Kansas State Agricultural College

CATALOGUE

FORTY-NINTH SESSION

1911-'12

ANNOUNCEMENTS

1912-1913

MANHATTAN
THE KANSAS INDUSTRIALIST, VOL. XXXVIII, No. 40
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Act of July 16, 1894.
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Calendar

1912.

JULY.

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1913.

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DECEMBER.

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COLLEGE CALENDAR

1912.

SEPT. 16, Monday.—Faculty meeting at nine A. M.
SEPT. 16, Monday.—Meeting of assigners at ten A. M.
SEPT. 16, Monday.—Assignment of students begins at one-thirty P. M.
SEPT. 17, Tuesday.—Admission of new students at nine A. M.
SEPT. 19, Thursday.—Assignment of students closes at five P. M.
SEPT. 19, Thursday.—Short course for housekeepers begins.
SEPT. 20, Friday.—All classes meet according to schedule.
SEPT. 20, Friday.—Opening convocation at ten A. M.
OCT. 12, Saturday.—Scholarship deficiency reports due.
NOV. 2, Saturday.—Scholarship deficiency reports due.
NOV. 28 to 30, Thursday to Saturday.—Thanksgiving vacation.
DEC. 13 to 20, Friday to Friday.—Examinations at close of term.
DEC. 16, Monday.—Assignment of students for winter term begins at nine A. M.

1913.

JAN. 6, Monday.—Admission of new students at nine A. M.
JAN. 7, Tuesday.—Assignment of students closes at five P. M.
JAN. 7, Tuesday.—Short courses in agriculture and dairying begin.
JAN. 8, Wednesday.—All classes meet according to schedule.
FEB. 1, Saturday.—Scholarship deficiency reports due.
FEB. 21, Friday.—Scholarship deficiency reports due.
FEB. 22, Saturday.—Holiday, Washington's Birthday.
MAR. 19, Wednesday.—Short courses in agriculture and dairying close.
MAR. 21 to 28, Friday to Friday.—Examinations at close of term.
MAR. 24, Monday.—Assignment of students for the spring term begins at nine A. M.

MAR. 31, Monday.—Admission of new students at nine A. M.
APR. 1, Tuesday.—Assignment of students closes at five P. M.
APR. 2, Wednesday.—All classes meet according to schedule.
APR. 19, Saturday.—Scholarship deficiency reports due.
MAY 10, Saturday.—Scholarship deficiency reports due.
MAY 30, Friday.—Holiday, Decoration Day.
JUNE 11 to 18, Wednesday to Wednesday.—Examinations at close of term.
JUNE 15 to 19, Sunday to Thursday.—Exercises of Commencement Week.
JUNE 19 to July 31, Thursday to Thursday.—Summer School in session.

SEPT. 15, Monday.—Assignment of students begins at one-thirty P. M.
SEPT. 18, Thursday.—Assignment of students closes.
SEPT. 19, Friday.—All classes meet according to schedule.

Students must be present the very first day of each term or render a reasonable excuse. Failure to take out an assignment is not accepted as an excuse for absence from classes.

The Board of Regents

HON. ARTHUR CAPPER (1913), *President,*
Topeka, Shawnee county.

HON. EDWIN TAYLOR (1915), *Vice-President,*
Edwardsville, Wyandotte county.

HON. W. E. BLACKBURN, (1915),
Anthony, Harper county.

HON. A. L. SPONSLER (1913),
Hutchinson, Reno county.

HON. M. M. SHERMAN (1913),
Ellsworth, Ellsworth county.

HON. A. T. PALMER (1915),
Wamego, Pottawatomie county.

H. J. WATERS (*ex officio*), *Secretary,*
Manhattan, Riley county.

MARGARET BUTTERFIELD, *Assistant Secretary.*

The Board of Instruction

HENRY JACKSON WATERS, B. S. A.,

President of the College.

B. S. A., University of Missouri, 1886; Assistant Secretary, Missouri State Board of Agriculture, 1886-1888; Assistant in Agriculture to Missouri Experiment Station, 1888-1891; Professor of Agriculture, Pennsylvania State College, and Agriculturist, Pennsylvania Experiment Station, 1892-1895; Instructor in Animal Nutrition, Graduate School of Agriculture, University of Ohio, 1902; Director Missouri State Agricultural Exhibit, World's Fair, St. Louis, 1903-1904; Student at the Universities of Leipzig and Zurich, 1904-1905; Instructor in Animal Nutrition, Graduate School of Agriculture, University of Illinois, 1906; President Missouri State Board of Agriculture, 1908-1909; Dean of the College of Agriculture, Director of the Experiment Station, and Professor of Agriculture, University of Missouri, 1895-1909; President, Kansas State Teachers' Association, 1911-1912; President, Kansas State Agricultural College, 1909—.

Office* A 30; Res. 500 Houston St.

JOHN DANIEL WALTERS, D. A.,

Professor of Architecture and Drawing.

Student, High School, Bucheggberg, Switzerland, 1860-1863; Student, College of Solothurn, Switzerland, 1863-1867; Instructor, Agricultural Experiment Station, Klingenberg, Switzerland, 1865-1866; Student, University of Bern, 1868; Instructor in Industrial Art, Kansas State Agricultural College, 1876-1885; M. S., ibid., 1883; Professor of Industrial Art and Design, ibid., 1885-1904; D. A., ibid., 1908; Professor of Architecture and Drawing, ibid., 1904—.

Office E 56; Res. 508 Bluemont Ave.

JULIUS TERRASS WILLARD, D. Sc.,

Dean of the Division of General Science, Professor of Chemistry.

B. S., Kansas State Agricultural College, 1883; Assistant in Chemistry, ibid., 1883-1887; M. S., ibid., 1886; Graduate Student, Johns Hopkins University, 1887-1888; Assistant Chemist, Kansas Experiment Station, 1888-1897; Assistant Professor of Chemistry, Kansas State Agricultural College, 1890-1896; Associate Professor of Chemistry, ibid., 1896-1897; Chemist, Kansas Experiment Station, 1897—; Professor of Applied Chemistry, Kansas State Agricultural College, 1897-1901; Director, Kansas Experiment Station, 1900-1906; Vice Director, ibid., 1907—; Professor of Chemistry, Kansas State Agricultural College, 1901—; D. Sc., ibid., 1908; Dean of the Division of General Science, ibid., 1909—; Chemist, Engineering Experiment Station, ibid., 1910—.

Office C 30; Res. 1725 Poyntz Ave.

JOSHUA DOUGLAS RICKMAN,

Superintendent of Printing.

Master Printer, Newton, Iowa, 1876; Printing trade, 1876-1898; Foreman Department of Printing, Kansas State Agricultural College, 1898-1899; Superintendent of Printing, ibid., 1899—.

Office K 28; Res. 928 Bluemont Ave.

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* Buildings are designated by letters, as follows:

A—Anderson Hall (Main).
C—Physical Science Hall.
D—Dairy Hall.
E—Mechanical Engineering Hall.
F—Fairchild Hall (Library).
G—Agricultural Hall (Old).
H—Horticultural Hall.
K—Kedzie Hall (Printing).
L—Domestic Science and Art Hall.
M—Auditorium.
R—Farm Mechanics Hall (Old Armory).
S—Engineering Shops.
V—Veterinary Hall.
W—Chemistry Annex.
X—Horticultural Laboratory.

BENJAMIN LUCE REMICK, PH. M.,

Professor of Mathematics.

Ph. B., Cornell College (Iowa), 1889; Instructor, Cornell College Academy, 1889-1892; Ph. M., Cornell College, 1892; Graduate Student, Johns Hopkins University, 1892-1893; Instructor, Northwestern University Academy, 1893-1894; Graduate Student, University of Chicago, 1894-1895; Professor of Mathematics, University of Pacific, 1895-1896; Graduate Student, University of Chicago, 1896-1898; Associate, Bradley Institute (Peoria, Illinois), 1898-1900; Professor of Mathematics, Kansas State Agricultural College, 1900—.

Office A 71; Res. 613 Houston St.

BENJAMIN FRANKLIN EYER, E. E.,

Professor of Electrical Engineering.

Professor of Physics, Hiawatha Academy, 1890-1895; Student, University of Chicago, Summers, 1893, 1898, 1901; Instructor in Physics and Chemistry, Topeka High School, 1895-1900; Vice Principal of Topeka High School, 1897-1900; Professor of Physics and Electrical Engineering, Kansas State Agricultural College, 1900-1908; on leave of absence, 1901-1902; B. S., Armour Institute of Technology, 1902; E. E., ibid., 1908; Professor of Electrical Engineering, Kansas State Agricultural College, 1908—.

Office C 33; Res. 1001 Laramie St.

HERBERT FULLER ROBERTS, M. S.,

Professor of Botany.

A. B., University of Kansas, 1891; LL. B., Northwestern University Law School (Chicago), 1893; Admission to the Bar, Supreme Court of Illinois, 1893; Assistant in law offices, Kansas City, Missouri, 1893-1894; Graduate Student in Biology, Kansas State Agricultural College, 1896-1898; M. S., ibid., 1898; Graduate Student, University of Chicago, 1898-1899; Instructor in Botany, Washington University (St. Louis), 1899-1901; Professor of Botany, Kansas State Agricultural College, 1901—.

Office H 58; Res. 1920 Poyntz Ave.

WILLIAM ARCH McKEEVER, PH. M.,

Professor of Philosophy.

B. A., Campbell College, 1893; Principal, Holton Schools, 1894-1896; A. M., University of Kansas, 1898; Superintendent, Smith Center Public Schools, 1898-1900; Assistant Professor of English and Philosophy, Kansas State Agricultural College, 1900-1901; Professor of Philosophy, ibid., 1901—; Ph. M., University of Chicago, 1904; Graduate Student, Harvard University Summer School, 1904.

Office N 27; Res. 341 N. Fourteenth St.

EDMUND BURKE McCORMICK, S. B.,

Dean of the Division of Mechanic Arts, Director Engineering Experiment Station, Professor of Power and Experimental Engineering.

Machinist with Chicago & Alton Railroad Company, 1889-1893; S. B. in Mechanical Engineering, Massachusetts Institute of Technology, 1897; Instructor in Mechanical Engineering, Montana State College, 1898-1899; Assistant Professor of Mechanical Engineering, ibid., 1899-1901; Professor of Mechanical Engineering, Kansas State Agricultural College, 1901-1910; Consulting Engineer, United States Office of Public Roads, 1907—; Dean of the Division of Mechanic Arts, Kansas State Agricultural College, 1908—; Director, Engineering Experiment Station, Professor of Power and Experimental Engineering, ibid., 1910—.

Office E 30; Res. 800 Houston St.

ALBERT DICKENS, M. S.,

Professor of Horticulture.

B. S., Kansas State Agricultural College, 1893; Foreman, Munger Orchards, Eureka, 1895; State Teacher's Certificate, 1895; Instructor, Ellinwood High School, 1897-1898; Teacher's Life Certificate, 1898; Assistant in Horticulture, Kansas State Agricultural College, 1899-1901; M. S., ibid., 1901; Acting Professor of Horticulture, ibid., 1901-1902; Professor of Horticulture, ibid., 1902—.

Office H 33; Res. 507 N. Manhattan Ave.

