr.	Portland
Kennedy, David Honore.....	Agri.	Fr.	Portland
Kennedy, Ruth Henrietta.....	H. E.	Soph.	Corvallis
Kenny, Dora Lotella.....	H. E.	Soph.	Portland
Kenton, Ralph Mills.....	M. E.	Sr.	Albany
Keppinger, Verna Mildred.....	H. E.	Soph.	Gervais
Kerr, Genieve.....	H. E.	Fr.	Corvallis
Kerr, Lynette.....	H. E.	Spec.	Logan, Wash.
Ketchum, Ruth Elizabeth.....	H. E.	Sr.	Independence
Kiddle, Lyle Blair.....	Com.	Jr.	Island City
Kimpton, Rowland Russell.....	M. A.	Voc.	Toston, Montana
Kimzey, Robert.....	Com.	Soph.	Corvallis
King, James Allen.....	Agri.	Fr.	Corvallis
King, Philip Sheridan.....	Agri.	Sr.	Portland
Kingsley, Everette Ellenor.....	H. E.	Soph.	Hermiston
Kinnison, Grace.....	H. E.	Sr.	Charleston, Missouri
Kirkland, Robin, Watson.....	Agri.	Voc.	Westham Island, B. C.
Kirkwood, Emile Glenn.....	Agri.	Soph.	Salem
Knight, Maurice Ruhberg.....	Agri.	Fr.	Santa Ana, Calif.

OREGON AGRICULTURAL COLLEGE

Name	Course	Rank	Home Address
Knoll, Paul Xenophon.....	For.	Fr.	Cedar Falls, Iowa
Knowles, Inez.....	H. E.	Jr.	La Grande
Kocken, Walter Joseph.....	Agri.	Jr.	Cleveland
Kohli, Chet Ram.....	Agri.	Soph.	Jammu, India
Koiner, Carl.....	Agri.	Spec.	Pasadena, Calif.
Koller, Frank Oswald.....	For.	Fr.	Astoria
Kooreman, Milton Abraham.....	M. E.	Soph.	Salem
Kraft, Harry William.....	Com.	Soph.	National City, Calif.
Krause, Cris Milton.....	Agri.	Soph.	Long Beach, Calif.
Kreitle, Margariete.....	H. E.	Soph.	Dallas
Kreps, Rhoda Jane.....	H. E.	Spec.	Laurel, Wash.
Krohn, LeRoy Bernard.....	M. E.	Fr.	Hood River
Krueger, Clarence William.....	E. E.	Jr.	Corvallis
Kruger, Herbert William.....	Min.	Sr.	Sherwood
Kubin, Junnie May.....	H. E.	Soph.	Salem
Kurtz, Martin.....	Com.	Jr.	Corvallis
Kyle, Kittie Gertrude.....	H. E.	Jr.	Corvallis
Lafky, Herman Ernest.....	Agri.	Soph.	La Grande
Lagus, Sigurd.....	Min.	Soph.	Astoria
Laing, Mabel Elsie.....	H. E.	Soph.	Boise, Idaho
Lamar, Howard Loring.....	Phar.	Fr.	Tillamook
Lamb, David.....	L. E.	Fr.	Corvallis
Lamb, Stewart Frank.....	Com.	Soph.	Albany
Lamoureux, Beatrice Josephine.....	Opt.		Camas, Wash.
Lamson, Maude Eliza.....	H. E.	Sr.	Cottage Grove
Lance, John Harland.....	Com.	Soph.	Corvallis
Lance, Neely Samuel.....	Agri.	Jr.	Corvallis
Landram, Telete.....	H. E.	Soph.	Merced, Calif.
Landreau, Catharine Palmyre.....	H. E.	Fr.	Corvallis
Landreau, Charles.....	M. A.	Voc.	Corvallis
Landwehr, Walter Richard.....	Min.	Soph.	Cottage Grove
Lane, Bernice.....	H. E.	Jr.	Corvallis
Lane, Dorothy Elizabeth.....	H. E.	Sr.	Los Angeles, Calif.
Langell, Fred Chastain.....	Agri.	Fr.	Bly
Langenau, Walter Henry.....	For.	Spec.	New York, N. Y.
Lankins, Hazel Claire.....	H. E.	Jr.	Hubbard
Lapham, Clarence Arthur.....	M. A.	Voc.	Toutle, Wash.
Larsen, Edward Louis.....	Com.	Fr.	Clatskanie
Larsen, Elmer Clarence.....	Com.	Fr.	Long Beach, Calif.
Larson, Ernest.....	Agri.	Voc.	Turner
Larsen, James Carl.....	E. E.	Soph.	Suver
Larson, Melvin Laverne.....	For.	Fr.	La Grande
Larson, Raymond Gilbert.....	Agri.	Soph.	Fairfield, Iowa
Lascar, Adhar Chandra.....	E. E.	Sr.	Calcutta, India
Lathrop, Willis.....	E. E.	Fr.	Portland
Lawson, James Elisha.....	Phar.	Fr.	McMinnville
Layton, Helen.....	H. E.	Fr.	Williams
Leavell, Leonard.....	Hi. E.	Soph.	Goldendale, Wash.
Leech, Archer Olin.....	M. E.	Jr.	Corvallis
Legg, Gladys Loretta.....	H. E.	Jr.	Portland
Legge, Roy.....	E. E.	Soph.	Gasport, Ind.

UNDERGRADUATE STUDENTS

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Name	Course	Rank	Home Address
Leland, Randolph Elliott	Agri.	Sr.	Los Angeles, Calif.
Lemieux, Diomedé Nichols	Com.	Voc.	Wrangell, Alaska
Lemieux, Louis Charles	Com.	Voc.	Wrangell, Alaska
Lemmon, Oral Miskell	Phar.	Fr.	Corvallis
Lenox, Gladys	H. E.	Fr.	Klamath Falls
Leonard, Charlie Lloyd	Com.	Soph.	Scappoose
Le Peau, Nathaniel Xavier	Hi. E.	Fr.	Portland
Letelier, George Henry	Com.	Jr.	Mill City
Levage, Harry Vernon	Agri.	Sr.	Florence
Lewis, Garfield	I. A.	Fr.	Long Beach, Calif.
Lewis, John Mitchell	Agri.	Jr.	Corvallis
Lewis, Louise Mary	Com.	Jr.	Portland
Lewis, Wade Vernon	Min.	Fr.	Portland
Lewthwaite, Alexander	M. A.	Voc.	Portland
Likins, Joseph Irving	M. E.	Soph.	Portland
Lindal, Joseph Walter	Com.	Fr.	Blaine, Wash.
Lindeman, Harold Henry	Agri.	Soph.	Alhambra, Calif.
Lindquist, Eric Arthur	Hi. E.	Fr.	Poplar, Wis.
Lindsay, Alexander Lewis	Agri.	Sr.	Corvallis
Lindsay, Annie McDonald	H. E.	Jr.	Corvallis
Lindsay, Edith McOnie	H. E.	Spec.	Corvallis
Lindsay, Oleta Eulalia	H. E.	Fr.	Salem
Linn, Ralph	Agri.	Soph.	Three Forks, Mont.
Linville, Myrtle Harriet	H. E.	Soph.	Astoria
Livery, Anne	Com.	Fr.	Liberty, Nebraska
Little, Hubert	Com.	Soph.	McMinnville
Littler, Florence Elizabeth	H. E.	Jr.	Forest Grove
Lodell, Carl	Com.	Fr.	Portland
Lockwood, Chauncey Adair	E. E.	Fr.	Salem
Long, Carl Douglas	Com.	Fr.	Oakland
Loop, Charles Roy	Agri.	Soph.	McMinnville
Loop, Rosa Viola	H. E.	Spec.	McMinnville
Loosley, Merle John	Agri.	Fr.	Fort Klamath
Loo, Nai Fatt	Agri.	Soph.	Victoria, B. C.
Lorence, Jennings Bryan	M. E.	Jr.	Monmouth
Lorence, Ruby Ann	Opt.		Monmouth
Loughary, Elithe	H. E.	Jr.	Monmouth
Love, Annis	H. E.	Jr.	Junction City
Low, Charles Earl	Hi. E.	Soph.	Salem
Lowe, Allen Nelson	Opt.		Hopkinton, Iowa
Lowry, Edith Mae	H. E.	Fr.	Bellingham, Wash.
Lowry, Ralph William	Agri.	Sr.	Corvallis
Lucas, Elva Alice	Opt.		Dallas
Lucas, William Thomas	Min.	Soph.	Parkplace
Luebke, George	For.	Fr.	Toutle, Wash.
Luebke, James	M. E.	Soph.	Toutle, Wash.
Lundgren, Alice	H. E.	Soph.	Corvallis
Lundgren, Carl Oliver	Agri.	Jr.	Corvallis
Luper, Loren John	Agri.	Fr.	Tangent
Luxton, William	Com.	Sr.	Idaho Falls, Idaho
Lyman, Lee Percy	Agri.	Fr.	Cleveland, Ohio

Name	Course	Rank	Home Address
Lyman, Lloyd Gauvy	For.	Soph.	Cleveland, Ohio
McAllister, Everett William	Com.	Soph.	Portland
McBride, Lola Winifred	H. E.	Soph.	Eddyville
McCormick, Harl Craig	I. A.	Sr.	Drain
McCornack, Alice	H. E.	Jr.	Marcola
McCornack, Eugene Francis	Agri.	Jr.	Klamath Falls
McCornack, Helen Jvelyn	H. E.	Fr.	Marcola
McCullough, Addie	H. E.	Soph.	Portland
McCaffrey, Lawrence Martin	For.	Jr.	Dayton, Ohio
McCain, Ernest Vivian	E. E.	Soph.	Corvallis
McCain, Isla Mae	H. E.	Fr.	Jordan Valley
McCamant, Davis Dave	Agri.	Fr.	Portland
McCaw, Bessie Constance	H. E.	Fr.	Prescott, Wash.
McCaw, Ernest	Agri.	Fr.	Prescott, Wash.
McCaw, Marie Mae	H. E.	Fr.	Prescott, Wash.
McClain, Arthur	Com.	Soph.	Salem
McClanathan, Robert Allen	Hi. E.	Fr.	Delano, Calif.
McClintock, Leon Edward	Com.	Spec.	Roseburg
McClung, Samuel Hudson	Agri.	Spec.	Los Angeles, Calif.
McClure, Wallace Windom	Com.	Spec.	Sunnyside, Wash.
McCollum, Charles Adelbert	For.	Jr.	Salinas, Calif.
McCollum, John Edgar	For.	Sr.	Salinas, Calif.
McComb, Allan Wallace	Agri.	Fr.	Klamath Falls
McDevitt, Ray Carlton	Com.	Fr.	Sumpter
McEwen, Daniel Franklin	Agri.	Jr.	Portland
McFarland, Donald Clinton	Com.	Fr.	Meridian, Idaho
McGeorge, William Lee	C. E.	Sr.	Eugene
McGilchrist, George Millar	Agri.	Fr.	Salem
McIntosh, William Edward	M. E.	Spec.	Corvallis
McKay, James Douglas	Agri.	Sr.	Portland
McKee, Stuart	Agri.	Fr.	Selah, Wash.
McKissick, Joe	Com.	Soph.	Wallace, Idaho
McLagan, Eva Crystal	Opt.		Tangent
McLagan, Ruby May	Opt.		Tangent
McMaster, Cedric Stuart	Agri.	Jr.	Corvallis
McMindes, Elvin Winfield	Agri.	Jr.	Corvallis
McMindes, Laura Jackson	H. E.	Jr.	Corvallis
McMinn, Bryan Towne	M. E.	Jr.	Portland
McNeil, Alex	Agri.	Soph.	Houston, Scotland
McPherson, Walter Jay	M. A.	Voc.	Forest Grove
McRay, Lela LaMiza	Com.	Fr.	Sherwood
McRay, Virgil Page	Agri.	Voc.	Sherwood
Maag, Esther Verna	H. E.	Soph.	Salem
MacCrow, Hughretta Naomi	Com.	Spec.	Goldendale, Wash.
MacDonald, Helen	H. E.	Sr.	Corvallis
Mack, Laurence Wallace	I. A.	Sr.	Boulder, Colorado
Madsen, Alvin Hjalmar	Agri.	Spec.	Silverton
Magnuson, Hazel Johanna	H. E.	Soph.	Everett, Wash.
Mahan, Adelaide Stevens	H. E.	Fr.	Chicago, Ill.
Mainwaring, William Bernard	Com.	Soph.	Newberg
Malone, Earl Nicholas	Agri.	Soph.	Corvallis