CLARK MILLS BRINK, PH. D.,

Dean of the College, Assistant to the President, Professor of English Literature.

A. B., University of Rochester, 1879; Graduate, Rochester Theological Seminary, 1882; Pastor, First Baptist Church, Des Moines, Iowa, 1882-1887; Fellow and Graduate Student, New York University, 1888-1892; Instructor in Rhetoric and Oratory, Brown University, 1892-1895; A. M., University of Rochester, 1893; Ph. D., New York University, 1894; Professor of English and History, Kalamazoo College, 1895-1901; Graduate Student, University of Chicago, Summer, 1900; Graduate Student, Harvard University, 1901-1902; Professor of English, Kansas State Agricultural College, 1902-1911; Assistant to the President, ibid., 1908—; Dean of Science, ibid., 1908-1909; Dean of the College, ibid., 1909—; Professor of English Literature, ibid., 1911—.

Office A 27; Res. 353 N. Fourteenth St.

RALPH RAY PRICE, A. M.,

Professor of History and Civics.

A. B., Baker University, 1896; Graduate Student, University of Kansas, 1896-1898; A. M., ibid., 1898; Assistant in History, ibid., 1897-1900; Graduate Student, University of Chicago, Summer, 1899; Instructor in History and Civics, Lawrence High School, 1898-1901; Graduate Student, University of Wisconsin, Summer, 1901; Instructor in History and Civics, Ishpeming (Michigan) High School, 1901-1902; Graduate Student, Cornell University, Summer, 1902; Instructor in History and Civics, and Assistant Principal, Rockford (Illinois) High School, 1902-1903; Graduate Student, University of Michigan Law School, Summer, 1909; Professor of American History and Government, University of Kansas, Summer, 1911; Professor of History and Civics, Kansas State Agricultural College, 1903—.

Office F 57; Res. 826 Houston St.

JULIUS ERNEST KAMMEYER, A. M.,

Professor of Economics.

A. B., Central Wesleyan College, 1886; Instructor, Public Schools, 1886-1893; A. M., Central Wesleyan College, 1889; Instructor in History and Civics, Kansas City (Kansas) High School, 1893-1897; Vice Principal and Instructor in Economics, ibid., 1897-1903; Professor of Oratory, Kansas State Agricultural College, 1903-1904; Graduate Student, University of Chicago, Summer, 1910; Professor of Economics, Kansas State Agricultural College, 1904—.

Office A 52; Res. 901 Bluemont Ave.

JOHN VANZANDT CORTELYOU, PH. D.,

Professor of German.

A. B., University of Nebraska, 1897; Assistant Principal, Humboldt (Nebraska) High School, 1897-1898; Principal, ibid., 1898-1899; A. M., University of Nebraska, 1901; Graduate Student, University of Heidelberg, Germany, 1901-1904; Research Work, British Museum and Bibliotheque Nationale (Paris), Summer, 1903; Ph. D., University of Heidelberg, 1904; Professor of German, Kansas State Agricultural College, 1904—.

Office N 59; Res. 329 N. Fourteenth St.

OLOF VALLEY, B. M.,

Professor of Music.

Student, Teknologiska Institutet, Stockholm, Sweden, 1886-1888; Engineering Profession, Chicago, 1888-1892; Pupil of Signor Carpi, 1892-1893, Albert B. Ruff, 1893-1897; Soloist with American Union Swedish Singers on European Concert Tour, 1897; Pupil of Williams Nelson Burritt, 1898-1900; Concert and Oratorio Artist, 1900—; Pupil of Max Heinrich, 1900-1901; B. M., Chicago Conservatory of Music, 1902; Instructor and Concert Artist, Chicago Conservatory of Music, 1903-1904; Professor of Music, Kansas State Agricultural College, 1904—.

Office M 30; Res. 225 N. Fourteenth St.

FRANCIS SIEGEL SCHOENLEBER, D. V. S.,

Professor of Veterinary Medicine.

B. S. A., Iowa State College, 1885; Assistant in Agriculture, ibid., 1885-1888; M. S. A., ibid., 1887; Associate Editor, *Orange Judd Farmer*, Chicago, 1888-1890; D. V. S., Chicago Veterinary College, 1890; Private Veterinary Practice, 1890-1896; Dean, McKillip Veterinary College, Chicago, 1896-1899, and 1901-1905; M. D., Harvey Medical College, Chicago, 1901; M. D., National Medical University, Chicago, 1901; Private Human Practice, 1901-1903; Professor of Veterinary Medicine, Kansas State Agricultural College, 1905—.

Office V 30; Res. 603 Houston St.

JOHN HAROLD MILLER, A. M.,

Director of College Extension.

A. B., Central Normal College (Danville, Indiana), 1882; President, Campbell College, 1882-1888; with D. C. Heath & Co., 1888-1890; Publisher *Northwestern Monthly*, Lincoln, Nebraska, 1890-1900; Principal State Normal School, Cheney, Washington, 1900-1902; Editor and Publisher, Holton (Kansas) *Tribune*, 1902-1905, Superintendent of Agricultural Extension, Kansas State Agricultural College, 1905-1911; Director of College Extension, ibid., 1911—.

Office A 36; Res. 829 Fremont St.

THOMAS J HEADLEE, PH. D.,

Professor of Entomology and Zoölogy.

A. B., University of Indiana, 1902; A. M., ibid., 1903; Graduate Student in Entomology, Cornell University, 1904-1906; Scholar in Entomology, ibid., 1905-1906; Ph. D., ibid., 1906; Assistant Entomologist, New Hampshire Agricultural Experiment Station, 1906-1907; Associate Entomologist, ibid., 1907; Professor of Entomology and Zoölogy, Kansas State Agricultural College, 1907—.

Office F 51; Res. 319 N. Seventeenth St.

JOHN ORR HAMILTON, B. S.,

Professor of Physics.

Student, Monmouth College, 1888-1890; Superintendent, Roseville (Illinois) Public Schools, 1894-1898; B. S., University of Chicago, 1900; Instructor in Science, Mount Barbara Military Academy (Salina), 1900-1901; Assistant in Physics, Kansas State Agricultural College, 1901-1903; Assistant Professor of Physics, ibid., 1903-1908; Professor of Physics, ibid., 1908—.

Office C 57; Res. 335 N. Fourteenth St.

MARY PIERCE VAN ZILE,

Professor of Domestic Science, Dean of Women.

Instructor, Winfield (Iowa) Schools, 1888-1889; Student, Kansas State Agricultural College, 1889-1891; Principal, Wayland (Iowa) High School, 1891-1892; Teacher's Diploma, Iowa State College, 1902; Instructor in Domestic Science, ibid., 1902-1903; Student, Graduate School of Domestic Science, University of Illinois, Summer, 1903; Domestic Science Lecturer and Demonstrator at Chautauquas, Summers of 1903-1905; Instructor in Domestic Science and Art, Township High School, Chicago, 1903-1908; Professor of Domestic Science and Dean of Women, Kansas State Agricultural College, 1908—.

Offices L 29 and 30; Res. 829 Leavenworth St.

EDWIN HARRISON WEBSTER, M. S.,

Director of Agricultural Experiment Station, Dean of the Division of Agriculture.

B. S., Kansas State Agricultural College, 1896; Student, Sedalia (Missouri) Central Business College, 1896; Instructor, Private School for Boys, Denver, 1896-1897; Machinist, Aermotor Company, Chicago, 1898; Graduate Student, Kansas State Agricultural College, 1899-1900; Assistant in Dairying, Iowa State College, 1900-1901; B. S. Agr., ibid., 1901; M. S., Kansas State Agricultural College, 1901; Assistant Professor of Dairying, ibid., 1901-1902; Professor of Dairying, ibid., 1902-1903; Scientific Expert in Dairying, United States Department of Agriculture, 1903-1904; General Superintendent, Beatrice Creamery Company, Denver, 1904-1905; Chief of Dairy Division, United States Department of Agriculture, 1905-1908; Dean of the Division of Agriculture and Director of Agricultural Experiment Station, Kansas State Agricultural College, 1908—.

Office A 33; Res. Cor. Moro and 11th Sts.

LOWELL EDWIN CONRAD, M. S.,

Professor of Civil Engineering.

Chainman, Union Pacific Railroad Company, 1899; Chainman, Illinois Central Railroad Company, 1900; Levelman, Vicksburg National Military Park, 1900-1901; Field Draftsman, Choctaw, Oklahoma and Gulf Railroad Company, 1901; Instrument Man, Mexican Central Railway Company, 1902-1903; B. S., Cornell College (Iowa), 1904; Inspector and Instrument Man on Sewer Construction, Centralia, Illinois, 1904; Assistant Engineer on Construction, Tehuantepec National Railway Company, Mexico, 1905-1906; C. E., Cornell College (Iowa), 1906; Instructor and Graduate Student in Civil Engineering, Lehigh University, 1906-1908; M. S., ibid., 1908; Assistant Professor of Civil Engineering, Kansas State Agricultural College, 1908-1909; Professor of Civil Engineering, ibid., 1909—.

Office E 58; Res. 915 Fremont St.

ANTONETTA BECKER,

Professor of Domestic Art.

Graduate, Domestic Art Course, Drexel Institute, Philadelphia, 1899; Instructor, Night Classes, ibid., 1904-1906; Graduate, Normal Domestic Art Course, ibid., 1906; Superintendent of Domestic Art, Kansas State Agricultural College, 1906-1909; Professor of Domestic Art, ibid., 1909—.
Office L 55; Res. 309 N. Juliette Ave.

CHARLES ANDERSON SCOTT, B. S.,

Kansas State Forester.

B. S., Kansas State Agricultural College, 1901; Forest Expert, United States Forest Service, 1901-1904; Graduate Student, Yale University Forest School, 1904-1905; Forest Supervisor, United States Forest Service, 1905-1907; Special Lecturer on Forestry Subjects, University of Nebraska, Winters, 1906 and 1907; Professor of Forestry, Iowa State College, 1908-1910; Kansas State Forester, Kansas State Agricultural College, 1910—.
Office H 28; Res. 311 N. Eighteenth St.

LESLIE ARTHUR FITZ, B. S.,

Professor of Milling Industry.

B. S., Kansas State Agricultural College, 1902; Grain Investigation, United States Department of Agriculture, 1902-1906; Office of Grain Standardization, ibid., 1906-1910; in charge of Department of Milling Industry, Kansas State Agricultural College, 1910-1912; Professor of Milling Industry, ibid., 1912—.
Office A 33; Res. 1014 Houston St.

EDWIN LEE HOLTON, A. B.,

Professor of Rural Education.

Graduate, Indiana State Normal School, 1900; Principal, Township Consolidated Schools, Madison county, Indiana, 1900-1902; A. B., Indiana University, 1904; Graduate Student, ibid., Winter and Spring Terms, 1904; Superintendent City Schools, Holton, Kansas, 1904-1906; Superintendent City Schools, Noblesville, Indiana, 1906-1908; Graduate Student, Columbia University, 1908-1910; Supervisor Industrial Schools, New York City, 1909-1910; Professor of Rural Education, Kansas State Agricultural College, 1910—.
Office A 32; Res. 221 N. Fourteenth St.

ANDREY ABRAHAM POTTER, S. B.,

Professor of Steam and Gas Engineering; in Charge of Course in Mechanical Engineering.