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Name	Course	Rank	Home Address
Maloney, Harold	Agri.	Fr.	Pendleton
Manning, Allen Munroe	E. E.	Fr.	Vancouver, Wash.
Manning, George Everett	Com.	Fr.	Amity
Manuel, Mildred Marian	H. E.	Sr.	Oakland, Calif.
Marshall, Julian Stephens	Min.	Soph.	Rapid City, S. D.
Martens, Maime	H. E.	Fr.	Chinook, Mont.
Martin, Elsie Pauline	H. E.	Soph.	McMinnville
Martin, Emily Cassandra	H. E.	Fr.	Corvallis
Martin, Glen Roy	Agri.	Soph.	McMinnville
Martin, Millard	Agri.	Spec.	Gardena, Calif.
Martin, Porter Wilson	M. E.	Sr.	Corvallis
Mason, Ben	M. E.	Jr.	Puyallup, Wash.
Mason, Earl George	For.	Soph.	Salem
Mason, Howard	Agri.	Soph.	Pasadena, Calif.
Masson, Robert Clifford	Agri.	Fr.	Eagle Creek
Mather, Irving Allen	Min.	Fr.	Dupont, Wash.
Matlock, Horace Wood	Agri.	Voc.	Canyon City
Mattox, Forrest William	M. E.	Fr.	Long Beach, Calif.
Maxwell, Grace Eleanor	H. E.	Fr.	Weiser, Idaho
Maxwell, Jane Irene	H. E.	Spec.	Eugene
May, Lula Litten	H. E.	Jr.	Monkland
May, Marcus Wayland	Agri.	Fr.	Pendleton
Mayfield, Frank	Agri.	Fr.	Central Point
Mayne, Harry McDonald	Agri.	Jr.	Salt Lake City, Utah
Meacham, Clifford	Agri.	Fr.	Weiser, Idaho
Meacham, Leta	H. E.	Jr.	Weiser, Idaho
Meade, William Vanard	M. E.	Fr.	Orengo
Mears, Raymond	Agri.	Spec.	Shedd
Meek, Margaret	H. E.	Sr.	Oakland, Calif.
Meier, Albert	Agri.	Jr.	Hillsdale
Meins, Harry	Agri.	Voc.	Prairie, Wash.
Meloy, George Everett	M. E.	Soph.	Corvallis
Meloy, Kathleen	H. E.	Spec.	Corvallis
Meloy, Lulu Vivian	H. E.	Spec.	Corvallis
Mentzer, Leland	I. A.	Soph.	Pendleton
Mercer, Helen Bernetta	H. E.	Sr.	Salem
Marriott, William Andrew	E. E.	Fr.	Milwaukie
Meshner, Sophie	H. E.	Jr.	Portland
Metzger, Floyd Sanford	Com.	Sr.	Gresham
Metzler, Ivan	Com.	Jr.	North Bend
Meyers, Cornelius William	Min.	Sr.	Portland
Meyers, Cyril Lawrence	Min.	Sr.	Portland
Meyers, Madeline Cathryn	Opt.		Portland
Mickelsen, Chester	Agri.	Voc.	Portland
Middlekauff, Ruth Helen	H. E.	Fr.	Corvallis
Miller, Clare Albert	E. E.	Fr.	Oregon City
Miller, Edwin Harvey	Min.	Sr.	Lexington
Miller, Eula Ellen	H. E.	Soph.	Corvallis
Miller, Grace	H. E.	Soph.	Corvallis
Miller, Helen Lavenia	H. E.	Sr.	Corvallis
Miller, Iva Curtis	Com.	Fr.	Union

OREGON AGRICULTURAL COLLEGE

Name	Course	Rank	Home Address
Miller, Jessie Kate	H. E.	Fr.	Harrisburg
Miller, Leslie Allan	Agri.	Fr.	Grand Forks, B. C.
Miller, Lloyd	E. E.	Fr.	Portland
Miller, Marjorie Modelle	Opt.		Portland
Miller, Milton Marion	Agri.	Fr.	Oregon City
Mills, Harold Milton	Agri.	Soph.	Corvallis
Mitchell, George Adamson	Agri.	Soph.	Upland, Calif.
Mjelde, Evelyn Marie	Opt.		Livingston, Montana
Moberg, James Dalgety	E. E.	Jr.	Astoria
Moffitt, Victor Lee	Com.	Voc.	Salem
Mohney, Curtis Gilliam	Min.	Fr.	Salem
Moist, Charles Morgan	Phar.	Soph.	Lebanon
Monger, Walter Victor	E. E.	Sr.	Parkplace
Moody, Charlotte Elizabeth	H. E.	Jr.	Pasadena, Calif.
Moody, Clifford	Com.	Voc.	Fairbanks, Alaska
Moore, Alice	Agri.	Sr.	Wichita, Kansas
Moore, Genevieve	H. E.	Fr.	Corvallis
Moore, Heman Harvey	Agri.	Spec.	Bend
Moore, Iva Grace	H. E.	Voc.	Corvallis
Moore, Leland	Agri.	Jr.	Gresham
Moore, Myra	H. E.	Jr.	Corvallis
Moore, Neva	Opt.		Corvallis
Moore, Tom Ormand	Agri.	Voc.	Corvallis
Moran, Paul Francis	Agri.	Fr.	Seattle, Wash.
Morcom, Minnie Etta	H. E.	Fr.	Corvallis
Morcom, Margaret Myrtle	H. E.	Fr.	Corvallis
Morgan, Beulah Inez	H. E.	Jr.	Corvallis
Morgan, Charles Leslie	E. E.	Fr.	Portland
Morgan, Walter John	Agri.	Sr.	Portland
Morley, Frances Marian	H. E.	Fr.	Silverton
Morrell, Alfred Wilbur	Agri.	Fr.	Arcata, Calif.
Morrill, Dorothy Clark	H. E.	Fr.	Vancouver, B. C.
Morris, David Clyde	Min.	Sr.	Edmond, Oklahoma
Morris, Homer	M. E.	Jr.	Yamhill
Morris, Mary Blanche	H. E.	Sr.	Tennant, Iowa
Morris, Ray August	Agri.	Soph.	Oregon City
Morrison, Ernest	E. E.	Fr.	Amarillo, Texas
Morrison, Eugene	Min.	Soph.	William
Morrow, William Harold	Agri.	Soph.	Portland
Morton, Ruth	H. E.	Jr.	White Salmon, Wash.
Moss, Lloyd Arthur	Agri.	Soph.	Hood River
Motz, Frederick Allen	Agri.	Sr.	Rock Island, Ill.
Moulton, Arthur Samuel	Agri.	Soph.	Portland
Mudge, Frank Raymond	Com.	Spec.	Knappa
Mulkey, Oren	E. E.	Sr.	Myrtle Creek
Muller, Ruth Margaret	H. E.	Soph.	Eugene
Munson, Robert Bliss	E. E.	Fr.	Milwaukee, Wisconsin
Murhard, Erroll Alexander	Agri.	Fr.	Portland
Murneek, Andrew Edward	Agri.	Sr.	Talsen, Russia
Murphy, Clara May	H. E.	Sr.	Eden
Murphy, Donald Ridgway	Agri.	Spec.	Salem

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Name	Course	Rank	Home Address
Murphy, Frank Thomas.....	Agri.	Sr.	Alhambra, Calif.
Murphy, Pat John.....	Min.	Spec.	Butte, Montana
Musgrave, Hester.....	H. E.	Fr.	Corvallis
Myers, Claire Edgar.....	Phar.	Fr.	Pendleton
Myers, Clarence William.....	Agri.	Sr.	Moneta, Calif.
Myers, Francis.....	M. E.	Jr.	Corvallis
Myers, Stanley Howard.....	E. E.	Jr.	Corvallis
Noderman, George Vincent.....	M. E.	Soph.	Turner
Namba, Masno.....	Agri.	Voc.	Portland
Neal, Martena Ruth.....	H. E.	Jr.	Hood River
Nesbitt, Clarence Scott.....	Com.	Jr.	Corvallis
Nestelle, Fred Washington.....	Agri.	Jr.	Seattle, Wash.
Nettleton, Harry.....	For.	Soph.	La Porte, Colorado
Neuhaus, Karl Frank.....	Agri.	Soph.	Ferndale, Calif.
Nevins, John.....	Agri.	Soph.	Long Beach, Calif.
Newman, Don.....	Phar.	Spec.	Portland
Newman, Erbine.....	Agri.	Sr.	Corvallis
Newman, Meier.....	Com.	Jr.	Portland
Newton, Bessie Fay.....	H. E.	Spec.	Corvallis
Niblen, Amy.....	H. E.	Jr.	Portland
Niblin, Ruth Calvina.....	H. E.	Soph.	Portland
Nichols, Benjamin Hodge, Jr.....	M. E.	Soph.	Glendale, Calif.
Nichols, Dewey.....	M. E.	Fr.	Bonanza
Nichols, Floyd Myron.....	E. E.	Spec.	Corvallis
Nichols, Fred.....	Agri.	Jr.	Glendale, Calif.
Nichols, Rudolph.....	Agri.	Jr.	Corvallis
Nichols, Tressa Elizabeth.....	Opt.		Corvallis
Nielsen, Christian Dejgaard.....	Agri.	Voc.	Strellev, Denmark
Nielson, Sidney Maurice.....	Agri.	Soph.	Ferndale, Calif.
Nisley, Barbara Hoffman.....	H. E.	Soph.	Portland
Noble, Audrey Martha.....	H. E.	Fr.	Prineville
Nolan, Edward Victor.....	Com.	Sr.	Corvallis
Noles, Carl.....	Com.	Jr.	Dundee, Texas
Nordling, David Nathaniel.....	I. A.	Jr.	Colton
Norgren, Clarence.....	Agri.	Voc.	Vancouver, Wash.
Norman, Ruth Alma.....	Com.	Sr.	Milton
Norris, Rita Pearl.....	H. E.	Fr.	Burley, Idaho
North, David Starr.....	I. A.	Jr.	Monmouth
Norton, Harry Stewart.....	Com.	Soph.	Coquille
Norton, Lola.....	H. E.	Sr.	Corvallis
Norton, Walter Bert.....	Agri.	Sr.	Corvallis
Norton, Wenny Leonard.....	Agri.	Soph.	Corvallis
O'Harra, Herman Edward.....	Agri.	Jr.	Weston
Oliver, Alfred.....	Agri.	Jr.	Salem
Oliver, Burt Leroy.....	For.	Soph.	Diamond
Oliver, Mrs. Genevieve Gertrude.....	H. E.	Spec.	Diamond
Olsen, Edward Carl.....	Com.	Spec.	Portland
O'Neil, William James.....	For.	Sr.	Chippewa Falls, Wis.
Opedal, Martha.....	H. E.	Fr.	Silverton
Opstad, Otto Melvin.....	Agri.	Spec.	Blaine
Orem, Clarence Leslie.....	Min.	Fr.	Mollalla

OREGON AGRICULTURAL COLLEGE

Name	Course	Rank	Home Address
Orr, George David	Agri.	Fr.	Corvallis
Orr, Judson	I. A.	Fr.	Corvallis
Orr, Victor	Agri.	Jr.	Creswell
Osborne, Gifford Lawson	Min.	Fr.	Aurora
Osburn, Orren Edgar	E. E.	Jr.	The Dalles
Ostrander, Aubrey	Agri.	Jr.	Portland
Ostrander, Wilbur Wesley	M. A.	Voc.	Gold Beach
Owens, Iva	Com.	Spec.	Portland
Owens, Jacob Henry	Phar.	Spec.	Raymond, Wash.
Page, Chester Leroy	M. E.	Soph.	Whitehall, Montana
Paine, Charles	Com.	Jr.	Caldwell, Idaho
Paine, Allen	E. E.	Sr.	Portland
Paine, John	Agri.	Fr.	Caldwell, Idaho
Paine, Lincoln	Com.	Jr.	Caldwell, Idaho
Palmer, Bert Cecil	Com.	Soph.	Jordan Valley
Palmer, Charles Luther	Phar.	Sr.	Baker
Palmer, Lowell Elbert	Com.	Fr.	Jordan Valley
Palmer, Walter	Phar.	Spec.	Trinidad, Colorado
Parker, Alan Berthold	Agri.	Fr.	Pasadena, Calif.
Parker, Lewis	Agri.	Soph.	Needles, Calif.
Paroni, Anthony	Agri.	Jr.	Berkeley, Calif.
Parrish, Philip Hammon	Agri.	Sr.	Corvallis
Parsons, Arthur	M. A.	Voc.	Crabtree
Parsons, Cyril Malcolm	Hi. E.	Fr.	Bonanza
Parsons, Howard Brewster	Agri.	Fr.	Claremont, Calif.
Partin, Rae	H. E.	Jr.	Summer Lake
Patchett, Walter	Agri.	Fr.	Berkeley, Calif.
Patrick, Ethel	H. E.	Spec.	Roseburg
Patterson, Margaret	H. E.	Sr.	Portland
Patton, Harry Clifford	For.	Sr.	Maccleay
Patton, Palmer	Agri.	Jr.	Chicago, Ill.
Patty, Florence Valeria	H. E.	Fr.	Amity
Paull, James Gregory	Agri.	Jr.	Los Angeles, Calif.
Paulsen, Edward Meirer	For.	Sr.	Portland
Paulson, Oscar	Agri.	Fr.	Corvallis
Payzant, Charles Young	Agri.	Voc.	Chehalis, Wash.
Peaslee, Ruth Erickson	H. E.	Spec.	Corvallis
Peavy, Bradley Adelbert	For.	Fr.	Corvallis
Peeler, Royce Mallery	Phar.	Fr.	Seaside
Pendergrass, James Elmo	Phar.	Spec.	Clovis, Calif.
Pendergrass, Travis Ray	Phar.	Spec.	Clovis, Calif.
Pernot, Dorothy	H. E.	Spec.	Corvallis
Perry, Dale Alfred	Agri.	Fr.	Houlton
Perry, Jesse Lee	Hi. E.	Fr.	Wendling
Persinger, Clanton	Agri.	Voc.	Corvallis
Peterson, Esther Helen	H. E.	Fr.	Portland
Peterson, Inez Mae	Com.	Soph.	Corvallis
Peterson, May	Com.	Spec.	North Bend
Peterson, Robert	Agri.	Soph.	Aumsville
Phillips, Hazel Elsie	H. E.	Voc.	Izee
Phillips, James Robert	Agri.	Fr.	Corvallis

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Name	Course	Rank	Home Address
Phillips, Walter Anderson.....	Com.	Jr.	Ashland
Pierce, Lloyd Byron.....	Agri.	Spec.	La Grande
Pierce, Walter James.....	Agri.	Fr.	Mount Vernon, Wash.
Pietzker, Henry Fred.....	E. E.	Jr.	Portland
Pike, Howard Elmer.....	Com.	Voc.	Corvallis
Pike, Mary.....	Com.	Voc.	Corvallis
Pimm, Charles Jesse.....	E. E.	Sr.	Philomath
Pinckney, Dunbar.....	Agri.	Sr.	Aberdeen, Wash.
Pine, William Douglas.....	Agri.	Jr.	Berkeley, Calif.
Pinkerton, Harry.....	Com.	Fr.	Corvallis
Pitman, John Elijah.....	Agri.	Sr.	Fairmont, Calif.
Pitney, Mary Eleanor.....	H. E.	Jr.	Junction City
Planta, Olive M. Francis.....	Agri.	Spec.	Nanaimo, B. C., Can.
Platt, Dwight Gilbert.....	M. E.	Sr.	Idaho Falls, Idaho
Plov, Nellie.....	H. E.	Voc.	Suver
Poling, Harold Wayne.....	Min.	Soph.	Dallas
Pollanz, Percy Edward.....	Agri.	Fr.	West Linn
Polson, Nellie Irene.....	H. E.	Jr.	Mount Vernon, Wash.
Poole, Elmer Gordon.....	Min.	Soph.	McMinnville
Poole, Leslie Erving.....	M. E.	Fr.	Corvallis
Poole, Roy Mabae.....	Min.	Soph.	Corvallis
Porter, Charles Orland.....	E. E.	Fr.	Ashland
Porter, Dale.....	E. E.	Jr.	McMinnville
Porter, Harry Baxter.....	M. E.	Sr.	Myrtle Creek
Porter, Nellie Bly.....	H. E.	Fr.	Silverton
Porter, Ted John.....	Agri.	Sr.	Halsey
Post, Clara Olga.....	Com.	Sr.	Blachly
Post, Elmer Oren.....	Agri.	Sr.	Blachly
Powell, Clares Clinton.....	E. E.	Fr.	Monmouth
Powell, DeWitt.....	Min.	Fr.	Corvallis
Powell, Lydia.....	H. E.	Sr.	Monmouth
Powell, Middleton Randolph.....	I. A.	Fr.	Fruitland, Idaho
Powell, Norval Hubert.....	E. E.	Fr.	Cottage Grove
Powell, Opal Erma.....	H. E.	Fr.	North Bend
Powell, Wilmer Dwight.....	Agri.	Soph.	Monmouth
Powers, Fred.....	I. A.	Sr.	Oakland
Powers, Verne Leona.....	H. E.	Soph.	Corvallis
Prather, Harry Albert.....	Phar.	Fr.	Klamath Falls
Prather, Marie Alma.....	Com.	Soph.	Corvallis
Prather, Mildred Esther.....	H. E.	Spec.	Corvallis
Prentiss, Sara Watt.....	H. E.	Sr.	Samia, Ont., Can.
Presley, Albert.....	Agri.	Fr.	Grants Pass
Preston, Edward Lincoln.....	Agri.	Soph.	Dallas
Prettyman, Ella Edythe.....	Opt.		Ashland
Price, Curtis.....	M. E.	Fr.	Springfield
Price, Elise Groves.....	H. E.	Fr.	Sifton, Wash.
Price, Inez Fay.....	H. E.	Spec.	Springfield
Price, Willard Watts.....	Com.	Fr.	Scappoose
Prindle, Ray.....	Min.	Sr.	Payette, Idaho
Proctor, Daryl Franklin.....	Agri.	Fr.	Salem
Proebstel, John Elden.....	Agri.	Soph.	Big Pine, Calif.

OREGON AGRICULTURAL COLLEGE

Name	Course	Rank	Home Address
Pryer, Clarence Edwin	Phar.	Sr.	Fortuna, Calif.
Pugh, John McKinley	Agri.	Fr.	Shedd
Purvine, Laurence	Com.	Soph.	Salem
Quant, Emily Alice	H. E.	Fr.	Albee
Quine, Herbert Donald	Com.	Fr.	Roseburg
Raab, Edith Belle	Opt.		North Bend
Radcliff, Edward Everett	Agri.	Soph.	Burbank, Calif.
Rains, Opal Irene	H. E.	Soph.	Oregon City
Ramsdell, George Votts James	Agri.	Jr.	Riverwood
Rankin, Charles	Agri.	Fr.	Los Angeles, Calif.
Ranks, Grace Miller	H. E.	Voc.	Springfield
Ransom, Myrtle Blanche	H. E.	Spec.	Battle Ground
Rapp, Leo	E. E.	Fr.	Roseburg
Ray, Howard	Agri.	Jr.	Roslyn, Wash.
Rayburn, Ralph Blanchard	Agri.	Voc.	Whittier, Calif.
Raymond, Thayer	H. E.	Soph.	Raymond, Wash.
Rearden, Barton	I. A.	Soph.	Corvallis
Rearden, Henry	Com.	Soph.	Corvallis
Reber, Albert Roy	Agri.	Jr.	Kansas City, Kansas
Records, Warren Willis	Agri.	Fr.	Umapine
Redmond, Agnes Theresa	H. E.	Jr.	Portland
Reed, Ada	H. E.	Jr.	Portland
Reed, Frank Leland	For.	Soph.	Hermet, Calif.
Reed, Maurice Albert	Agri.	Soph.	Fresno, Calif.
Reese, Neilsen Walker	Hi. E.	Jr.	Corvallis
Regnell, Lloyd Clifford	For.	Soph.	Hood River
Reichart, Zatalie Loucille	Com.	Fr.	Corvallis
Reichart, Robert Ray	Com.	Sr.	Corvallis
Reid, Ralph	Min.	Soph.	Portland
Reitsma, Catharina	H. E.	Fr.	Portland
Reitsma, Ray	M. E.	Voc.	Portland
Reynolds, Earl	Agri.	Soph.	La Grande
Reynolds, Gladys	H. E.	Fr.	Independence
Reynolds, Hugh Milton	Agri.	Sr.	Pasadena, Calif.
Rhodes, Solomon Martin	Agri.	Soph.	Conington, Tenn.
Rice, Clarence De Puy	Agri.	Jr.	Prineville
Rice, Gladys	H. E.	Soph.	Corvallis
Rice, Leaton Alanson	Min.	Jr.	Corvallis
Richard, Lorene	Com.	Sr.	Corvallis
Richardson, Elizabeth Clay	H. E.	Fr.	Portland
Richardson, Ora Lavone	H. E.	Fr.	Portland
Richey, Lester	For.	Soph.	Corvallis
Richter, Paul Eugene	Agri.	Soph.	Oak Grove
Ricketts, Ellsworth Gould	Hi. E.	Soph.	Portland
Rickson, Carl August	For.	Fr.	Portland
Riddell, Christine Elsie	H. E.	Spec.	Fruitvale, Idaho
Riddle, Julius	E. E.	Soph.	Roseburg
Riddle, Katheryn	H. E.	Spec.	La Grande
Ritchie, Douglas William	Agri.	Jr.	Corvallis
Roake, John Albert	Min.	Fr.	Oregon City
Robbins, George	I. A.	Spec.	Forsyth, N. C.

UNDERGRADUATE STUDENTS

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Name	Course	Rank	Home Address
Roberts, Jessamy	H. E.	Sr.	Portland
Robertson, Mary Catharine	H. E.	Soph.	Portland
Robinson, George Vinton	C. E.	Soph.	Forest Grove
Robinson, Marian Isabelle	H. E.	Fr.	Seattle, Wash.
Roche, Chester	Agri.	Fr.	Brownsville
Rodgers, Gladys Belle	H. E.	Sr.	Gardena, Calif.
Rodgers, Hugh Graham	Com.	Jr.	Cupertino, Calif.
Roehrig, Frederick Austin	E. E.	Jr.	Pasadena, Calif.
Rogers, Hugh George	Agri.	Fr.	Independence
Rogers, Mary Alice	H. E.	Jr.	Corvallis
Row, Narayana	Com.	Jr.	Kudravalli, India
Romans, Squire Bernard	Agri.	Spec.	Danburg, Conn.
Romig, Edith Marie	H. E.	Voc.	McCoy
Rose, Charles Duncan	Agri.	Fr.	Seattle, Wash.
Roseman, Arthur Mills	Agri.	Soph.	Corvallis
Rosenquest, Vera	H. E.	Fr.	Salem
Roser, Edgar Noell	E. E.	Fr.	Oskaloosa, Kansas
Ross, Frank Earl	Min.	Fr.	Central Point
Ross, Linden	Agri.	Soph.	Los Angeles, Calif.
Ross, Lucile	H. E.	Fr.	Irving
Rountree, Kenneth	Min.	Jr.	Hillsdale
Rugh, Gladys	H. E.	Spec.	Eugene
Rundell, Hugh Dean	M. E.	Soph.	Newberg
Runyan, Wilber Arthur	Hi. E.	Jr.	Portland
Rupert, Emily Mae	H. E.	Fr.	Portland
Ruch, Benjamin	C. E.	Sr.	Elgin
Russell, Charles	Agri.	Soph.	Pendleton
Russell, Fred Campbell	Agri.	Fr.	Pendleton
Russell, John Robert	Agri.	Fr.	Spokane, Wash.
Russell, Marjorie	H. E.	Fr.	Everett, Wash.
Russell, Ralph	Agri.	Soph.	La Grande
Ryan, Anna Louise	H. E.	Spec.	Auburn, Wash.
Sabin, Lynn Platt	Com.	Fr.	Grants Pass
Sanders, Lewis Claude	I. A.	Sr.	Corvallis
Sandon, Helen Beatrice	H. E.	Soph.	Corvallis
Sarna, Sajjan	Agri.	Fr.	Rawalpindi City, India
Satterlee, Guy Norman	Agri.	Spec.	Tidewater
Saunders, Edward Towle	Hi. E.	Soph.	Portland
Sawyer, Doris	H. E.	Jr.	Salem
Sawyers, Wilbur Ernest	Agri.	Fr.	Santa Barbara, Calif.
Says, Carroll	Agri.	Spec.	Moro
Scea, Paul Waldie	Com.	Fr.	Milton
Scharzinger, Harold Henry	Agri.	Spec.	Oretown
Schley, Ringgold	Hi. E.	Fr.	Vancouver, B. C.
Schmidt, Ernest	Phar.	Voc.	Corvallis
Schminky, Harold Bruce	Hi. E.	Fr.	Eagle Creek
Schoeffel, Raymond Louis	I. A.	Sr.	Los Angeles, Calif.
Schooley, Paul Tafel Von	Agri.	Sr.	Santa Ana, Calif.
Schoth, Albert Joseph	Agri.	Jr.	Oregon City
Schott, Ralph	Hi. E.	Spec.	Condon
Schott, Rena	H. E.	Soph.	Salem