S. B., Massachusetts Institute of Technology, 1903; Engineer in Experimental Steam Turbine Department, General Electric Company, 1903-1905; Graduate Student, Columbia University, Summer Session, 1908; Assistant Professor of Mechanical Engineering, Kansas State Agricultural College, 1905-1910; Professor of Steam and Gas Engineering, ibid., 1910—.
Office S 55; Res. 1332 Fremont St.

ROY ANDREW SEATON,* M. S.,

Professor of Applied Mechanics and Hydraulics.

B. S., Kansas State Agricultural College, 1904; Assistant in Mathematics, ibid., 1904-1906; Assistant Professor, ibid., 1907-1908; Graduate Student, University of Wisconsin, Summer Session, 1908; Instructor in Mechanical Engineering, Kansas State Agricultural College; 1908-1909; Assistant Professor of Mechanical Engineering, ibid., 1909-1910; M. S., ibid., 1910; Professor of Applied Mechanics and Hydraulics, ibid., 1910—.
Office S 63; Res. ———.

WILLIAM M JARDINE, B. S. A.,

Professor of Agronomy.

B. S. A., Utah Agricultural College, 1904; Instructor in Agronomy, ibid., 1904-1905; Manager, Utah Arid Farming Company, Utah, 1905; Assistant Professor of Agronomy, Utah Agricultural College, 1905; Student, Graduate School of Agriculture, University of Illinois, 1906; Professor of Agronomy, Utah Agricultural College, 1906-1907; Assistant Cerealist, United States Department of Agriculture, 1907-1910; Professor of Agronomy, Kansas State Agricultural College, 1910—.
Office G 28; Res. 1020 Houston St.

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* On leave of absence during the year 1911-1912.

CHARLES JAMES DILLON,

Professor of Industrial Journalism.

Special Correspondent in Mexico for the St. Louis *Globe-Democrat*, 1887-1888; Correspondent for the *Tacoma Ledger*, Session of the Legislature, Olympia, Washington, 1889; Roving commissions and syndicate writing, British Northwest Territories, 1890-1892; with the Chicago *Post*, World's Fair Grounds, 1893; Editor the Associated Press, Chicago, 1894; with the San Francisco *Examiner*, 1895; with the Honolulu *Advertiser*, 1896; Roving commissions through the South Seas to Japan, China, and Vladivostock, 1897-1898; with *The Kansas City Star*, 1899-1910; Professor of Industrial Journalism, Kansas State Agricultural College, 1910—.

Office K 27; Res. Cor. Sixth St. and Poyntz Ave.

ROBERT PATTISON HARBOLD,

First Lieutenant 25th U. S. Infantry, Professor of Military Science and Tactics.

Cadet, United States Military Academy, 1900-1904; Second Lieutenant, 25th United States Infantry, 1904-1911; First Lieutenant, 1911—; Professor of Military Science and Tactics, Kansas State Agricultural College, July 1, 1911—.

Office N 29; Res. 816 N. Juliette Ave.

JAMES WILLIAM SEARSON, A. M.,

Professor of the English Language.

Principal, Weeping Water (Nebraska) High School, 1894-1895; Instructor, Nebraska Teachers' Institutes, 1895—; A. B., University of Nebraska, 1896; Fellow in History, ibid., 1896-1898; A. M., ibid., 1899; Superintendent, Wahoo (Nebraska) Schools, 1899-1905; Professor of English and Rhetoric, Nebraska State Normal School (Peru), 1905-1910; Associate Professor of English, Kansas State Agricultural College, 1910-1911; Professor of the English Language, ibid., 1911—.

Office K 27; Res. 1314 Fremont St.

OLLIE EZEKIEL REED, M. S.,

Professor of Dairy Husbandry.

B. S., University of Missouri, College of Agriculture, 1908; Assistant in Dairy Husbandry, ibid., 1908-1909; Instructor in Milk Production, Purdue University, 1909-1910; M. S., University of Missouri, 1910; Assistant Professor in charge of Department of Dairy Husbandry, Kansas State Agricultural College, 1910-1911; Professor of Dairy Husbandry, ibid., 1911—.

Office D 30; Res. 1221 Laramie St.

GUY SUMNER LOWMAN, B. P. E.,

Professor of Physical Education, Director of Physical Training.

B. Di., Iowa State Normal School, 1903; B. P. E., International School of Physical Training, Springfield, Massachusetts, 1905; Director of Physical Training, Brookline (Massachusetts) High School, 1905-1907; Graduate Student, Harvard Summer School of Physical Education, Summer, 1907; Director of Physical Education, Warrensburg (Missouri) State Normal School, 1907-1908; Instructor in Physical Education, University of Missouri, 1908-1910; Professor of Physical Training and Director of Athletics, University of Alabama, 1910-1911; Professor of Physical Education and Director of Physical Training, Kansas State Agricultural College, 1911—.

Office N 37; Res. 323 N. Fourteenth St.

ARTHUR BOURNE SMITH, B. L. S.,

Librarian.

Librarian in Charge, Genesee Wesleyan Seminary, New York, 1892-1895; Principal, Smithboro (New York) Public Schools, 1895-1896; Assistant in Library, Wesleyan University, 1896-1900; Ph. B., Wesleyan University, 1900; Library Assistant, University of Illinois, 1900-1902; B. L. S., ibid., 1902; Assistant Editor, *Cumulative Book Index*, *United States Catalogue* and *Readers' Guide to Periodical Literature*, June-September, 1902; Lecturer on Bibliography, University of California, 1903; Head of Order Department of Library, ibid., 1903 - June, 1911; Head of Accessions Division of Library, ibid., July - August, 1911; Instructor in Summer School, ibid., 1906 and 1907; Librarian, Kansas State Agricultural College, 1911—.

Office F 32; Res. 1020 Poyntz Ave.

WILLIAM ADAMS LIPPINCOTT, B. S.,

Professor of Poultry Husbandry.

A. B., Illinois College, 1903; Secretary, Young Men's Christian Association, Chicago, 1903-1904; Student, Chicago Theological Seminary, 1904-1906; Poultry Farming, 1906; Graduate Student, Cornell University, 1906-1907; Superintendent of Poultry Farm, Iowa State College, 1907-1908; Student Assistant in Poultry, ibid., 1908-1910; Student, Graduate School of Agriculture, Ames, Iowa, Summer, 1910; Assistant in Charge of Poultry, Iowa State College, 1910-1911; B. S., ibid., 1911; Assistant Professor of Animal Husbandry in Charge of Poultry, ibid., 1911; Professor of Poultry Husbandry, Kansas State Agricultural College, 1912—.

Office D 2; Res. 710 Humboldt St.

WILBUR ANDREW COCHEL, B. S.,

*Professor of Animal Husbandry.**

A. B., University of Missouri, 1897; Assistant in Agronomy Department, St. Louis World's Fair, 1903; In Charge of Holsteins in Dairy Test, ibid., 1904; B. S., University of Missouri, 1905; Fellowship in Animal Husbandry, ibid., 1905-1906; Assistant in Animal Husbandry, Purdue University, 1906-1907; Associate in Animal Husbandry, ibid., 1907-1909; Professor of Animal Husbandry, Pennsylvania State College, 1909-1912; Professor of Animal Husbandry, Kansas State Agricultural College, 1912—.

Office G 30; Res. ———.

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Professor of Heating and Sanitation.

LELAND EVERETT CALL,† B. S. A.,

Associate Professor of Soils.

B. S. A., University of Ohio, 1906; Teaching Fellow, ibid., 1906-1907; Assistant in Agronomy, Kansas State Agricultural College, 1907-1908; Assistant Professor of Soils, ibid., 1908-1911; Associate Professor of Soils, ibid., 1911—.

Office G 37; Res. 609 N. 9th St.

ALBERT MOORE TENEYCK, M. S.,

Superintendent of Fort Hays Branch Agricultural Experiment Station.

B. S. A., University of Wisconsin, 1893; Farmer, Wisconsin and Colorado, 1893-1896; Assistant in Agricultural Chemistry, Colorado Agricultural College, 1896-1897; M. S., ibid., 1897; Assistant Professor of Agriculture, North Dakota Agricultural College and Experiment Station, 1897-1902; Professor of Agronomy, Kansas State Agricultural College, 1902-1910; Professor of Farm Management, ibid., 1910-1911; Superintendent, Fort Hays Branch Agricultural Experiment Station, 1910—.

Office and Res. Hays, Kansas.

DALLAS STOCKWELL BURCH, B. S.,

State Dairy Commissioner.

B. S., Agricultural Course, University of Wisconsin, 1908; Expert in Dairying, United States Department of Agriculture, 1908-1909; Editor, *Butter, Cheese and Egg Journal,* 1910; Assistant Editor, *Farm and Fireside,* 1911; Kansas State Dairy Commissioner, 1911—.

Office X 22; Res. 1100 Bluemont Ave.

JACOB LUND, B. S.,

Superintendent of Heat, Water and Gas Distribution.

B. S., Kansas State Agricultural College, 1883; Steam Fitter and Instructor in Blacksmithing, ibid., 1883-1886; M. S., ibid., 1886; Machinist, Santa Fé Railroad Shops, Topeka, 1886-1888; with Las Vegas Hot Springs Company, Las Vegas Hot Springs, New Mexico, 1888-1891; General Repairer, Sidney (Washington) Shingle Mill, 1891-1892; Engineer and Fireman, Capital Iron Works, Topeka, 1892-1893; Steam Fitter and Fireman, Kansas State Agricultural College, 1893-1898; Engineer, ibid., 1898-1901; Superintendent, Heat and Power Department, ibid., 1901-1912; Superintendent of Heat, Water and Gas Distribution, ibid., 1912—.

Office S 34; Res. 1420 Fairchild Ave.

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* Effective July 1, 1912.

† On leave of absence, Winter term, year 1911-1912.

GERTRUDE A BARNES,

Assistant Librarian.

Graduate, Blue Rapids High School, 1880; Student with Private Tutor, 1880-1882; Student, The Misses Black School for Young Ladies, Geneva, New York, 1882-1883; Librarian, Blue Rapids Public Library, 1889-1899; Student, Amherst College Summer School, 1899; Library Assistant, ibid., 1899; Assistant Librarian, Kansas State Agricultural College, 1899-1908; Librarian, ibid., 1908-1911—; Assistant Librarian, ibid., 1911—.

Office F 32; Res. 337 N. Sixteenth St.

ROBERT HENRY BROWN, B. M.,

Assistant Professor of Music.

B. M., Kansas Conservatory of Music, 1893; B. S., Kansas State Agricultural College, 1898; Special Student, Chicago Musical College, 1898-1900; Instructor in Violin and Band Instruments, Kansas State Agricultural College, 1900-1905; Assistant Professor of Music and Director of Orchestra, ibid., 1905—.

Office M 27; Res. 331 N. Seventeenth St.

GEORGE ADAM DEAN, M. S.,

Assistant Professor of Entomology.

B. S., Kansas State Agricultural College, 1895; State Teacher's Certificate, 1898; Principal, Highland Park (Topeka) Public School, 1898-1902; Assistant in Entomology, Kansas State Agricultural College, 1902-1905; M. S., ibid., 1905; Instructor in Entomology, ibid., 1905-1907; Assistant Professor of Entomology, ibid., 1907—.

Office F 52; Res. 511 N. Juliette Ave.

WILLIAM HIDDLESON ANDREWS, A. B.,

Assistant Professor of Mathematics.

Principal, Beloit High School, 1897-1898; A. B., University of Chicago, 1900; Superintendent, Blue Rapids City Schools, 1901-1905; Instructor in Mathematics, Leavenworth High School, 1905-1906; Assistant in Mathematics, Kansas State Agricultural College, 1906-1907; Assistant Professor of Mathematics, ibid., 1907—; Principal of Academic Department, ibid., 1910—; Graduate Student, University of Chicago, Summer, 1911.

Office A 64; Res. 630 Moro St.

GEORGE CARPENTER WHEELER, B. S.,

Lecturer on Farm Management, Department of College Extension.

B. S., Kansas State Agricultural College, 1895; Farming, Railroading and Studying, 1895-1903; Assistant in Feeding Experiments, Kansas State Agricultural College, 1903-1905; Assistant in Animal Husbandry, ibid., 1905-1907; Assistant Professor of Animal Husbandry, ibid., 1907-1909; Lecturer on Farm Management, Agricultural College Extension Department, ibid., 1909—.

Office A 36; Res. 303 N. Fourteenth St.

PLEASANT CRABTREE,

Lecturer on Farm Management, Department of College Extension.

Student, Fort Scott Teachers' Normal Institute, 1885; Student, Lamar (Missouri) Teachers' Normal Institute, 1885-1889; Instructor, Missouri Public Schools, 1886-1889; Student, Denver Business College, 1897; Editor, *Agricultural and Live Stock Herald*, Denver, 1897-1900; Lecturer, Missouri Farmers' Institutes, 1900-1904; Lecturer on Farm Management, Extension Department, Kansas State Agricultural College, 1908—.

Office A 36; Res. 931 Moro St.

KIRK WHITNEY STOUDER,† D. V. M.,

Assistant Professor of Veterinary Medicine.

D. V. M., Iowa State College, 1905; House Surgeon, Iowa State College, 1904-1905; Veterinary Inspector, United States Department of Agriculture, 1905; Professor of Surgery and Anatomy, Washington State College, 1905-1908; Deputy State Veterinarian, Washington, 1905-1908; Assistant Professor of Veterinary Medicine, Kansas State Agricultural College, 1908—.

Office V 31; Res. 1007 Houston St.

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† Absent on leave.

LEONARD WHITTLESEY GOSS,* D. V. M.,

Assistant Professor of Veterinary Medicine.

D. V. M., Ohio State University, 1905; Assistant in Veterinary Science, Kansas State Agricultural College, 1905-1907; Instructor in Veterinary Science, ibid., 1907-1909; Graduate Student, Tieraerztliche Hochschule, Berlin, Germany, 1911-1912; Assistant Professor of Veterinary Medicine, ibid., 1909—.
Office V 56; Res. 113 S. Sixth St.

ULA MAY DOW,* B. S.,

Assistant Professor of Domestic Science.

B. S., Kansas State Agricultural College, 1905; Teacher's Diploma, Massachusetts State Normal School, 1906; Assistant in Domestic Science, Kansas State Agricultural College, 1906; Instructor in Domestic Science, ibid., 1906-1909; Assistant Professor of Domestic Science, ibid., 1909—.
Office L 30; Res. R. R. No. 1.

HERBERT HIRAM KING, A. M.,

Assistant Professor of Chemistry.

A. B., Ewing College, 1904; Professor of Chemistry, Manchester College, 1904-1906; A. M., Ewing College, 1906; Assistant in Chemistry, Kansas State Agricultural College, 1906-1908; Instructor in Chemistry, ibid., 1908-1909; Graduate Student in Physical Chemistry, University of Chicago, Summer Session, 1909; Assistant Professor of Chemistry, Kansas State Agricultural College, 1909—; Assistant Chemist, Engineering Experiment Station, ibid., 1910—.
Office C 56; Res. 916 Humboldt St.

JOHN BENNETT WHELAN, A. M.,

Assistant Professor of Chemistry.

A. B. and Ped. B., Hillsdale College, 1903; Instructor, Pawpaw (Illinois) High School, 1903-1905; Instructor, Rensselaer (Indiana) High School, 1905-1906; Instructor, Lincoln (Nebraska) High School, 1906-1908; Fellow, University of Nebraska, 1907-1908; A. M., ibid., 1908; Instructor in Chemistry, Kansas State Agricultural College, 1908-1909; Graduate Student in Organic Chemistry, University of Chicago, Summer, 1909; Assistant Professor of Chemistry, Kansas State Agricultural College, 1909—.
Office C 41; Res. 511 Laramie St.

CHARLES OSCAR SWANSON, M. AGR.,

Assistant Professor of Agricultural Chemistry.

A. B., Carlton College, 1899; Principal, Jackson (Minnesota) High School, 1899-1900; Instructor, Cannon Falls (Minnesota) High School, 1900-1903; M. Agr., University of Minnesota, 1905; Instructor in Agricultural Chemistry and Assistant Chemist in Experiment Station, Purdue University, 1905-1906; Assistant Chemist in Agricultural Experiment Station, Kansas State Agricultural College, 1906—; Asssistant Professor of Agricultural Chemistry, ibid., 1909—.
Office C 6; Res. 931 Bluemont Ave.

LEWIS HENRY BEALL,* A. B.,

Assistant Professor of English Literature.

A. B., Denison University, 1902; Principal, Rockwell City (Iowa) High School, 1902-1904; Principal, Ellsworth High School, 1905-1906; Assistant in English, Kansas State Agricultural College, 1907-1908; Instructor in English, ibid., 1908-1909; Assistant Professor of English, ibid., 1909-1911; Graduate Student, University of Chicago, Summer, 1910; Assistant Professor of English Literature, Kansas State Agricultural College, 1911—.
Office A 57; Res. 220 S. Eighth St.

GEORGE EBEN BRAY, M. E.,

Assistant Professor of Shop Methods and Practice, Superintendent of Shops.

M. E., University of Minnesota, 1894; Instructor in Manual Training, Logan High School, Minneapolis, Minnesota, 1897-1898; Supervisor of Manual Training, Superior (Wisconsin) Public Schools, 1900-1903; Graduate Student, Columbia University, Summer, 1902; Graduate Student, University of Minnesota, Summer, 1903; Director of Mechanical Drawing and Manual Arts, New Trier Township High School, Kenilworth, Illinois, 1903-1909; Assistant Professor of Mechanical Engineering, Kansas State Agricultural College, 1909-1910; Superintendent of Shops, ibid., 1909—; Assistant Professor of Shop Methods and Practice, ibid., 1910—.
Office S 62; Res. 817 Osage St.

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* On leave of absence, year 1911-1912.

WILMER ESLA DAVIS, A. B.,

Assistant Professor of Botany.

Graduate, Ohio Normal University, 1894; Public School work, 1894-1900; A. B., University of Illinois, 1903; Principal, Rossville (Illinois) High School, 1903-1904; Instructor, Great Falls (Montana) High School, 1904-1905; Instructor in Science, Urbana (Illinois) High School, 1905-1908; Graduate Student in Botany, University of Chicago, 1908-1909, and Summers, 1908, 1909, and 1910; Assistant Professor of Botany, Kansas State Agricultural College, 1909—.

Office H 57; Res. 927 Leavenworth St.

CLARENCE VICTOR HOLSINGER, B. S.,

Lecturer on Horticulture, Department of College Extension.

B. S., Kansas State Agricultural College, 1895; Grower of Fruit and Nursery Stock, 1895-1909; Lecturer on Horticulture, Extension Department, Kansas State Agricultural College, 1909-1912.

Office A 36; Res. 620 Moro St.

FRANCES LANGDON BROWN, B. S.,

Lecturer on Domestic Science, Department of College Extension.

Graduate, Kansas State Normal School, 1898 and 1906; Instructor, Madison (Kansas) City Schools, 1899-1900; Instructor, Shorey Public Schools, 1901-1902; Instructor, Topeka City Schools, 1902-1908; Student, State Manual Training Normal School, 1908; B. S., Kansas State Agricultural College, 1909; Lecturer on Domestic Science, Extension Department, ibid., 1909—.

Office A 36; Res. 519 Houston St.

WALTER SCOTT GEARHART, B. S. in C. E.,

State Highway Engineer, Department of College Extension.

Student, Bucknell University, 1899-1902; Chainman, United States Coal and Coke Company (West Virginia); Transitman, Pere Marquette Railroad Company (Michigan); Assistant Engineer, Chicago and Alton Railroad Company (Missouri); Assistant State Highway Engineer, Illinois Highway Commission; B. S. in C. E., University of Missouri, 1907; Highway Engineer, Agricultural College Extension Department, Kansas State Agricultural College, 1909—.

Office A 36; Res. 114 N. Juliette Ave.

JAMES HENRY BURT, D. V. M.,

Assistant Professor of Veterinary Medicine.

V. S., Ontario Veterinary College, 1895; Private Practice, 1895-1903; D. V. M., Ohio State University, 1905; Veterinary Inspector, United States Bureau of Animal Industry, 1905-1909; Assistant in Veterinary Medicine, Kansas State Agricultural College, 1909-1910; Assistant Professor of Veterinary Medicine, ibid., 1910—.

Office V 27; Res. 500 Houston St.

GEORGE SHERWOOD HINE, B. S. A.,

Lecturer on Dairying, Department of College Extension.

B. S. A., University of Wisconsin, 1907; Student Instructor in Farm Engineering, ibid., 1907; Assistant in Feed and Fertilizer Inspection and Dairy Tests, ibid., 1907-1908; Principal, Marinette (Wisconsin) County School of Agriculture and Domestic Economy, 1909; Lecturer on Dairying, Department of College Extension, Kansas State Agricultural College, 1910—.

Office A 36; Res. 512 Houston St.

HARRY BRUCE WALKER, B. S. in C. E.,

Drainage Engineer, Department of College Extension.

Student, Iowa State College, 1906-1910; Topographer, Chicago, Burlington and Quincy Railroad Company, 1906-1907; Student Assistant, Iowa State College, 1909-1910; Draftsman, Great Northern Railway Company, 1910; Drainage Engineer, Humboldt, Iowa, 1909-1910; B. S. in C. E., Iowa State College, 1910; Drainage Engineer, Department of College Extension, Kansas State Agricultural College, 1910—.

Office A 36; Res. 712 Poyntz Ave.

ARTHUR HENRY LEIDIGH, B. S.,

Assistant Professor of Crops.

B. S., Kansas State Agricultural College, 1902; Farm Hand, 1902-1903; with Office of Grain Investigations, United States Department of Agriculture, as Superintendent of Experiment Station, Channing, Texas, 1903-1905; Superintendent Experiment Station, Amarillo, Texas, 1905-1908; Farmer, Hutchinson, Kansas, 1908-1911; Collaborator, United States Department of Agriculture, 1908-1911; Assistant Professor of Crops, Kansas State Agricultural College, March, 1911—.

Office G 33; Res. 1638 Osage St.

PAUL NELSON FLINT, M. S.,

Assistant Professor of Animal Husbandry.