OREGON AGRICULTURAL COLLEGE

Name	Course	Rank	Home Address
Schoubor, Lee Morris	M. E.	Fr.	Portland
Schrepele, Oliver Henry	Agri.	Sr.	Corvallis
Schuerman, Fred	Com.	Fr.	McCloud, Calif.
Schumacher, John Herman	E. E.	Fr.	Mill City
Schwarz, George	E. E.	Soph.	Portland
Scott, Alfred Merle	M. E.	Soph.	Scotts Mills
Scott, Albert Miles	Agri.	Jr.	Ada
Scott, Clarence Vincent	Agri.	Sr.	Chicago, Ill.
Scott, Elmer Riggs	Agri.	Fr.	Ada
Searcy, Philip Thomas	M. A.	Voc.	Moro
Sebo, Clarence	Agri.	Fr.	Silverton
Sefrit, Charles Leonard	Min.	Fr.	Bellingham, Wash.
Seibert, Emil	Com.	Fr.	Pendleton
Sein, Walter	Agri.	Fr.	Los Angeles, Calif.
Selover, Eleanor Marie	H. E.	Soph.	Klamath Agency
Selph, Raymond	Agri.	Jr.	Los Angeles, Calif.
Sessions, Philip Roddis	Com.	Sr.	Portland
Shake, Harold	Phar.	Spec.	Payette, Idaho
Shake, Rodney Hudson	Min.	Soph.	Payette, Idaho
Shank, Arthur Lincoln	Agri.	Jr.	Seattle, Wash.
Shankland, Albert	I. A.	Jr.	Estacada
Sharp, Anne	H. E.	Soph.	Yamhill
Shaver, Leonard Raymond	Com.	Soph.	Portland
Shaw, Cyril Glenalton	M. A.	Voc.	Astoria
Shaw, Ralph Fred	Agri.	Jr.	Portland
Shea, Esther Elizabeth	H. E.	Fr.	Portland
Shedd, Bertha Lucile	H. E.	Jr.	Shedd
Sheffield, Emma Rohrer	H. E.	Voc.	Newport
Sheffield, Frank Brizee	For.	Fr.	Newport
Shelley, Marjorie Louise	H. E.	Fr.	Everett, Wash.
Shelton, Wilbur Walter	Com.	Fr.	Pomeroy, Wash.
Sheppard, Don	Agri.	Fr.	Baker
Sheppard, Will	Com.	Soph.	Hood River
Short, Elaine	H. E.	Soph.	Corvallis
Short, Eugene Francis	Com.	Fr.	Long Beach, Calif.
Short, Mabel Eudora	H. E.	Spec.	Corvallis
Short, Vivian Frank	Agri.	Spec.	Corvallis
Shotwell, Jesse Gordon	H. E.	Fr.	Hermiston
Shutt, Clare Hubert	Agri.	Voc.	Aberdeen, Wash.
Sibley, Benjamin Cassins	Agri.	Soph.	San Bernardino, Cal.
Sieberts, Adolph Gustaff	Com.	Sr.	Portland
Simons, Flora	H. E.	Fr.	Tangent
Simpson, Allen Robert	Agri.	Fr.	Pendleton
Simpson, Charles Eldon	Com.	Fr.	Carrolls, Wash.
Simpson, Glenn	Agri.	Fr.	Ashland
Simpson, John Ernest Henry Jr.	M. E.	Sr.	Portland
Simpson, Rodger Whittier	Opt.		Corvallis
Singh, Mahadeo	Agri.	Sr.	Hasanpore, India
Sinks, Lenora	H. E.	Fr.	Portland
Skelton, Albert	C. E.	Sr.	Corvallis
Skidmore, Maud May	H. E.	Jr.	Curtin

UNDERGRADUATE STUDENTS

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Name	Course	Rank	Home Address
Skow, Harvey Richard	Min.	Fr.	Corvallis
Slayton, Mabel Adaline	H. E.	Soph.	Prineville
Slayton, Mildred Lura	H. E.	Soph.	Prineville
Smily, James Raymond	E. E.	Fr.	Corvallis
Smilie, Robert Stanley	For.	Jr.	Oakland, Calif.
Smyth, Fred Wendel	Com.	Soph.	Diamond
Smith, Cecil Starr	Log. E.	Fr.	Portland
Smith, Doyle Bertis	Com.	Soph.	Salem
Smith, Elizabeth Frances	Com.	Fr.	Portland
Smith, Elva	H. E.	Jr.	Portland
Smith, Everett Lathrop	Agri.	Fr.	Pasadena, Calif.
Smith, Floyd Arthur	E. E.	Fr.	Lakeview
Smith, Grace Elizabeth	H. E.	Fr.	Portland
Smith, Harvey	Agri.	Jr.	Los Angeles, Calif.
Smith, Hazel Harriet	H. E.	Fr.	Hood River
Smith, Hubert	Phar.	Spec.	Clovis, Calif.
Smith, Kathryn Matilda	H. E.	Spec.	Marshfield
Smith, Leone Adell	H. E.	Jr.	Carnation
Smith, Lewis	E. E.	Fr.	Missoula, Montana
Smith, Madelon Maxwell	H. E.	Fr.	Hood River
Smith, Wendell	Agri.	Soph.	Jennings Lodge
Smith, Sterling William	E. E.	Fr.	Portland
Smith, Van Carr	Agri.	Fr.	Long Beach, Calif.
Smith, Wallace	Agri.	Soph.	Corvallis
Smith, Wilbur Joseph	M. E.	Soph.	Rainier
Snowberger, Fred	Phar.	Soph.	Payette, Idaho
Soden, Frances Jeanette	Com.	Soph.	Portland
Sodhi, Charn Singh	Com.	Sr.	Quetta, India
Somers, George Brooks	Min.	Jr.	Ft. Wayne, Ind.
Southern, Raymond Duncan	E. E.	Soph.	Brownsville
Southward, Walter Stone	Min.	Fr.	Le Grand, Calif.
Spain, Gail Elliott	M. E.	Fr.	Portland
Spalding, Anna Mary	Opt.		San Francisco, Calif.
Spalding, Donald Parker	For.	Sr.	Lowell, Mass.
Specht, Mabel	H. E.	Fr.	Portland
Spika, Edwin Axtel	Phar.	Spec.	Grand Junction, Colo.
Spindler, Walter Arthur	Agri.	Soph.	Portland
Spires, Elton Cyrus	Agri.	Fr.	Myrtle Point
Spires, Roy Leon	Hi. E.	Fr.	Myrtle Point
Spitzbart, Frieda Georgine	Opt.		Salem
Spranger, Fred Edward	Agri.	Fr.	Salem
Sprague, Hazel Emma	H. E.	Sr.	Corvallis
Spriggs, James Llewellyn	Agri.	Soph.	Portland
Staats, Vere Leslie	Phar.	Fr.	Airlie
Stafford, Royle Raymond	Agri.	Soph.	Altoona, Kansas
Staiger, Guy Alfred	Phar.	Soph.	Corvallis
Stalker, Harold	Min.	Fr.	Halfway
Stanley, C. Lewis	Agri.	Fr.	Pasadena, Calif.
Stanley, Lewis Adams	Com.	Spec.	Baker
Staples, Harvey Delbert	M. A.	Voc.	Astoria
Stark, Leslie	Com.	Jr.	Holdnege, Nebr.

Name	Course	Rank	Home Address
Stauff, Gladys	H. E.	Voc.	Cooston
Stebbins, Hazel Anna	H. E.	Voc.	Lordsburg, Calif.
Steel, Joseph Irvine	For.	Fr.	Portland
Steele, Isabelle Alice	H. E.	Fr.	Portland
Steele, Ruth	H. E.	Fr.	Creswell
Stegerwald, Andrew	Opt.		Corvallis
Steiger, Freda Amelia	H. E.	Spec.	Klamath Falls
Steininger, Maude Ellen	H. E.	Spec.	Molalla
Stelling, John Lloyd	Agri.	Soph.	San Jose, Calif.
Stephens, George Curtis	Phar.	Fr.	Arlington
Stephens, James Thomas	For.	Sr.	Hoquiam, Wash.
Stephens, Leslie Earl	M. E.	Fr.	Veneta
Stephenson, Mervyn	Hi. E.	Soph.	Condon
Steusloff, Claude	Agri.	Soph.	Salem
Stevens, Kenneth	Com.	Soph.	Albany
Stevenson, Harold	Agri.	Fr.	Halsey
Stewart, Harry James	Agri.	Soph.	Portland
Stewart, Ivan	Com.	Fr.	Fossil
Stewart, James Oscar	Agri.	Spec.	Lorella
Stewart, Robert Alexander	Agri.	Fr.	Portland
Stewart, Ruth	H. E.	Fr.	Portland
Stewart, Stanley Earl	Agri.	Soph.	Danington, Wash.
Stewart, Wallace Glenn	Phar.	Fr.	McMinnville
Stidd, Erma Phoebe	H. E.	Spec.	McDermott, Nev.
Stimpson, Laura Elaine	H. E.	Voc.	Corvallis
Stockton, Smith Patsy	Agri.	Fr.	Parma, Idaho
Stockwell, Martin Frank	Agri.	Fr.	Tacoma, Wash.
Stone, Adelia Olive	H. E.	Spec.	Asotin, Wash.
Stone, Herman Al	Agri.	Jr.	Woodburn
Stone, Walter Irving	For.	Fr.	Denton, Mont.
Storm, Earl Vasberg	For.	Jr.	Milton
Storrs, Isabella Garrison	Opt.		Pomona, Calif.
Storrs, Ruth Parsons	Opt.		Pomona, Calif.
Stovall, John Henry	Opt.		Philomath
Stow, William Raymond	Agri.	Soph.	Corvallis
Straight, Lois Emily	H. E.	Voc.	Lordsburg, Calif.
Strain, Stephanie	H. E.	Fr.	Portland
Straughn, Orson	Agri.	Jr.	Pendleton
Streiff, Albrecht	E. E.	Sr.	Hillsdale
Strief, Hazel Jean	H. E.	Fr.	Portland
Strome, Glenn Smyth	Agri.	Jr.	Eugene
Strome, Katherine Marcelle	H. E.	Soph.	Corvallis
Strong, Geoffrey	Agri.	Spec.	Myrtle Creek
Stroud, William Harold	Agri.	Jr.	Los Angeles, Calif.
Strowbridge, Howard	Agri.	Spec.	Portland
Struck, Martha Bertha	H. E.	Sr.	Lyle, Wash.
Stuart, Donald Bruce	E. E.	Fr.	Portland
Stuart, George Arnold	Com.	Voc.	Latourell Falls
Stutz, Lelia Bertha	H. E.	Fr.	Corvallis
Sumner, Lucien Herbert	Agri.	Voc.	San Diego, Calif.
Summers, Clement Moore	Opt.		Ashland

UNDERGRADUATE STUDENTS

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Name	Course	Rank	Home Address
Supple, Joseph	Agri.	Jr.	Oakland
Sutherland, Frank Gillette	Agri.	Sr.	Honolulu, Hawaii
Swaggerty, James Granderson	Min.	Fr.	Salem
Swan, Harry Twiss	Min.	Soph.	Baker
Sweeney, Elynore Dorothea	H. E.	Fr.	Walla Walla, Wash.
Sweeney, Philips Brooks	Agri.	Soph.	Walla Walla, Wash.
Sykes, Elizabeth Cole	Opt.		Corvallis
Tait, John David	E. E.	Fr.	Corvallis
Tanner, Clifford Gilbert	Agri.	Sr.	Morro, Calif.
Tatham, Frank Selby	Com.	Soph.	Portland
Taylor, Charles Everett	Agri.	Fr.	Monroe, Wash.
Taylor, Fred Arthur	Com.	Fr.	Medford
Taylor, Herbert Harold	For.	Soph.	Lowell, Mass.
Taylor, Kenneth Somers	Agri.	Fr.	Glendale, Calif.
Temple, Roy	Agri.	Voc.	Pendleton
Terry, Robert	Agri.	Voc.	Carlton
Teutsch, William	Agri.	Fr.	Spokane, Wash.
Thacker, Richard Thomas	Agri.	Fr.	Harrisburg
Thayer, Jessie	H. E.	Jr.	Rainier
Thayer, John Alden	Agri.	Soph.	Rainier
Thiessen, Raymond Lee	Com.	Spec.	Milwaukie
Thomas, George Warren	Agri.	Jr.	Auburn, Ind.
Thomas, Herbert Franklin	L. E.	Spec.	St. Paul, Minn.
Thomas, Marie Laura	H. E.	Soph.	Auburn, Ind.
Thomas, Marvin	Agri.	Fr.	Alhambra, Calif.
Thomas, Ruby	H. E.	Voc.	Hillsboro
Thomas, Seymour	Agri.	Fr.	Alhambra, Calif.
Thompson, Benjamin Garrison	Agri.	Jr.	Shedd
Thompson, Cecil Adelbert	Agri.	Jr.	Stevensville, Mont.
Thompson, Mrs. George	Opt.		Corvallis
Thompson, Gertrude Luella	Opt.		Portland
Thompson, Josephine Sophia	H. E.	Fr.	Seaside
Thoms, Harold Wayne	Min.	Jr.	Scio
Thomson, Stanley Aaron	Phar.	Fr.	Astoria
Throne, Robert Franklin	M. E.	Sr.	Ashland
Tibbetts, Joe Wood	Min.	Fr.	Forest Grove
Tidball, Lynn Hudson	Agri.	Spec.	Corvallis
Tillery, Merle	Com.	Sr.	Corvallis
Tilton, Arthur James	Agri.	Soph.	Portland
Tinker, George Henry	Agri.	Voc.	Seattle, Wash.
Tolls, Leveritt Joseph	Agri.	Fr.	Portland
Tooker, Floyd Llewellyn	Com.	Fr.	Salem
Truesdell, Charles	Agri.	Soph.	Redlands, Calif.
Tubbesing, William Herman	M. E.	Soph.	Portland
Tulley, Stewart Wendell	Opt.		Wallowa
Turnbull, James Lockhart	Min.	Sr.	Mooreville
Turner, Margerite	Com.	Fr.	Corvallis
Tussing, Gerald Dean	M. A.	Voc.	Brownsville
Tuthill, Lewis Hamilton	Hi. E.	Fr.	Sutherlin
Tuttle, LeRoy James	For.	Sr.	Naches, Wash.
Tweed, Catherine	H. E.	Soph.	Okanogan, Wash.

Name	Course	Rank	Home Address
Tycker, Roy Adrian	I. A.	Fr.	Brownsville
Tyrrel, Claude Alonzo	Agri.	Soph.	Alhambra, Calif.
Tynell, Lyvere Allen	Agri.	Voc.	Castle Rock, Wash.
Underwood, Joseph Marion	Min.	Jr.	Pasadena, Calif.
Ure, Ray Elwin	Agri.	Voc.	Portland
Vail, Richard	Agri.	Fr.	Ferndale, Wash.
Van Atta, Ellis	E. E.	Soph.	North Yakima, Wash.
Van Buskirk, Elinor	H. E.	Soph.	Portland
Van Buskirk, Frances Eugene	H. E.	Fr.	Portland
Van Buskirk, Mac	Agri.	Sr.	Portland
Vannice, Keifer Thomas	Com.	Fr.	Corvallis
Van Norden, Loys Freeman	Agri.	Spec.	The Dalles
Van Orsdel, Thomas Clark	For.	Spec.	Dallas
Van Raes, Fred Adolph	Com.	Voc.	Fairbanks, Alaska
Varma, Sanjhi Ram	Agri.	Jr.	Batala, Punjab, India
Vaughan, Leonard	Agri.	Voc.	Lebanon
Vestal, James Fenix	I. A.	Soph.	Eagle Point
Vihari, Ambalal Jivabhai	Com.	Jr.	Baroda, India
Vilas, George Warren	Com.	Sr.	Medford
Vincent, Hazel Margaret	H. E.	Soph.	Viri, Okla.
Virgil, Fannie Eldora	H. E.	Sr.	Klamath Falls
Volbrecht, Marguerite	Com.	Fr.	Gresham
Voruz, Ruth	H. E.	Soph.	Baker
Wagner, Henrietta	H. E.	Jr.	Laurel, Ind.
Waite, Katherine Douglas	Phar.	Soph.	Roseburg
Wakeman, William James	For.	Sr.	Portland
Walborn, Clay Elwood	Agri.	Spec.	Portland
Walberg, Hilding Carl	Agri.	Jr.	Los Angeles, Calif.
Walen, Lulu	Ccm.	Fr.	North Yakima, Wash.
Walker, Edwin	Com.	Fr.	Dolores, Colo.
Walker, Ethel Elaine	H. E.	Soph.	Corvallis
Walker, Ozbun Garard	Com.	Fr.	Portland
Walker, Tom Martin	Agri.	Voc.	Fairbanks, Alaska
Walpole, Robert Nichols	Agri.	Fr.	Portland
Walters, Eugene Paul	M. E.	Voc.	Hillyard, Wash.
Walters, Mary Frances	Com.	Fr.	Corvallis
Walton, Fremont Winston	Agri.	Sr.	Salem
Ward, Lillian Alice	H. E.	Fr.	Portland
Ward, Sidney	Com.	Spec.	Goldendale, Wash.
Wascher, Frank	Agri.	Sr.	Portland
Washburne, James	Agri.	Spec.	Junction City
Watenpaugh, Harold Leroy	Agri.	Soph.	Ontario, Calif.
Watenpaugh, Rolland Vernet	Com.	Soph.	Ontario, Calif.
Waterman, Crawford Burbank	Agri.	Fr.	Pasadena, Calif.
Waterman, Whitney	Agri.	Soph.	Pasadena, Calif.
Waters, Clarence	Agri.	Fr.	Idaho Falls, Idaho
Waters, Frank Northup	E. E.	Soph.	Portland
Watson, Irvin	Agri.	Jr.	Corvallis
Watt, Robert Henry	Agri.	Fr.	Bay City
Wattenburger, Ina Mae	H. E.	Sr.	Echo
Weber, Richard	Agri.	Soph.	The Dalles

UNDERGRADUATE STUDENTS

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Name	Course	Rank	Home Address
Webster, Earl	Agri.	Fr.	Portland
Webster, Robert Millard	Agri.	Fr.	Milford, Utah
Weeks, Margaret Lucy	Opt.		Portland
Wellman, Harrison Richard	M. E.	Fr.	Umapine
Werlein, Edward Eldridge	E. E.	Soph.	Portland
Werner, Richard John	Agri.	Sr.	Los Angeles, Calif.
Werth, Conrad Walter	E. E.	Jr.	Portland
Wescott, Merton Girard	Agri.	Spec.	Winter Harbor, Maine
West, Flavius	Com.	Fr.	Portland
West, Thelma	M. E.	Fr.	Dee
Weymouth, Blanche Naomi	Com.	Fr.	San Francisco, Calif.
Wharton, Jane	H. E.	Spec.	Roseburg
Wharton, Malcom	Agri.	Soph.	Garden Grove, Calif.
Wheeler, Eva May	H. E.	Fr.	Tillamook
Wheeler, Harold Edward	Com.	Jr.	Portland
Wheeler, Helen Grace	H. E.	Fr.	Portland
Wheeler, Levi Asher	For.	Fr.	Strathmore, Calif.
Whillock, Bertha Alice	Com.	Spec.	Medford
Whitaker, Elizabeth	Com.	Fr.	McFarland, Calif.
Whitaker, Leslie Clinton	Agri.	Soph.	Sacramento, Calif.
Whitaker, Raymond Wallace	Agri.	Soph.	McFarland, Calif.
White, Cleo Oneeta	H. E.	Sr.	McMinnville
White, Florence Geraldine	H. E.	Fr.	Oregon City
White, Harold	Com.	Fr.	Kerby
White, Irls Eaton	Agri.	Fr.	Polson, Mont.
Whitmore, Corrine Marion	H. E.	Voc.	Jermyn, Pa.
Wicks, Arthur Forest	Agri.	Fr.	North Powder
Wicks, Forrest	M. E.	Sr.	Albany
Wieder, David Martin	Com.	Fr.	Albany
Wieman, John Samuel	Agri.	Soph.	Los Angeles, Calif.
Wiggins, Jeanette Margaret	Com.	Fr.	Portland
Wilber, Howard Earl	Agri.	Fr.	Long Beach, Calif.
Wilbur, Robert Fisher	Agri.	Fr.	Omaha, Nebr.
Wilcox, Joseph Hillair	Agri.	Fr.	Pendleton
Wilcox, Ralph	Com.	Sr.	Portland
Wilde, Cora Anna Mary	Com.	Voc.	Junction City
Wilhelm, Roger Jesse	Min.	Fr.	The Dalles
Wilkes, Clair	Agri.	Sr.	Hillsboro
Wilkes, Elinor	Opt.		Hillsboro
Wilkes, Rhea	H. E.	Sr.	Hillsboro
Wilks, Lovel Raymond	Agri.	Fr.	Helix
Willer, Ernest Koch	Agri.	Spec.	Detmold, Germany
Willey, Earl Clark	M. E.	Spec.	Coquille
Williamson, Loma Emma	H. E.	Fr.	Corvallis
Williamson, Martha Jane	H. E.	Soph.	Corvallis
Willis, Elwin Clinton	Com.	Fr.	Corvallis
Willoughby, Charles Elbert	Com.	Soph.	National City, Calif.
Willoughby, Ralph	Agri.	Fr.	Harrisburg
Wilmot, Richard Kenneth	For.	Jr.	Portland
Wilt, Clarence Oliver	M. A.	Voc.	Corvallis
Williams, Carl Alfred	Com.	Fr.	Alpine

Name	Course	Rank	Home Address
Williams, Charles Walter	Agri.	Jr.	Corvallis
Williams, Claire Stamwood	Agri.	Voc.	Philomath
Williams, James Wayne	L. E.	Fr.	Portland
Williams, Llewellyn Morris	Com.	Soph.	Corvallis
Williams, Mary Edna	Opt.		Corvallis
Williams, Richard	Agri.	Jr.	Hillsboro
Williams, Richard Hipsley	Agri.	Soph.	Dillon, Mont.
Williams, Ruth	Opt.		Glendale
Williams, Sumner	L. E.	Fr.	Glendale
Williams, Vern Whitman	Phar.	Spec.	Airlie
Williams, William	E. E.	Sr.	Portland
Wilson, Bushrod Washington	Min.	Spec.	Corvallis
Wilson, Jalmar	M. E.	Jr.	Astoria
Wilson, John Bushrod	Agri.	Sr.	Corvallis
Wilson, Olive Isabelle	H. E.	Sr.	Bonneville
Wilson, Otis Estee	M. E.	Soph.	Salem
Wilson, Russell Charles	Agri.	Voc.	Troutdale
Wilson, Stella Nora	H. E.	Soph.	Burns
Winsor, Charles	Com.	Soph.	North Bend
Winter, Ardina	Agri.	Soph.	Los Angeles, Calif.
Wise, Clarence Jerome	Com.	Jr.	Alpine
Witt, Eric William	Agri.	Fr.	Portland
Wood, Edwin Roscoe	Agri.	Fr.	Exeter, Calif.
Wood, Rowena Adelaide	Opt.		Arlington
Woodcock, Arthur James	Phar.	Jr.	Portland
Woodsum, Edna May	H. E.	Soph.	Corvallis
Woodworth, Gladys	H. E.	Spec.	Portland
Woodworth, Grace	H. E.	Sr.	Portland
Woollomes, James Paul	Com.	Soph.	Delano, Calif.
Woollomes, Agnes Mara	H. E.	Fr.	Delano, Calif.
Wooton, Pearl Alice	H. E.	Fr.	Portland
Wootton, William Barker	Opt.		Astoria
Worley, Stanley	Agri.	Jr.	San Francisco, Calif.
Wright, Blanche Ellen	H. E.	Fr.	Brownsville
Wright, Dorothy Lois	H. E.	Sr.	Portland
Wright, Mark	For.	Sr.	Tumalo
Wright, Marshall Simpson	Agri.	Soph.	Sierra Madre, Calif.
Wright, Minnie Ethel	H. E.	Sr.	La Grande
Wright, William So Relle	Agri.	Jr.	San Gabriel, Calif.
Yamamoto, Francis Yoneichi	E. E.	Jr.	Seattle, Wash.
Yannke, Gonevieve Louise	H. E.	Fr.	Salem
Yates, Eva	H. E.	Jr.	Corvallis
Yates, Lloyd Dexter	For.	Sr.	Milton
Yeatman, Irene Estelle	H. E.	Fr.	Oakland, Calif.
Young, Ellsworth Schuyler	For.	Soph.	Mt. Solo, Wash.
Young, Ruth Evelyn	H. E.	Spec.	Salem
Young, Vida	H. E.	Sr.	Stayton
Young, Walter Henry	Agri.	Fr.	La Grande
Zan, Regina	H. E.	Voc.	Portland
Ziegler, Helen Marie	H. E.	Soph.	White Salmon, Wash.
Ziegler, Laura Elizabeth	H. E.	Soph.	White Salmon, Wash.
Zimmerman, Wilson Stuart	Hi. E.	Spec.	Portland

SUMMER SCHOOL STUDENTS

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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 is easily determined it is indicated as Art, Commerce (Com.), 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. Special (Spec.) indicates Short Course for Industrial Club Members.)