B. S., Michigan Agricultural College, 1904; Manager of Stock Farm, 1904-1905; M. S., University of Illinois, 1906; Assistant in Animal Husbandry, Georgia Experiment Station, 1906-1907; Animal Husbandman, ibid., 1907-1910; Professor of Animal Husbandry, University of Arkansas, 1910-1911; Assistant Professor of Animal Husbandry, Kansas State Agricultural College, 1911—.

Office G 30; Res. 915 Bluemont Ave.

LELAND DAVID BUSHNELL, B. S.,

Assistant Professor in Charge of Department of Bacteriology.

B. S., Michigan Agricultural College, 1905; Assistant in Bacteriology, ibid., 1906-1907; Expert in Dairy Bacteriology, Bureau of Animal Industry, University of Wisconsin, 1908-1909; Assistant in Bacteriology, Kansas State Agricultural College, 1909-1910; Instructor in Bacteriology, ibid, 1910-1911; Assistant Professor in Charge of Department of Bacteriology, ibid., 1911—.

Office V 54; Res. 621 Houston St.

MICHAEL FRANCIS AHEARN, B. S.,

Assistant Professor of Floriculture.

B. S., Massachusetts Agricultural College, 1904; Assistant in Horticulture, Kansas State Agricultural College, 1904-1909; Head Coach in Athletics, ibid., 1905-1911; Instructor in Horticulture, ibid., 1909-1911; Assistant Professor of Floriculture, ibid., 1911—.

Office H 32; Res. 507 Laramie St.

EVERETT PARKER JOHNSTON, A. B.,

Assistant Professor in Charge of Department of Public Speaking.

A. B., Oberlin College, 1897; Graduate, Emerson College of Oratory, 1899; Instructor in Public Speaking, University of North Dakota, 1899-1902; Graduate Student, University of Chicago, Summer, 1901; Reader under Management Chicago Lyceum Bureau, 1907-1909; Assistant in Public Speaking, Kansas State Agricultural College, 1909-1910; Instructor in Public Speaking, ibid., 1910-1911; Assistant Professor in Charge of Department of Public Speaking, 1911—.

Office N 53; Res. 608 Bluemont Ave.

ROBERT KIRKLAND NABOURS, PH. D.,

Assistant Professor of Zoölogy, Curator of the Natural History Museum.

Ed. B., School of Education, University of Chicago, 1905; Teacher of Natural History, and Assistant Curator of the Museum, ibid., 1905-1909; Graduate Student in Zoölogy, University of Chicago, 1907-1910; Assistant in Zoölogy, ibid., 1909-1910; Instructor in Zoölogy, Kansas State Agricultural College, 1910-1911; Ph. D., University of Chicago, 1911; Assistant Professor of Zoölogy, Kansas State Agricultural College, 1911—.

Office F 54; Residence, 714 Poyntz Ave.

GEORGE WASHINGTON CONN,

Superintendent of Farmers' Institutes.

Superintendent of Schools, Hebron, Illinois, 1892-1895; Student, University of Chicago, 1895-1896; Superintendent of Schools, Richmond, Illinois, 1900-1902; County Superintendent of Schools, McHenry county, Illinois, 1902-1910; Superintendent of Farmers' Institutes, Kansas State Agricultural College, 1911-1912.

Office A 37; Res. 527 Poyntz Ave.

RALPH DYKSTRA, D. V. M.,

Assistant Professor of Veterinary Medicine.

Registered Pharmacist in Iowa, 1900; D. V. M., Iowa State College, 1905; Assistant Professor of Anatomy, Obstetrics and Clinics, ibid., 1905-1907; Associate Professor of Anatomy, Obstetrics and Clinics, ibid., 1907-1909; Professor of Anatomy, Obstetrics and Clinics, ibid., 1909-1911; Veterinary Inspector, United States Bureau of Animal Industry, Summer, 1911; Assistant Professor of Veterinary Medicine, Kansas State Agricultural College, 1911—.

Office V 31; Res. 714 Houston St.

HARRY LLEWELLYN KENT,

Director of Instruction by Correspondence, Department of College Extension.

Graduate, Kansas State Normal School, 1904; Assistant, Science Department, ibid., 1902-1904; Instructor in Science and Geography, Western State Normal School, 1904-1909; Student, University of Chicago, Summer, 1908; Special Student, Kansas State Agricultural College, Summer, 1909; Instructor in Nature Study and Elementary Agriculture, New Hampshire State Normal, 1909-1911; Student, Cornell University, Summer, 1910; Director of Instruction by Correspondence, Department of College Extension, Kansas State Agricultural College, 1911—.

Office A 35; Res. 501 Laramie St.

HARRY JOHN CHARLES UMBERGER, B. S.,

Assistant Professor of Farm Crops, Assistant in Dry Land Agriculture.

B. S., Kansas State Agricultural College, 1905; Scientific Assistant, Bureau of Soils, United States Department of Agriculture, 1906; Scientific Assistant, Bureau of Plant Industry, ibid., 1906-1909; Superintendent of Experiment Station (Moro, Oregon), United States Department of Agriculture, 1909-1911; Assistant Professor of Farm Crops and Assistant in Dry Land Agriculture, Kansas State Agricultural College, 1911—.

Office G 33; Res. 928 Leavenworth St.

ALFRED EVERETT WHITE, M. S.,

Assistant Professor of Mathematics.

B. S., Purdue University, 1904; Principal, Lapel (Indiana) High School, 1904-1906; Instructor, Shortridge High School, Indianapolis, 1906-1907; Principal, Connersville (Indiana) High School, 1907-1909; Assistant in Mathematics, Kansas State Agricultural College, 1909-1910; Instructor in Mathematics, ibid., 1910-1912; Assistant Professor of Mathematics, ibid., 1912—.

Office A 69; Res. 712 Poyntz Ave.

BLANCHE EARL ENYART, A. B.,

Instructor in Physical Training, in Charge of Women.

A. B., University of Michigan, 1904; Graduate, Chautauqua School of Physical Education, 1905; Instructor in Physical Training, Saginaw (Michigan) High School, 1905-1907; Instructor in Physical Training, Kansas City (Missouri) High School, 1907-1910; Graduate Student, Harvard University Summer School, 1910; Director of Physical Training for Women, Kansas State Agricultural College, 1910-1911; Instructor in Physical Training, in Charge of Women, ibid., 1911—.

Office N 3; Res. 930 Humboldt St.

ADA RICE, B. S.,

Instructor in the English Language.

B. S., Kansas State Agricultural College, 1895; Assistant in English, ibid., 1899-1905; Life Teacher's Certificate for Kansas, 1900; Graduate Student, University of Chicago, 1902; Graduate Student, Harvard University Summer School, 1905; Instructor in English, Kansas State Agricultural College, 1905-1911; Instructor in the English Language, ibid., 1911—.

Office A 61; Res. 917 Osage St.

DAISY DOROTHY ZEININGER, A. B.,

Instructor in Mathematics.

A. B., Fairmount College, 1900; Instructor, Ellsworth High School, 1900-1904; Assistant in Mathematics, Kansas State Agricultural College, 1904-1907; Instructor in Mathematics, ibid., 1907—; Graduate Student, University of Chicago, Summer, 1909.

Office A 72; Res. 530 Humboldt St.

ELLA WEEKS, A. B.,

Instructor in Drawing and in Color and Design.

A. B., University of Kansas, 1901; Illustrator in Biological Departments, Kansas State Agricultural College, 1903-1904; Assistant in Drawing, ibid., 1904-1908; Graduate Student, Summer School of the South, Knoxville, Tennessee, Summer, 1906; Graduate Student, Marine Biological Laboratory, Woods Hole, Massachusetts, Summer, 1907; Instructor, Ruston (Louisiana) Summer School, Summer, 1909; Instructor in Drawing, Kansas State Agricultural College, 1908—.

Office A 68; Res. 829 Leavenworth St.

BURTON RAY ROGERS, D. V. M.,

Instructor in Veterinary Medicine.

D. V. M., Iowa State College, 1899; Graduate Student, McKillip Veterinary College, Chicago, 1899-1900; House Physician and Demonstrator of Anatomy in Veterinary Department, Iowa State College, 1900; Inspector in Bureau of Animal Industry, United States Department of Agriculture, 1900-1905; Student, Dearborn Night Medical College, Chicago, 1905-1906; Instructor in Veterinary Medicine, Kansas State Agricultural College, 1906—.

Office V 32; Res. 917 Pierre St.

INA FOOTE COWLES, B. S.,

Instructor in Domestic Art.

B. S., Kansas State Agricultural College, 1901; Graduate Student, Teachers' College, Columbia University, 1905-1906; Assistant in Domestic Art, Kansas State Agricultural College, 1902-1905 and 1906-1909; Instructor in Domestic Art, ibid., 1909—.

Office L 56; Res. 920 Fremont St.

ANNETTE LEONARD, A. B.,

Instructor in English.

Student, Wellesley College, 1897-1900; Instructor, Topeka City Schools, 1903-1904; Reference Library Assistant, University of Kansas, 1904-1905; A. B. and Graduate Student, ibid., 1906; Assistant in English, Kansas State Agricultural College, 1907-1909; Instructor in English, ibid., 1909—.

Office K 52; Res. 1020 Vattier St.

WILLIAM LEONARD HOUSE,

Instructor in Woodwork, Foreman of Carpenter Shop.

Apprentice with J. Adams & Sons Company, Amherst, Massachusetts, 1863-1868; with the Newton Wagon Works, Batavia, Illinois; Foreman, Carpenter Shop, Atchison, Topeka and Santa Fé Railway Company, Las Vegas, New Mexico, 1880-1883; Cabinetmaker with The Howell Company, Sioux City, Iowa, 1883-1888; Foreman of Carpenter Shop, Kansas State Agricultural College, 1888—; Instructor in Woodwork, ibid., 1909—.

Office S 28; Res. 608 Moro St.

JEREMIAH HAFFER HOLLAR,

Instructor in Forging, Foreman of Blacksmith Shop.

Apprentice in Blacksmithing, Greenspring, Pennsylvania; Foreman, Lake Shore & Michigan Southern Railway Shops, White Pigeon, Michigan; With Miller Machine and Iron Company, Muskegon, Michigan, 1880-1882; With Novelty Iron Works, ibid., 1882-1885; With Rogers Iron Works, ibid., 1885-1887; In business in General Blacksmithing, 1887-1903; Instructor, Illinois Manual Training School, Glenwood, Illinois, 1903-1908; With Ornamental Iron Works, Chicago, 1908-1909; Instructor in Forging, Foreman of Blacksmith Shop, Kansas State Agricultural College, 1909—.

Office S 38; Res. 519 N. Juliette Ave.

LEONARD MARION PEAIRS,* M. S.,

Instructor in Entomology.

B. S., Kansas State Agricultural College, 1905; Graduate Student, ibid., 1904-1907; M. S., ibid., 1907; Assistant to Illinois State Entomologist, 1907-1908; Instructor in Entomology and Zoölogy, Maryland State Agricultural College, 1908-1909; Assistant State and Experiment Station Entomologist, Maryland, 1908-1910; Graduate Student, Cornell University, Summer School, 1909; Assistant Professor of Entomology and Zoölogy, Maryland State Agricultural College, 1909-1910; Instructor in Entomology, Kansas State Agricultural College, 1910-1912.

Office F 55; Res. 431 Leavenworth St.

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* Resigned, February 15, 1912.

ANNIE ELSIE LINDSEY,

Instructor in Domestic Science.

Graduate, California State Normal School (San José), 1901; Instructor, San José (California) City Schools, 1901-1904; Student, University of the Pacific, 1904-1905; Instructor, San José City Schools, 1905-1906; Student, Simmons College, 1905-1907; Instructor, Girls' Trade School, Boston, 1907-1908; Assistant in Domestic Science, Kansas State Agricultural College, 1908-1910; Instructor in Domestic Science, ibid., 1910—.

Office L 35; Res. 1027 Houston St.

PORTER JOSEPH NEWMAN, M. S.,

Instructor in Chemistry.

B. S., Franklin College, 1908; Assistant in Chemistry, ibid., 1907-1908; Assistant Chemist, Indianapolis Board of Health, 1907-1908; Graduate Student, University of Chicago, Summer, 1909; Assistant in Chemistry, Kansas State Agricultural College, 1909-1910; M. S., Franklin College, 1910; Instructor in Chemistry, ibid., 1910—.

Office C 64; Res. 917 Fremont St.

RAYMOND GARFIELD TAYLOR, A. B.,

Instructor in History and Civics.

A. B., University of Kansas, 1907; Principal and Instructor in History, Hiawatha High School, 1907-1910; Graduate Student, University of Kansas, Summer, 1909; Graduate Student, University of Chicago, Summer, 1911; Instructor in History and Civics, Kansas State Agricultural College, 1910—.

Office F 58; Res. 109 S. Juliette Ave.

EARL NATANAEL RODELL, B. S.,

Instructor in Printing.

With Marquette *Tribune*, 1897-1898; Student Employee, Department of Printing, Kansas State Agricultural College, 1898-1901; B. S., ibid., 1903; Assistant in Printing, ibid., 1903-1911; General Manager of Athletics, ibid., 1911; Instructor in Printing, ibid., 1911—.

Office K 29; Res. 431 Leavenworth St.

FLORA CORNELIA KNIGHT, A. B.,

Instructor in the English Language.

A. B., University of Wyoming; Graduate Student, University of Chicago, two years; Assistant in English, Kansas State Agricultural College, 1907-1911; Graduate Student in English, Columbia University, Summer, 1911; Instructor in the English Language, Kansas State Agricultural College, 1911—.

Office A 61; Res. 1016 Leavenworth St.

HELEN KNOSTMAN HUSE, B. S.,

Instructor in Domestic Science.

B. S., Kansas State Agricultural College, 1908; Graduate Student, ibid., 1908; Student Assistant in Domestic Science, ibid., 1909; Assistant in Domestic Science, ibid., 1909-1911; Chautauqua Domestic Science Lecturer and Demonstrator, Summer, 1911; Instructor in Domestic Science, Kansas State Agricultural College, 1911—.

Office L 43; Res. 831 Leavenworth St.

EDISON FRANK KUBIN, D. V. M.,

Instructor in Veterinary Medicine.

D. V. M., Kansas State Agricultural College, 1909; Assistant in Veterinary Medicine, ibid., 1909-1911; Instructor in Veterinary Medicine, ibid., 1911—.

Office V 31; Res. 1630 Leavenworth St.

ESTELLA MAY BOOT, M. A.,

Instructor in the English Language.

Teacher in Public Schools, Hartley, Iowa, 1897-1898; A. B., University of South Dakota, 1901; Assistant in English and Latin, Cherokee (Iowa) High School, 1901-1906; Principal, ibid., 1906-1908; Graduate Student, State University of Iowa, Summer, 1905; Instructor in Summer School and Institute, Cherokee county, Iowa, 1907-1908; A. M., Northwestern University, 1909; Assistant in English, Kansas State Agricultural College, 1909-1911; Instructor in the English Language, ibid., 1911—.

Office A 72; Res. 1020 Vattier St.

JAMES RUSSELL JENNESS, B. S.,

Instructor in Physics.

B. S., Denison University, 1906; Professor of Natural Science, Lenox College, 1906-1908; Assistant in Physics, University of Kentucky, 1908-1909; Assistant in Physics, Kansas State Agricultural College, 1909-1911; Instructor in Physics, ibid., 1911—.

Office C 57; Res. 601 N. Manhattan Ave.

FRANK CLYDE HARRIS, B. S.,

Instructor in Architecture and Drawing.

B. S., Kansas State Agricultural College, 1908; City Engineer, Manhattan, Kansas, 1907-1909; Supervising Engineer, W. K. Palmer Company, Engineers, 1909; Assistant in Architecture and Drawing, Kansas State Agricultural College, 1909-1911; Graduate Student, Chicago (Illinois) Art Institute, Summer, 1910; Student, Italy, Germany, and France, Summer, 1911; Instructor in Architecture and Drawing, Kansas State Agricultural College, 1911—.

Office A 66; Res. College Hill.

WALTER WILLIAM CARLSON, B. S.,

Instructor in Machine Tool Work, Foreman of Machine Shop.

Apprentice in Machine Shops, Kansas State Agricultural College, 1903-1904; B. S., ibid., 1908; Instructor in Mechanical Engineering, Montana State College, 1908-1909; Graduate Student, Armour Institute, Summer, 1909; Assistant Professor of Mechanical Engineering, Montana State College, 1909-1910; Assistant in Machine Tool Work, Kansas State Agricultural College, 1910-1911; Instructor in Machine Tool Work, ibid., 1911—; Foreman of Machine Shop, ibid., 1910—.

Office S 31; Res. 608 Bluemont Ave.

EDWIN CYRUS MILLER, PH. D.,

Instructor in Botany.

A. B., Lebanon College, 1906; A. B., Yale University, 1907; Graduate Student, ibid., 1907-1910; Ph. D., ibid., 1910; Assistant in Botany, Kansas State Agricultural College, 1910-1911; Instructor in Botany, ibid., 1911—.

Office H 56; Res. 514 N. Juliette Ave.

FRANCIS BURZLEY MILLIKEN, B. S.,

Assistant Entomologist.

Instructor, Kansas Public Schools, 1902-1903 and 1906-1907; B. S., Kansas State Agricultural College, 1909; Graduate Student, ibid., 1909-1910, Assistant Entomologist, Kansas State Agricultural College, 1910—.

Office F 62; Res. 1126 Moro St.

CHARLES HENRY CLEVENGER, S. M.,

Instructor in Mathematics.

B. S., Ohio State University, 1902; Acting Professor of Mathematics and Physics, Drury College, 1903-1904; Instructor in Mathematics, Sheboygan (Wisconsin) High School, 1906-1908; Professor *pro tem.* of Pure and Applied Mathematics, Tarkio College, Spring Term, 1909; S. M., University of Chicago, 1910; Assistant in Mathematics, Kansas State Agricultural College, 1910-1911; Instructor in Mathematics, ibid., 1911—.

Office A 71; Res. 712 Poyntz Ave.

GEORGE ALBERT DAVIS,

Instructor in Molding, Foreman of Foundry.

Apprentice in Brass Foundry, Baltimore and Ohio Railroad, Baltimore, Maryland, 1904-1906; Apprentice in Iron and Steel Foundry, Newport News (Virginia) Shipbuilding Company, 1907-1908; Molder, Maryland Steel Works, Sparrows Point, Maryland, 1908-1909; Graduate, Winona Technical Institute, Indianapolis, Indiana, 1911; Molder, Marmon Automobile and Machinery Company, Indianapolis, 1911; Instructor in Molding, Foreman of Foundry, Kansas State Agricultural College, 1911—.

Office S 42; Res. 1201 Vattier St.

EUSTACE VIVIAN FLOYD, S. B.,

Instructor in Physics.

S. B., Earlham College, 1903; Instructor in Chemistry, Westtown School, Philadelphia, Pennsylvania, 1903-1905; Professor of Physics, Guilford College, 1905-1909; Graduate Student and Assistant in Physics, University of Chicago, 1909-1911; Instructor in Physics, Kansas State Agricultural College, 1911—.
Office C 57; Res. 347 N. Fourteenth St.

IVOR VICTOR ILES, A. M.,

Instructor in History and Civics.

Graduate, Eastern Illinois State Normal School, 1901; A. B., University of Kansas, 1905; Fellow in European History, ibid., 1904-1905; A. M., ibid., 1905; Graduate Student and Assistant in History, University of Colorado, 1905-1906; Graduate Student and Assistant in European History, University of Wisconsin, 1906-1907; Instructor in History, Politics and Economics, Princeton University, 1907-1908; Harrison Fellow in American History, University of Pennsylvania, 1908-1909; Instructor in History, Anaconda (Montana) High School, 1909-1910; Instructor in History, Yale University, 1910-1911; Instructor in History and Civics, Kansas State Agricultural College, 1911—.
Office F 58; Res. 109 S. Juliette Ave.

MAX RAVITCH, A. M.,

Instructor in the English Language.

A. B., University of Missouri, 1909; Fellow in English, University of Illinois, 1909-1910; A. M., ibid., 1910; Graduate Student, Columbia University, 1910-1911; Instructor in the English Language, Kansas State Agricultural College, 1911—.
Office A 53; Res. 831 Leavenworth St.

JOHN WILLIAM SCOTT, PH. D.,

Instructor in Zoölogy.

A. B., Missouri State University, 1896; A. M., ibid., 1897; Graduate Student in Zoölogy, University of Chicago, 1901-1904; Assistant in Embryology, ibid., 1902; Fellow in Zoölogy, ibid., 1902-1904; Ph. D., ibid., 1904; Head of Department of Biology, Westport High School, Kansas City, Missouri, 1904-1911; Instructor in Zoölogy, Marine Biological Laboratory, Woods Hole, Massachusetts, 1907-1911; Instructor in Zoölogy, Kansas State Agricultural College, 1911—.
Office F 62; Res. 926 Pierre St.

NEIL EVERETT STEVENS, PH. D.,

Instructor in Botany.

A. B., Bates College, 1908; Ph. D., Yale University, 1911; Instructor in Botany, Kansas State Agricultural College, 1911—.
Office H 56; Res. 908 Laramie St.

ERNEST ALEXANDER HEILMANN,* A. M.,

Instructor in German.

A. B., Northwestern College, 1905; A. B., University of Minnesota, 1906; Instructor, Antigo (Wisconsin) High School, 1906-1907; Graduate Student, University of Wisconsin, 1907-1911; A. M., ibid., 1908; Assistant in German, ibid., 1908-1911; Instructor in German, Kansas State Agricultural College, 1911—.
Office N 61; Res. ———.

ELDEN VALORIUS JAMES,* A. M.,

Instructor in History and Civics.

Principal, Caywood (Ohio) Public Schools, 1895-1897 and 1901-1902; A. B., Marietta College, 1901; Assistant Principal, Williamstown (West Virginia) High School, 1902-1904; A. B., University of Michigan, 1905; Head of Department of History, Monmouth (Illinois) High School, 1905-1906; Principal, West Palm Beach (Florida) High School, 1906-1908; A. M., Marietta College, 1908; Instructor in History, ibid., Summers, 1902, 1908; Professor of History and Economics, West Virginia Wesleyan College, 1908-1909; Head of Department of History, Wichita High School, 1909-1911; Vice-Principal, ibid., 1911-1912; Instructor in History and Civics, Kansas State Agricultural College, 1912—.
Office F 1; Res. ———.