Name	Course	Home Address
Acheson, Gertrude	Meth.	Portland
Acheson, Edna	Meth.	Portland
Acree, Louise Carlton	Coll.	Berkeley, Calif.
Ahern, Merrie Ierne	Coll.	Hugo
Allen, Walter	Spec.	Darby
Allingham, William David	Meth.	Corvallis
Amort, Paul	Meth.	Corvallis
Anderson, William	Coll.	Portland
Appleman, Marguerite	Coll.	Corvallis
Archbold, Alton Conway	Meth.	Corvallis
Armitstead, Amy	Meth.	Portland
Asbahr, Katherine	Meth.	Cornelius
Ault, Byrd	Meth.	Enterprise
Ayres, Richard	Spec.	Corvallis
Baker, Albert	Com.	Port Angeles, Wash.
Baldwin, Ayne	Coll.	Philomath
Ball, Waldo	Coll.	Corvallis
Barden, Margurite	Meth.	Missoula, Mont.
Barfoot, Gladys	Coll.	Corvallis
Barfoot, May	Coll.	Corvallis
Barratt, Marjorie	Coll.	Portland
Barss, A. F.	Coll.	Corvallis
Bartlett, Ethelyn	H. E.	Grants Pass
Barton, Robert	Meth.	Portland
Barzee, Fay	Meth.	Corvallis
Beard, Mrs. R. F.	Coll.	Corvallis
Bechen, Martha	Meth.	Hillsboro
Bedynik, John	Mus.	Corvallis
Benson, Mrs. O.	Meth.	Cottage Grove
Bernstein, Salome	Meth.	Portland
Biesen, Valeska	Coll.	Portland
Billie, Brewer	Meth.	Astoria
Birch, Gracia Delle	Meth.	Corvallis
Blackman, Mrs. R.	Coll.	Portland
Blakely, Lloyd	Meth.	Corvallis
Blume, Muriel	Spec.	Albany
Boies, Etta	Meth.	Corvallis
Bonney, Margaret	Spec.	The Dalles
Bonney, Rex	Spec.	The Dalles
Bowen, Merle	Meth.	Silverton
Bowles, Lindlay	Spec.	Dallas
Brennan, Minnie	Meth.	Berkeley, Calif.
Brewer, Grace	Meth.	Portland
Brodie, R. K.	Coll.	Corvallis

Name	Course	Home Address
Brogden, Cecil	Coll.	Hillsboro
Brogden, J. L.	Coll.	Hillsboro
Brown, Gertrude	Spec.	Tygh Valley
Bruce, Louise Charlotte	Mus.	Portland
Euchanan, Frank G.	Meth.	Oregon City
Buchanan, Walter	Meth.	Florence
Brumbaugh, Madeline	Spec.	Corvallis
Brumbaugh, Sheldon	Spec.	Corvallis
Bursell, Hazel	Spec.	Monmouth
Bursell, Homer	Spec.	Monmouth
Burtner, Kathryn	Spec.	The Dalles
Butler, Mrs. Maude	Coll.	Cathlamet, Wash.
Campbell, Cora	Meth.	Roseburg
Campbell, Donald	Meth.	Portland
Cantrall, Leland	Meth.	Ruch
Cartan, Hazel	Meth.	Corvallis
Castle, Carrie	Coll.	Berkeley, Calif.
Case, Vanessa	Coll.	Corvallis
Chalker, Estella	Coll.	Portland
Charley, Claus	Spec.	Brownsboro
Charley, Leland	Spec.	Brownsboro
Choller, Maude	Meth.	Portland
Churchill, Leigh	Com.	Corvallis
Churchman, Tressa	Coll.	Corvallis
Clancy, Bess	Meth.	Woodland, Wash.
Clarke, Doris	Meth.	Portland
Clarke, Edna	Meth.	Portland
Cochrane, Adona	Coll.	Corvallis
Collins, Joseph	Spec.	Central Point
Conklin, Evelyn	Meth.	Grants Pass
Cooley, Earl	Spec.	Salem
Cordery, Lucille	H. E.	Pendleton
Cordley, Dorothea	Coll.	Corvallis
Courtney, Gertrude	Spec.	La Grande
Crosby, Mabel	Spec.	Hillsboro
Currin, Minnie Edith	Meth.	Corvallis
Currin, Mary	Coll.	Heppner
Dallinger, Bertha	Meth.	Portland
Darling, Ruth	Mus.	Corvallis
Davidson, Della	H. E.	San Raphael, Calif.
Davis, Anita	Meth.	Portland
Davis, Keren Lee	Meth.	Portland
Davis, Leonard	Com.	Corvallis
Davis, Norma	Coll.	Corvallis
Davison, Janet	Meth.	Cottage Grove
Dearmin, Lillian	Com.	Portland
Demmon, Alice	H. E.	Butte, Mont.
Denniston, Laneta	Meth.	McMinnville
Dillon, Martha	Coll.	Portland
Doane, Emery	Coll.	Salem
Doolittle, Maida Laura	Meth.	Wallowa

SUMMER SCHOOL STUDENTS

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Name	Course	Home Address
Down, J. R.	Meth.	Joseph
Duncan, R. A.	Meth.	Corvallis
Dunne, Lucille	Meth.	Portland
Durrell, Jean	Coll.	Corvallis
Edwards, Bertha Beulah	Meth.	Monroe
Edwards, Caryl	Com.	Corvallis
Eliot, Calista Post	Coll.	Portland
Eliot, Craig	Spec.	Portland
Eliot, Mignon	Spec.	Portland
English, E. C.	Coll.	Nehalem
English, Georgia	Coll.	Nehalem
Evans, Ora	Spec.	Mosier
Fawcett, Hazel	Meth.	Coquille
Fick, Frank	Meth.	East Auburn
Fielder, Elizabeth	Coll.	Corvallis
Finnerty, Mrs. G. E.	H. E.	Albany
Finnerty, G. E.	Coll.	Albany
Fitts, Grace	Meth.	Corvallis
Fones, Theodore Claude	Spec.	Yamhill
Fowler, Newell	Meth.	Anacortes, Wash.
Fox, Otto	Meth.	Ashland
Frazier, Genevieve	Com.	Salem
Frost, Melville	Spec.	Corvallis
Fridley, Nettie	Meth.	Klondike
Fulton, Helen	Coll.	Corvallis
Funk, Arnold	Com.	Corvallis
Gale, William	Coll.	Keating
Gambbee, Hosmer	Meth.	Phoenix, Arizona
Gambbee, Lewis Phaon	Meth.	Corvallis
Garvin, Goldia	Coll.	Corvallis
Gatchell, Charles Barnard	Meth.	Corvallis
Gerow, Mrs. A. C.	Meth.	Portland
Glines, Hallie	Meth.	Walport
Goble, Ray	Meth.	Ferndale, Calif.
Goemanpott, Etta	Coll.	Renville, Minn.
Graves, L. L.	Coll.	Corvallis
Grimes, Etta	Meth.	Corvallis
Groshong, F. M.	Meth.	Portland
Guthrie, Jane	Meth.	Corvallis
Guthrie, Mary	H. E.	Oak Grove
Guthrie, G. W.	Meth.	Oak Grove
Haight, Racheal	H. E.	Corvallis
Hall, Mable	Meth.	Medford
Halsey, Caroline	Meth.	Burlington, Wash.
Hamilton, J. M.	Meth.	National City, Calif.
Hamman, Elizabeth Snell	Meth.	Echo
Hamman, E. W.	Meth.	Echo
Hansen, Kareen	Meth.	Corvallis
Hanson, Manette	Meth.	Corvallis
Hanson, Margaret	Meth.	Corvallis
Hanthorn, Faith	Meth.	Portland

OREGON AGRICULTURAL COLLEGE

Name	Course	Home Address
Harriman, Arthur	Com.	The Dalles
Harriman, Edna	Com.	The Dalles
Harriman, Nellie	Com.	The Dalles
Hart, Anna	Coll.	Portland
Hartzog, Clara	Coll.	Lakeview
Hartzog, Delphia	H. E.	Lakeview
Hathaway, Mark	Coll.	Corvallis
Haumeser, Elsie	Coll.	Portland
Hawkins, Leroy	Spec.	Mill City
Heath, Laura	Meth.	Corvallis
Heckart, E. W.	Meth.	Eugene
Heckart, Mrs. Viva	H. E.	Springfield
Hilliar, Agatha Amelia	Meth.	London, England
Holgate, Laura	Coll.	Corvallis
Hollingsworth, Gertrude	Meth.	Newberg
Howard, W. C.	Meth.	Stanfield
Howett, Elizabeth	Meth.	Gresham
Humphrey, Esther	Coll.	Eugene
Hung, Tung Ming	Com.	Amoy, China
Hunt, Irene	Spec.	The Dalles
Hurd, Mildred	Com.	Corvallis
Husbands, Esther	Coll.	Hood River
Irvine, Harry	Coll.	Silverton
Irving, Iona	Meth.	Albany
Jaeger, Paul	Spec.	Sherwood
Jackson, Laura	Coll.	Lorane
James, Oscar	Meth.	Corvallis
Janes, Marjorie	Meth.	Portland
John, Morris	Meth.	Corvallis
Johns, Miles	Meth.	Seattle, Wash.
Johnston, Jane Agnes	Meth.	Corvallis
Johnston, Ida May	Meth.	Portland
Jones, Carmen	Spec.	Pendleton
Jones, Marie	Meth.	Corvallis
Kalbus, Minnie	Meth.	Chehalis, Wash.
Kan, Grace	Coll.	McMinnville
Kehrli, Hulda Margaret	Meth.	Hillsdale
Kelley, Glenn	Meth.	Portland
Kelly, Ruth	Coll.	Portland
Kern, Alma	Com.	Washougal, Wash.
Ketchum, Beth	Meth.	Independence
Keyes, Mrs. H. F.	Coll.	Corvallis
Kimmel, Walter	Meth.	Lebanon
King, Luther	Meth.	Corvallis
Kirkham, Mrs. J. M.	Meth.	Ritzville, Wash.
Kirkham, J. M.	Meth.	Ritzville, Wash.
Kirkham, V. R. D.	Meth.	Ritzville, Wash.
Knopp, Grace	H. E.	Eugene
Kongsle, Edward	Meth.	Bellingham, Wash.
Lafky, E. H.	Meth.	Corvallis
Laidlaw, Charlotte	H. E.	Portland