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* On leave of absence during the year 1911-1912.

* Effective September 1, 1912.

JOSEPH HENRY MERRILL, B. S.,

Instructor in Entomology, Assistant Entomologist.

B. S., Dartmouth College, 1905; On Insect Pest Suppression Work, Massachusetts, 1905-1908; Graduate Student in Entomology, Massachusetts Agricultural College, 1909-1911; Deputy State Nursery Inspector, Massachusetts, 1910-1911; Instructor in Entomology, Assistant Entomologist, Kansas State Agricultural College, 1912—.

Office F 55; Res. ———.

INA EMMA HOLROYD, B. S.,

Assistant in Mathematics.

B. S., Kansas State Agricultural College, 1897; Graduate, Kansas State Normal School, 1899; Graduate Student, Harvard University, Summer School, 1905; Graduate Student, Cornell University, Summer School, 1911; Assistant in Mathematics, Kansas State Agricultural College, 1900—.

Office A 72; Res. 1001 Moro St.

AMANDA KATHARIN TINKEY,

Loan Assistant in Library.

Student, Oskaloosa College (Iowa), 1878-1879; Instructor, Smith Center Schools, 1887-1889 and 1893-1903; Student, Campbell College, Summer, 1890; Assistant Librarian, Kansas State Agricultural College, 1903-1911; Loan Assistant in Library, ibid., 1911—.

Office F 32; Res. 1230 Laramie St.

CHARLES YOST,

Assistant in Machine Shop.

Assistant in Heat and Power Department, Kansas State Agricultural College, 1905-1910; Foreman of Boiler Room, ibid., 1910-1912; Assistant in Machine Shop, ibid., 1912—.

Office S 34; Res. 1230 Laramie St.

JOHN THOMPSON PARKER,

Assistant in Woodwork.

Student, Lakin High School, 1897; Graduate, Apprentice Course in Woodwork, Kansas State Agricultural College, 1902; Carpenter, 1902-1904; Farmer, 1904-1905; Assistant in Woodwork, Kansas State Agricultural College, 1906—.

Office S 28; Res. 926 Vattier St.

HUGH OLIVER,

Assistant in Heat, Water and Gas Distribution.

Apprentice, Heat and Power Department, Kansas State Agricultural College, 1902-1903; Assistant in Heat and Power Department, ibid., 1906-1912; Assistant in Heat, Water and Gas Distribution, ibid., 1912—.

Office S 34; Res. 1126 Kearney St.

CHARLAINE FURLEY, A. B.,

Assistant in the English Language.

A. B., Fairmount College, 1906; Student Assistant in English, ibid., 1905-1906; Assistant in Preparatory Department, Kansas State Agricultural College, 1906-1908; Assistant in English, ibid., 1908-1911; Assistant in the English Language, ibid., 1911—.

Office K 56; Res. 724 Houston St.

JESSIE ANNABERTA REYNOLDS, A. B.,

Assistant in History and Civics.

A. B., University of Kansas, 1905; B. S., Kansas State Agricultural College, 1906; Graduate Student, University of Kansas, Summers, 1905 and 1906; Assistant in History and Civics, Kansas State Agricultural College, 1906—; Graduate Student, University of Chicago, Summers, 1907 and 1910.

Office F 3; Res. 129 Anderson Ave.

WILLIAM CARL LANE, B. S.,

Assistant in Electrical Engineering.

B. S., Kansas State Agricultural College, 1905; Student Apprentice with Allis-Chalmers Company, 1905-1906; Electrical Tester with Allis-Chalmers Company, 1906-1907; Assistant in Physics, Kansas State Agricultural College, 1907-1908; Assistant in Electrical Engineering, ibid., 1908—.

Office C 63; Res. 1031 Humboldt St.

MARGARET ANNA MACK,*

Assistant in History and Civics.

Graduate, Illinois Normal University, 1886; Principal, Wilsey Public Schools, 1886-1888; Instructor, Newton City Schools, 1888-1890; Instructor, Eureka City Schools, 1890-1892; Superintendent, Council Grove Schools, 1892-1895; Assistant Principal, Junction City High School, 1895-1901; Assistant Principal, Clay County High School, 1901-1904; Instructor, Leavenworth High School, 1904-1907; Graduate Student, University of Colorado, Summer, 1907; Graduate, Kansas State Normal School, 1909; Graduate Student, University of Wisconsin, Summer, 1910; Assistant in History and Civics, Kansas State Agricultural College, 1907-1912.

CHESTER ALLEN ARTHUR UTT, M. S.,

Assistant in Food Analysis.

B. S., Cornell College, 1903; Graduate Student, State University of Iowa, 1903-1904; Instructor, Keokuk (Iowa) High School, 1904-1907; Graduate Student, University of Iowa, Summer, 1907; Assistant in Food Analysis, Kansas State Agricultural College, 1907—; Assistant Chemist, Kansas State Board of Health, 1907—; Assistant Chemist, Kansas State Dairy Commission, 1907—; M. S., Cornell College, 1909.

Office W 29; Res. 1209 Vattier St.

ANNA WILKINSON GORDON, A. B.,

Assistant in History and Civics.

A. B., Iowa College, 1904; Instructor, Public Schools, Iowa, 1904-1905; Graduate Student, University of Chicago, Summer, 1910; Assistant in History and Civics, Kansas State Agricultural College, 1907—.

Office F 3; Res. 901 Leavenworth St.

SAMUEL WILSON McGARRAH, A. M.,

Assistant in Mathematics.

Student, Grove City College (Pennsylvania), 1881-1885; Principal, Lamertine (Pennsylvania) High School, 1885-1886; Principal, Millerstown (Pennsylvania) Public Schools, 1886-1887; Principal, Halstead Public Schools, 1887-1891; Instructor, Kansas County Normal Institutes, Summers, 1888-1901; Superintendent, Anthony Public Schools, 1891-1893; A. M., Grove City College, 1893; Superintendent, Olathe Public Schools, 1895-1901; Editor and Proprietor, Manhattan *Nationalist*, 1901-1907; Assistant in Mathematics, Kansas State Agricultural College, 1907—.

Office A 53; Res. 607 Houston St.

HARRISON ELEAZER PORTER, B. S.,

Assistant in Mathematics.

B. S., Kansas State Agricultural College, 1907; With Engineering Department, Santa Fe Railway Company, Summer, 1907; Graduate Student, Harvard University, Summer, 1910; Graduate Student, Columbia University, Summer, 1911; Assistant in Mathematics, Kansas State Agricultural College, 1908—.

Office A 70; Res. 1024 Houston St.

CLAUDE CARROLL CUNNINGHAM, B. S.,

Assistant in Farm Demonstrations.

B. S., Kansas State Agricultural College, 1903; Graduate Student, ibid., 1904; Graduate Student, Cornell University, 1906; Special Assistant in Agronomy, Kansas State Agricultural College, 1907-1908; Assistant in Agronomy, Fort Hays Branch Experiment Station, 1908-1911; Assistant in Farm Demonstrations, Kansas State Agricultural College, 1912—.

Office G 55; Res. 406 Moro St.

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* Deceased.

GEORGE KELLER HELDER,

Assistant Superintendent and Secretary, Fort Hays Branch Experiment Station.

Student, Kansas State Agricultural College, 1888-1890; Clerk, First National Bank, Manhattan, 1891-1901; Cashier, ibid., 1901-1904; Bookkeeper, Fort Hays Branch Experiment Station, 1904-1906; Secretary, ibid., 1907-1908; Assistant Superintendent and Secretary, ibid., 1909—.
Office and Res. Hays, Kansas.

BURTON SYLVESTER ORR, B. S.,

Assistant in Power and Experimental Engineering.

B. S., Kansas State Agricultural College, 1907; in Engineering Department, Swift & Co., St. Joseph, Missouri, 1907-1908; Assistant in Mechanical Engineering, Kansas State Agricultural College, 1908-1910; Assistant in Power and Experimental Engineering, ibid., 1910—.
Office E 27; Res. 1010 Osage St.

ELMER JOHNSON, B. S.,

Assistant in Power and Experimental Engineering, Superintendent of Power Plant.

B. S., Kansas State Agricultural College, 1908; Assistant in Mechanical Engineering, ibid., 1908-1910; Assistant in Power and Experimental Engineering., ibid., 1910—; Superintendent of Power Plant, ibid., 1912—.
Office E 32; Res. 1010 Osage St.

RAYMOND CLIFFORD WILEY, B. S.,

Assistant in Chemistry.

B. S., Oklahoma College of Agriculture and Mechanic Arts, 1905; Assistant Chemist, Maryland Agricultural Experiment Station, 1905-1908; Assistant in Chemistry, Agricultural Experiment Station, Kansas State Agricultural College, 1908—.
Office C 3; Res. 711 Humboldt St.

THOMAS POWELL HASLAM, B. S.,

Assistant in Veterinary Medicine, Agricultural Experiment Station.

B. S., Kansas State Agricultural College, 1908; Assistant Instructor in Chemistry, University of Kansas, 1908-1909; M. S., ibid., 1910; Assistant in Veterinary Medicine, Agricultural Experiment Station, 1909—.
Office V 2; Res. 713 N. Tenth St.

AMY ALENA ALLEN, B. S.,

Assistant in Printing.

Apprentice in Printing Department, Kansas State Agricultural College, Summer, 1900; Student Assistant, ibid., 1901-1904; B. S., ibid., 1904; Proof-reader, ibid., 1904-1909; Assistant in Printing, ibid., 1909—.
Office K 28; Res. 1452 Fairchild Ave.

THOMAS GEORGE PATERSON, B. S. A.,

Assistant in Animal Husbandry.

Graduate, School of Agriculture, University of Minnesota, 1902; Graduate student, ibid., 1903-1904; Assistant in Animal Husbandry, ibid., 1905-1909; B. S. A., University of Minnesota, 1909; Assistant in Animal Husbandry, Kansas State Agricultural College, 1909—.
Office G 33; Res. 1011 Osage St.

JESSIE GULICK,

Assistant Cataloguer in Library.

Instructor, Kansas Public Schools, 1899-1901 and 1903-1905; Instructor, Virginia Public Schools, 1901-1903; Chief Clerk, Extension Department, Kansas State Agricultural College, 1907-1909; Assistant in Library, ibid., 1909-1911; Assistant Cataloguer in Library, ibid., 1911—.
Office F 32; Res. 1622 Osage St.

ADA MARIE BAUM,

Assistant in Music.

Student, Chicago Musical College, 1899 and 1903-1904; Assistant in Music, Kansas State Agricultural College, 1909—.
Office M 29; Res. 827 Poyntz Ave.

ETHEL KATE MAY PING,

Assistant in Music.

Graduate, Sherwood Music School, Chicago, 1909; Assistant in Music, Kansas State Agricultural College, 1909—.
Office M 52; Res. 611 Humboldt St.

DEAN HUMBOLDT ROSE, A. M.,

Assistant in Botany.