SUMMER SCHOOL STUDENTS

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Name	Course	Home Address
Lane, Dorothy	Coll.	Los Angeles, Calif.
Lee, George	Meth.	Maltby, Wash.
Leeper, Enid Glenda	Meth.	Corvallis
Leland, Randolph	Meth.	Los Angeles, Calif.
Lewis, Claudia	Mus.	Corvallis
Lewis, Mae	Meth.	Albany
Lindsay, Edith	Coll.	Corvallis
Littler, Florence	Meth.	Forest Grove
Loo, Nai Fatt	Coll.	Victoria, B. C.
Lowe, Marian	Spec.	Nyssa
Loy, Alfred	Spec.	Buena Vista
Lukens, G. W.	Meth.	Redwood Falls, Minn.
McBride, Mildred	Meth.	Corvallis
McDonald, May	Spec.	Dallas
McCallum, D. P.	Meth.	Vancouver, B. C.
McCammant, Davis	Coll.	Portland
McCormack, Mrs. Joel	Meth.	Corvallis
McCornack, Alice	Meth.	Marcola
McDonald, Byron	Meth.	The Dalles
McFarlane, Mrs. Mary	Meth.	Corvallis
McHenry, Muriel	Meth.	Corvallis
McKay, James Douglas	Meth.	Portland
McRay, Lela	Coll.	Corvallis
MacDonald, Helen	Meth.	Corvallis
MacGowan, Warren	Spec.	Independence
Maris, Homer	Coll.	Portland
Martin, Elsie	Coll.	McMinnville
Martin, Emily	Coll.	Corvallis
Meacham, Leta	Coll.	Weiser, Idaho
Meneice, Sarah	Meth.	Home Valley, Wash.
Mercer, Helen	Meth.	Salem
Mettie, Zena	Meth.	Ukiah
Metzler, Ethel	Meth.	Corvallis
Miller, D. B.	Coll.	Corvallis
Miller, Esther	Spec.	Medford
Miller, Mrs. E. R.	Meth.	Portland
Miller, Eva	Meth.	Corvallis
Miller, Helen	Meth.	Corvallis
Miller, James	Meth.	Centralia, Wash.
Montgomery, Pearl	H. E.	Portland
Moore, Genevieve	Coll.	Corvallis
Morgan, Exie	Spec.	The Dalles
Morgenson, Louise	Spec.	Tygh Valley
Morris, Blanche	Meth.	Tennant, Iowa
Morris, Gwendolyn	Spec.	Corvallis
Morris, Mrs. H. W.	Meth.	Corvallis
Morton, Ruth	Coll.	Hood River
Motley, J. W.	Meth.	Heppner
Mudge, Frank	Coll.	Nappa
Muir, A. B.	Meth.	Portland
Mullenhoff, Rudolf	Spec.	Boring

OREGON AGRICULTURAL COLLEGE

Name	Course	Home Address
Munford, Ruby	Meth.	Senecaville, Ohio
Munson, Robert	Meth.	Oakland, Calif.
Murphy, Pat	Coll.	Butte, Mont.
Myers, Eva T.	Coll.	Long Creek, Ill.
Nichols, Ben	Com.	Glendale, Calif.
Nichols, Tressa	Meth.	Corvallis
North, David	Meth.	Corvallis
Norton, Mabel	Meth.	Corvallis
Norton, W. B.	Meth.	Corvallis
Olin, John Frederick	Spec.	Mill City
Orr, Vernon	Spec.	Rogue River
Osborn, William	Meth.	Portland
Page, Ina	Spec.	Shaniko
Farcher, Phillip	Meth.	The Dalles
Parker, Stella	Coll.	Mosier
Passmore, Dorothy	Meth.	Tualatin
Patterson, Margaret	Meth.	Ashland
Patton, Palmer	Coll.	Davis
Peachey, Robert	Meth.	Jacksonville
Pearcy, Raymond	Spec.	The Dalles
Peavy, Bradley	Coll.	Corvallis
Peterson, Henry	Spec.	Junction City
Peterson, Inez	Coll.	Corvallis
Peterson, S. H.	Meth.	Corvallis
Pfaff, R. L.	Coll.	Salem
Philippi, Leora	Meth.	Early
Pimm, Alice	Meth.	Philomath
Pine, W. D.	Coll.	Berkeley, Calif.
Plank, Esther	Meth.	Woodburn
Post, Clara	Meth.	Blachly
Post, E. O.	Meth.	Blachly
Potter, Willis	Spec.	Mill City
Powell, R. H.	Coll.	Medford
Prentiss, Mrs. Sara Watts	Meth.	Portland
Quint, Alice	Coll.	Broadmead
Rains, Opal	Coll.	Oregon City
Ramsdell, George	Coll.	Portland
Rankin, Grace	H. E.	Portland
Ream, Rebecca	Coll.	Metzger
Reed, David	Meth.	Tillamook
Reeves, Orville	Meth.	Corvallis
Reichart, Robert	Meth.	Corvallis
Reynolds, Harold	Spec.	Independence
Rice, Gladys	Meth.	Corvallis
Roberts, Jessamy	Meth.	Portland
Robey, Gladys	Meth.	Corvallis
Rossiter, Cora	Meth.	Manly, Iowa
Ruring, G. A.	Meth.	Vale
Russell, Ann	Meth.	Portland
Ruth, Mrs. C. C.	Coll.	Corvallis
Rutledge, Anne	Meth.	Spokane, Wash.

SUMMER SCHOOL STUDENTS

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Name	Course	Home Address
Sahasrabudhe, J. V.	Meth.	Nagpur, India
Sanders, George	Meth.	Tillamook
Sawyer, Doris	Coll.	Salem
Schelling, Caroline	Coll.	Cottage Grove
Schreiber, Martin	Meth.	McMinnville
Schrepel, Minnie	Meth.	Corvallis
Schultz, Elsie	Meth.	Gresham
Seeley, Hazel	Mus.	Independence
Sevy, Genevieve	Coll.	Freewater
Seavy, J. B.	Meth.	Freewater
Seavy, Mrs. Orpha	Meth.	Freewater
Sexton, Dana	Coll.	Hugo
Shaw, R. F.	Coll.	Portland
Sheridan, Rose Mae	Meth.	Shedds
Shimmin, Albert	Meth.	Anacortes, Wash.
Shimmin, Everett	Meth.	Anacortes, Wash.
Skidmore, Maud	Coll.	Curtin
Smith, Eleanor	Mus.	Corvallis
Smith, Esther	Meth.	Amity
Smith, Mrs. E. M.	Coll.	Corvallis
Smith, H. B.	Com.	Los Angeles, Calif.
Smith, Wallace	Coll.	Corvallis
Soden, Frances	Coll.	Portland
Soden, Mildred	Meth.	Portland
Sodhi, Charn Singh	Meth.	Guetta, India
Stearns, Mrs. H.	Coll.	Walla Walla, Wash.
Stearns, Martin	Coll.	Walla Walla, Wash.
Strange, Lola May	Mus.	Corvallis
Stewart, Earl	Spec.	Cottage Grove
Straughan, J. A.	Meth.	Pendleton
Struble, F. H.	Meth.	Corvallis
Struck, Martha	Coll.	Lyle, Wash.
Stuart, Isabella	H. E.	Oakland, Calif.
Sumner, Madge	Spec.	Antelope
Sykes, Nell	Meth.	Salem
Thayer, Mrs. D. G.	Meth.	Corvallis
Thomas, George Randolph	Meth.	Forest Grove
Thomas, Mrs. George Randolph	Meth.	Forest Grove
Thomas, Mrs. Lucy	H. E.	Portland
Thompson, Benjamin	Coll.	Corvallis
Thompson, Mrs. Ella	Coll.	Corvallis
Thompson, Mrs. Mary	Meth.	Marshfield
Tillery, Genevieve	Meth.	Corvallis
Tilton, Arthur	Coll.	Portland
Tobey, Otis Charles	Spec.	Dufur
True, Mrs. Elsie	Meth.	Sherwood
Turner, Arthur Edward	Meth.	Corvallis
Turner, H. W.	Meth.	Eugene
Tweed, Catherine	Meth.	Corvallis
Underwood, E. F.	Meth.	Corvallis
Van Buskirk, Ronald	Spec.	Portland

Name	Course	Home Address
Van Loo, Elizabeth	Coll.	Portland
Vierhus, Ellen	Meth.	Oregon City
Vilas, George	Coll.	Medford
Virgil, Fannie	Meth.	Klamath Falls
Waddell, Norma	Meth.	Corvallis
Walker, Ethel	Coll.	Corvallis
Wattenburger, Ina	Meth.	Echo
Wells, Mrs. C. B.	H. E.	Portland
Wharton, Florence	Spec.	Roseburg
Wheeler, A. W.	Meth.	Corvallis
Whipple, Gladys	Meth.	Portland
Wilkes, Lena	Spec.	Hillsboro
Williamson, Charles	Meth.	Corvallis
Witzig, Ivy	H. E.	Corvallis
Wolcott, Lena	Coll.	Corvallis
Wright, Dorothy	Coll.	Portland

SPECIAL MUSIC STUDENTS *

Name	Course	Home Address
Appleman, Marguerite	Voice	Corvallis
Arthurs, Arleigh	Violin	Brownsville
Bauer, Marian	Piano	Corvallis
Bedynik, John	Violin	Corvallis
Blackstone, Paul	Voice	Corvallis
Bradshaw, Harrison	Piano	Newport
Broders, Chester	Piano	Corvallis
Brumbaugh, Madeline	Violin	Corvallis
Burton, Mabel Stevens	Voice	Corvallis
Chambers, Bernice	Piano	Corvallis
Cordley, Dorothea	Voice	Corvallis
Corrie, Bernice	Piano	Corvallis
Eaton, Helen	Piano	Independence
Ficher, Ardis	Piano	Corvallis
Fisher, Mrs. W. G.	Voice	Philomath
Foster, Ada	Piano	Corvallis
Fox, Otto	Trombone	Albany
Garrett, Arline	Piano	Corvallis
Harpole, Mrs. Irene	Piano	Monroe
Hatch, Leonard	Clarinet	Corvallis
Hurd, Blanche	Violin	Corvallis
Kerr, Marion	Violin	Corvallis
Kiger, Martha	Voice	Corvallis
Kirk, Christine	Piano	Corvallis
Kuhlman, Mrs.	Voice	Corvallis
McBride, Clare	Violin	Corvallis
McLouth, Mrs.	Piano	Corvallis
Martin, Ruby Marie	Piano	Newberg

* In addition to the names listed here, 200 regular students of the College whose names are listed elsewhere in the catalogue took work in the School of Music.

WINTER SHORT COURSE STUDENTS

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Name	Course	Home Address
Merriott, Mona Rosalie	Piano	Corvallis
Moore, Elsie Virginia	Voice	Seattle, Wash.
Nichols, Mrs. Eleanor	Voice	Corvallis
Peer, Helen	Mandolin	Corvallis
Schubert, John Walter	Violin	Corvallis
Shattuck, Mrs. Obil	Saxophone	Corvallis
Skipton, Lawrence	Violin	Corvallis
Smedley, Georgian	Piano	Portland
Smith, Eleanor	Voice	Corvallis
Spencer, Clyde	Harmony	Portland
Stenson, Raymond	Clarinet	Corvallis
Thomas, P. F.	Violin	Corvallis
Watkins, Mrs. A. W.	Piano	Philomath
Watson, Fannie	Violin	Corvallis
Watson, Margaret	Piano	Corvallis

WINTER SHORT COURSE STUDENTS

Name	Home Address	Name	Home Address
Adams. Mrs. Alice.....	Corvallis	Cramer. Theodore.....	Grants Pass
Adamson. James.....	Prineville	Curriu. Mrs. Josephine.....	Corvallis
Alexander. Wilton Eugene.....	Sheridan	Darnall. H. A.....	Lents
Amos. William.....	Culver	Davenport. Jesse A.....	Roseburg
Anderson. Arthur.....	Aurora	Decker. T. A.....	Hood River
Anderson. Ben.....	Heppner	Deffenbaugh. George.....	Corvallis
Anderson. Carl.....	Lee	Eames. Mrs. Alvah.....	Cordova, Alaska
Anderson. David.....	Tangent	Earnest. Lillian.....	Corvallis
Anderson. George.....	Sherwood	Edholm. F. O.....	Albany
Anderson. Henry.....	Mt. Angel	Edholm. Roy.....	Albany
Anderson. T. J.....	Aurora	Edwards. J. W.....	Drain
Arnold. Mrs. Marie.....	Albany	Egger. John.....	Portland
Atwood. J. R.....	Corvallis	Erickson. H. J.....	Barlow
Axtell. Mrs. Elizabeth.....	Corvallis	Ewing. Frank.....	Estacada
Bartholomew. Mrs. Mae.....	Corvallis	Ewing. Mrs. Frank.....	Estacada
Belloni. H. P.....	Coquille	Faber. Minnie.....	Albany
Bergstrom. Ellen.....	Gooseberry	Farmer. Ora.....	Shedd
Bergstrom. Emma.....	Eight Mile	Fegley. Mrs. A.....	Corvallis
Bergstrom. Hannah.....	Eight Mile	Flegal. Blair.....	Eugene
Berning. Clement.....	Mt. Angel	Flint. Joseph.....	Beaverton
Blevins. Glenn Maxey.....	Tangent	Forbes. Mrs. May.....	Corvallis
Bossen. Henry.....	Langlois	Forest. George.....	Three Pines
Braun. G. H.....	Dallas	Frazier. Clay.....	Albany
Breyman. Mrs. A. C.....	Portland	Gay. Bonnie Linn.....	Corvallis
Browne. Robert Henry.....	Medford	Gay. Nettie.....	Corvallis
Browne. Mrs. Robt. Henry.....	Medford	Gay. Mrs. W. F.....	Corvallis
Brumbaugh. Mrs. J. F.....	Corvallis	Gilkey. Mrs. Mildred.....	Portland
Buddenhagen. Clarence.....	Portland	Golden. Mrs. C. E.....	La Grande
Burkhart. Mrs. George.....	Grinthe	Grant. Dayton Ephraim.....	Culver
Burnap. W. S.....	Corvallis	Gray. Lloyd.....	Dufur
Byers. Mabel.....	Moro	Haffey. George.....	Portland
Caldwell. Mrs. V. A.....	Corvallis	Herd. William.....	Yamhill
Cannon. Mrs. Roy.....	Corvallis	Herigstad. Carl.....	Silverton
Chase. Ernest.....	Corvallis	Hilton. Everett.....	Portland
Clarke. Wedworth.....	Parkdale	Hinds. H. J.....	Corvallis
Cochran. E. A.....	Cloverdale	Hoecker. Conrad.....	Corvallis
Cochrane. Mrs. Isabelle.....	Corvallis	Hopkins. S.....	Corvallis
Compton. C. B.....	Dee	Howard. Edna.....	Philomath
Coon. G. B.....	Corvallis	Howard. Mrs. Etta.....	Corvallis
Cooper. Ray.....	Hebo	Howard. H. B.....	Philomath
Cornell. Ivan Robb.....	Portland	Howard. John.....	Corvallis

OREGON AGRICULTURAL COLLEGE

Name	Home Address
Jackson, Edgar.....	Portland
Jackson, Thomas.....	Lorane
Jaeger, Henry.....	Sherwood
Jarvis, Lloyd.....	Myrtle Point
King, Clara.....	Helix
King, J. E. E.....	Helix
Knecht, Fred.....	Portland
Kruse, Elmer.....	Sherwood
Lange, Fred.....	Scappoose
Lelliott, John Leonard.....	Mosier
Livingstone, H.....	Wenatchee, Wash.
Lowell, Grace.....	Corvallis
McAllister, R. G.....	Corvallis
McBride, F. Reed.....	Portland
McCornack, Joel.....	Marcola
McDevitt, Ray.....	Sumpter
McDonald, George.....	Norway
McDonald, L. A.....	Corvallis
Maas, Henry.....	Tangent
MacDonald, Mrs. L. A.....	Corvallis
Maegly, Esther.....	Portland
Magness, M. R.....	Myrtle Point
Marsh, A. H.....	Looking Glass
Martin, F.....	White Salmon, Wash.
May, Mrs. Inez.....	Gervais
Mayse, Lister.....	Dora
Merryman, J. H.....	Corvallis
Meyers, Claud.....	Echo
Myers, George H.....	Corvallis
Miller, Cecil Olive.....	Portland
Miller, Mrs. J. F.....	Hood River
Naderman, Theodore H.....	Turner
Needham, A. Roy.....	Cochise, Ariz.
Overton, Joe.....	Pendleton
Parsons, Arthur.....	Crabtree
Patchin, Edmund.....	Salem
Patton, Hamilton.....	Medford
Peffer, Rex.....	Dayton
Peterson, T. E.....	Ione
Phelps, Charles.....	Elmira
Phillips, Mrs. W. J.....	Corvallis
Pipal, Mrs. Julia.....	Corvallis
Plank, Mrs. John.....	Salem
Plank, John N.....	Salem
Plog, Edna Louise.....	Hood River
Plog, Olga Agnes.....	Hood River
Porter, Mrs. Flora.....	Corvallis
Pounder, Cecil James.....	Corbett
Rabinsky, Fred.....	Scappoose
Rackleff, Lawrence.....	Coquille

Name	Home Address
Radford, F. W.....	Hood River
Randleman, Claude.....	Bandon
Richey, G. H.....	Corvallis
Robbins, G. W.....	Corvallis
Robbins, Mrs. Mary H.....	Corvallis
Roberts, Allyn.....	Boyd
Rowland, J. S.....	Rickreall
Rudat, Fred.....	Clifton
Rufener, Fred.....	Corvallis
Rulschman, Albert.....	Tangent
Sanders, L. M.....	Corvallis
Saunders, G. H.....	Portland
Scadding, Mrs. Charles.....	Portland
Schmidt, Hans.....	Eugene
Schmidt, Martha.....	Eugene
Schnider, Ernest.....	Mt. Angel
Schnider, Lawrence.....	Mt. Angel
Snake, Mrs. Harold.....	Corvallis
Sherman, Edwin.....	Corvallis
Sinke, Carrie M. Ferintosh, Alberta	
Somers, Eugenia.....	Corvallis
Spindler, Burton.....	Portland
Stearns, Harry.....	Lawen
Stephens, John.....	Dilley
Stevenson, Mrs. Ola.....	Corvallis
Stowell, Mrs. G. E.....	Corvallis
Swango, S. F.....	Coburg
Tammen, Rose.....	Albany
Thompson, Ella.....	Corvallis
Thomsen, Clara Marie.....	Hood River
Tolladan, Mrs. Lucy.....	Corvallis
Tolman, Elizabeth.....	Hood River
Van Uyk, Charles.....	Santa Ana, Calif.
Vickers, Mrs. H. A.....	Corvallis
Walden, E. E.....	Central Point
Walker, Mrs. Effie.....	Corvallis
Waterman, Clyde.....	Myrtle Point
Watson, J. C.....	Corvallis
Watson, Mrs. J. C.....	Corvallis
Weir, A. D.....	Corvallis
Williams, Robert F.....	Cove
Woodward, Rt. C. Victoria, Canada	
Worthington, Elbert.....	Lorane
York, F. M.....	Carlton
Young, Paul.....	Eugene
Youngby, Oscar.....	Carlton
Zahler, John.....	Silverton
Zentner, Mrs. O. L.....	Eugene
Ziefle, Mrs. Cresence.....	Corvallis
Zumwalt, C. P.....	Port Orford

NOTE.—In addition to the above listed names, out of a total of 1723 students registered in the Farmers' Week and in the special Home Economics courses, the names of 1428 students who were registered in these courses but in no other College courses, do not appear.

SENIOR HONOR STUDENTS

Senior honors are conferred by the College Council upon those members of the graduating class who have maintained throughout their entire college course the highest scholastic standing in their department. No student is eligible to this honor unless his general average for all subjects has been eighty-five percent or higher. Election is limited to ten percent of the graduating members of a department.

SELECTION FOR JUNE 1916

AGRICULTURE

Joseph Edmond Currey
DeVere Fendall
Wallace LaDue Kadderly
Harvey Lee Lantz
Dale Everette Richards
Charles Hammer Roseman
Carey Lloyd Strome
Harold Roy Taylor
Earl Horsted Thompson
Nao Uyei

COMMERCE

Arnold John Funk

ENGINEERING

Winfield Eckley
Jack Walker Nash
Frank Vernon Romig
Rolf Theodore Wetteland

FORESTRY AND LOGGING ENGINEERING

Harold Gilbert Archibald

HOME ECONOMICS

Gertrude Acheson
Merrie Ierne Ahren
Una Marguerite Barden
Dorothy Southwick Brownell
Frances Helen Corl
Minnie Kalbus
Wilmetta Emily Morse
Winnifred Turner

MINES

Fritz Carl Floss

PHARMACY

Albert Dickenson Foster

FORENSIC HONOR ROLL FOR 1915-16

INTERCOLLEGIATE ORATOR

Eric Englund

INTERCOLLEGIATE DEBATORS

Robert Reichart
Godfrey Hoerner
Eric Englund

Phillip Parrish
Harold Hansen

CHAMPION INTERCLASS ORATOR

Eric Englund

Sophomore

CHAMPIONS IN INTERCLASS DEBATE

Bernard Mainwaring
Gerald Barrett
John Thayer

Freshmen

WINNER OF SHAKOPEAN CUP

Godfrey Richard Hoerner

Awarded annually to the member of the senior class having the best record in forensics for the whole College course.

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.

SELECTIONS FOR JUNE 1916

SENIORS

Geraldine Newins, Patchogue, New York
Gertrude Acheson, Portland, Oregon
Minnie Kalbus, Chehalis, Washington

JUNIORS

Martha Henrietta Bechen, Hillsboro, Oregon
Iva May Howey, Coquille, Oregon
Edna Clara Conner, Sheridan, Oregon.

SOPHOMORES

Marie Katherine Howells, Medford, Oregon
Helen Frances Dougherty, Baker, Oregon
Bernice Forest, Portland, Oregon

FRESHMEN

Christine Gordon Abbott, Roseburg, Oregon
Ethel Elaine Walker, Corvallis, Oregon
Florence Ernestine Berchtold, Corvallis, Oregon.

COMPARATIVE ENROLLMENT

1888-1889	97	1903-1904	530
1889-1890	151	1904-1905	680
1890-1891	201	1905-1906	735
1891-1892	208	1906-1907	833
1892-1893	282	1907-1908	1156
1893-1894	240	1908-1909	1352
1894-1895	261	1909-1910	1591
1895-1896	397	1910-1911	1778
1896-1897	316	1911-1912	2868
1897-1898	336	1912-1913	2314
1898-1899	388	1913-1914	2435
1899-1900	405	1914-1915	4176
1900-1901	436	1915-1916*	3251
1901-1902	448	1916-1917**	3797
1902-1903	541		

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 percent.

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 percent.

* Totals to and including March 16, 1916.

** Totals to and including April 25, 1917.

SUMMARIES *

CLASSIFIED AS TO COURSE

(All Duplicates Excluded)

Course	Men	Women	Total
Agriculture	569	7	576
Forestry	66		66
Logging Engineering	19		19
Home Economics		411	411
Engineering and Industrial Arts	271	1	272
Mining	93		93
Commerce	149	63	212
Pharmacy	57	6	63
Optional	8	53	61
Music	16	31	47
Summer School	144	223	367
Winter Short Courses	1002	608	1510
Totals	2394	1403	3797**

* The enrollment statistics include only those who have pursued work at the College; correspondence students are omitted.

** Total to and including April 25, 1917.

CLASSIFIED AS TO RESIDENCE

(All Duplicates Excluded)

States and Territories:		South Dakota	
Oregon	3135	Tennessee	2
Alaska	10	Texas	1
Arizona	5	Utah	2
California	205	Washington	6
Colorado	10	West Virginia	191
Connecticut	1	Wisconsin	1
Hawaii	3	Wyoming	3
Idaho	50		1
Illinois	20		611
Indiana	7		3746
Iowa	9		
Kansas	6		
Maine	3		
Maryland	2		
Massachusetts	5		
Michigan	2		
Minnesota	6		
Missouri	1		
Montana	21		
Nebraska	5		
Nevada	3		
New Hampshire	1		
New Jersey	1		
New York	4		
North Dakota	4		
Ohio	9		
Oklahoma	6		
Pennsylvania	5		

Foreign Countries:	
Argentina	1
Australia	1
Canada	13
China	3
Denmark	1
England	4
Finland	1
Germany	1
India	13
Japan	2
Nicaragua	1
Norway	1
Russia	2
Scotland	1
Sweden	1

Net total 3797

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