A. B., University of Kansas, 1904; A. M., Washington University (St. Louis), 1905; Principal, Smith Center High School, 1905-1906; Graduate Student, University of Chicago, Summer Session, 1906; Instructor in Biology, Manual Training High School of Washington University, 1906-1909; Assistant in Botany, Kansas State Agricultural College, 1909—.
Office H 54; Res. 1819 Humboldt St.

MADGE KAY, S. B.,

Assistant in Mathematics.

Principal of North Schools, Broken Bow, Nebraska, 1903-1904; Graduate, Nebraska State Normal Schools, 1905; Principal, O'Neill (Nebraska) High School, 1905-1906; Superintendent, Atkinson (Nebraska) Public Schools, 1906-1907; S. B., University of Chicago, 1908; Instructor in Mathematics, Chicago City Schools, 1908-1909; Graduate Student, University of Chicago, Summers, 1908, 1909, 1910; Ed. B., Nebraska State Normal School, 1911; Student, University of Chicago Law School, Summer, 1911; Assistant in Mathematics, Kansas State Agricultural College, 1909—.
Office A 55; Res. 105 S. Juliette Ave.

TURNER RICHARDSON HADEN WRIGHT, B. S. A.,

Assistant in Animal Husbandry.

B. S. A., University of Missouri, 1909; Assistant in Animal Husbandry, Kansas State Agricultural College, 1909—.
Office G 30; Res. 1919 Humboldt St.

CHARLOTTE AUGUSTA MORTON,* B. S.,

Assistant in Drawing.

B. S., Kansas State Agricultural College, 1908; Assistant in Drawing, ibid., 1909—.
Office A 58; Res. 423 Houston St.

FLORENCE WARNER, A. B.,

Cataloguer in Library.

A. B., University of Illinois, 1906; Cataloguer in Library, Kansas State Agricultural College, 1909—.
Office F 32; Res. 520 Poyntz Ave.

JOHN WILLARD CALVIN, B. S.,

Assistant in Animal Nutrition.

B. S., Kansas State Agricultural College, 1906; Graduate Student and Student Assistant in Chemical Department, ibid., 1906-1908; Assistant Expert in Animal Nutrition, United States Department of Agriculture, and Assistant in Animal Nutrition, Pennsylvania State College, 1908-1910; Assistant in Animal Nutrition, Agricultural Experiment Station, Kansas State Agricultural College, 1910—.
Office C 3; Res. 1209 Vattier St.

CARL FRED CHASE, B. S. A.,

Assistant in Farm Mechanics.

Graduate, Nebraska School of Agriculture, 1904; Student Assistant in Agronomy, University of Nebraska, 1908-1910; B. S. A., ibid., 1910; Assistant in Farm Mechanics, Kansas State Agricultural College, 1910—.
Office R 27; Res. 603 Houston St.

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* On leave of absence, year 1912-1913.

ELLA FRANCES MILES,

Assistant in Domestic Science.

Teacher's Certificate for Domestic Science, Macdonald Institute, Ontario Agricultural College, 1904; Instructor in Domestic Science, Hamilton (Ontario) Public Schools, 1907-1909; Assistant in Domestic Science, Kansas State Agricultural College, 1910—.

Office L 43; Res. 105 S. Juliette Ave.

ALANSON LOLA HALLSTED, B. S.,

Assistant in Dry Farming, in Coöperation with United States Department of Agriculture.

B. S., Kansas State Agricultural College, 1903; General Farming and Coöperative Work with Agronomy Department, Kansas State Agricultural Experiment Station, 1904-1909; Special Agent, Bureau of Plant Industry, United States Department of Agriculture, 1909-1910; Assistant in Dry Farming in Coöperation with United States Department of Agriculture, Fort Hays Branch Agricultural Experiment Station, 1910—.

Office and Res. Hays, Kansas.

CLARE LAVON BIDDISON, B. S.,

Assistant in Vocal Music.

B. S., Kansas State Agricultural College, 1907; Student Assistant in Music, ibid., 1908-1909; Graduate Student, Cosmopolitan School of Music, Chicago, Summer, 1910; Assistant in Vocal Music, Kansas State Agricultural College, 1910—.

Office M 30; Res. 910 Fremont St.

HOWARD McCUNE CHANDLER, B. S.,

Inspector of Construction, Fellow in Engineering.

Draftsman, Tuttle and Pike, Kansas City, Missouri, 1900; Draftsman, Union Depot-Bridge and Terminal Railroad Company, Kansas City, Missouri, 1901; Draftsman, Kansas City, Mexico and Orient Railroad Company, 1902; B. S. in Mechanical Engineering, Kansas State Agricultural College, 1903; Mechanical Engineer and Draftsman, W. T. Garratt Company, San Francisco, California, 1903-1904; Draftsman, Honolulu (Hawaii) Iron Works Company, 1904-1907 and 1909-1910; Construction Engineer, Guanica (Porto Rico) Centrale Sugar Company, 1907-1908; Assistant Chief Engineer, Cane Sugar Factory, Plantation Oaxaquena, Sta. Lucrecia, V. C. Mexico, 1908-1909; Assistant in Experimental Engineering, Kansas State Agricultural College, 1910-1912; Inspector of Construction, Fellow in Engineering, ibid., 1912—.

Office E 32; Res. 1723 Fairchild Ave.

ELLERY FRANKLIN CHILCOTT, B. S.,

Superintendent Garden City Branch Agricultural Experiment Station.

B. S., South Dakota State College, 1906; Assistant in Dry Land Agriculture, United States Department of Agriculture, Edgeley (North Dakota), Amarillo (Texas), and Garden City (Kansas), 1906-1911; Superintendent, Garden City Branch Agricultural Experiment Station, 1911—.

Office and Res., Garden City, Kansas.

NELSON ANTRIM CRAWFORD, JR., A. B.,

Assistant in the English Language.

Newspaper Writer, Iowa City and Council Bluffs (Iowa), 1906-1909; A. B., State University of Iowa, 1910; Instructor, Kansas Teachers' Institutes, 1912—; Assistant in English, Kansas State Agricultural College, 1910-1911; Assistant in the English Language, ibid., 1911—.

Office A 53; Res. 113 S. Eighth St.

JAMES BURGESS FITCH, B. S.,

Assistant in Dairying.

B. S., Purdue University School of Agriculture, 1910; in charge of Milk Supply, Children's Aid Association, Indianapolis, Indiana, Summer, 1910; Assistant in Dairying, Kansas State Agricultural College, 1910—.

Office D 30; Res. 1106 Laramie St.

ARTHUR ROY FEHN, PH. B.,

Assistant in Mathematics.

Ph. B., German Wallace College, 1903; Instructor in Mathematics, Park College Academy, 1904-1905; Assistant in Biology and Botany, Park College, 1905-1906; Principal, Argos (Indiana) High School, 1907-1908; Principal, Walnut (Illinois) High School, 1908; Assistant Superintendent, ibid., 1909-1910; Graduate Student, University of Chicago, Summer and Fall, 1908, and Summers, 1909 and 1910; Assistant in Mathematics, Kansas State Agricultural College, 1910—.

Office A 70; Res. 927 Leavenworth St.

ARTHUR LYNN HARRIS,

Assistant in Heat and Power.

Fireman, Kansas State Agricultural College, 1908-1909; Student, ibid., 1909-1910; Assistant in Heat and Power, ibid., 1910—.

Office S 34; Res. 616 Osage St.

THORNTON HAYES,

Assistant in Machine Shop.

Apprentice, Atchison, Topeka and Santa Fe Railway Company, 1904-1908; Machinist, Kansas Natural Gas Company, Scipio and Independence, 1908-1909; Foreman of Machine Shop, ibid., 1909-1910; Assistant in Machine Shop, Kansas State Agricultural College, 1910—.

Office S 31; Res. 608 Bluemont Ave.

JOSIAH SIMSON HUGHES, M. S.,

Assistant in Chemistry.

B. S., Ohio Wesleyan University, 1908; Instructor, ibid., 1908-1909; M. S., ibid., 1909; Fellow, Ohio State University, 1909-1910; A. M., ibid., 1910; Assistant in Chemistry, Kansas State Agricultural College, 1910—.

Office C 64; Res. 617 Kearney St.

JANE AGNES HUMPHREY,*

Assistant in Domestic Science.

Student, Michigan Agricultural College, 1901-1902; Teacher's Diploma in Domestic Science, Teachers College, Columbia University, 1908; Instructor in Domestic Science, State Industrial School for Girls, Adrian, Michigan, 1909; Assistant Instructor in Domestic Art, Winthrop Normal and Industrial College (Rock Hill, South Carolina), 1909-1910; Assistant in Domestic Science, Kansas State Agricultural College, 1910-1912.

Office L 28; Res. 1016 Leavenworth St.

CHARLES JABLOW, M. E.,

Assistant in Machine Design and Mechanical Drawing.

B. M. E., Kentucky State University, 1909; Designer, Northern Engineering Works, Detroit, Michigan, 1909-1910; Assistant in Machine Design and Mechanical Drawing, Kansas State Agricultural College, 1910—; M. E., Kentucky State University, 1912—.

Office S 63; Res. 731 Leavenworth St.

ALBERT RICHARD LOSH, B. S.,

Assistant in Highway Engineering, Department of College Extension.

Instructor in Bureau of Education, Philippine Islands, 1904-1907; Student, Philippine School of Arts and Trades, 1906; B. S., Kansas State Agricultural College, 1910; Assistant in Highway Engineering, Department of College Extension, Kansas State Agricultural College, 1910—.

Office A 5; Res. 800 Fremont St.

OTTO MAURER,

Research Assistant in Bacteriology.

Graduate, Koenigliche Oberrealschule, Heilbronn, Germany, 1907; Student, University of Wisconsin, 1907-1909; Assistant Bacteriologist, Pennsylvania Railroad Company, Altoona, Pennsylvania, 1909-1910; Research Assistant in Bacteriology, Agricultural Experiment Station, Kansas State Agricultural College, 1910—.

Office V 53; Res. 501 Laramie St.

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* Resigned February 10, 1912.

CHARLES ERNEST MILLAR, B. S.,

Assistant in Soil Analysis.

B. S., University of Illinois, 1909; Assistant in Chemistry, ibid., 1909-1910; Assistant Chemist, Illinois State Water Survey, 1910; Assistant in Chemistry, Kansas State Agricultural College, 1910; Assistant in Soil Analysis, Agricultural Experiment Station, ibid., 1911—.
Office C 3; Res. 930 Vattier St.

GEORGE ELLSWORTH RABURN, A. B.,

Assistant in Physics.

Graduate, Kansas State Normal School, 1905; A. B., University of Michigan, 1907; Assistant in Physics, Kansas State Agricultural College, 1910—.
Office C 61; Res. 1609 Poyntz Ave.

ARTHUR WILLIAM RUDNICK, B. S.,

Assistant in Dairying.

B. S., Iowa State College, 1910; Buttermaker, Alpha Creamery, Denver, 1910; Assistant in Dairying, Kansas State Agricultural College, 1910—.
Office D 2; Res. 1106 Laramie St.

EDWIN GEORGE SCHAFER, M. S.,

Assistant in Farm Crops.

B. S., Kansas State Agricultural College, 1907; Assistant in Agronomy, ibid., 1907-1909; Graduate Student, University of Illinois, 1909-1910; M. S., ibid., 1910; Assistant in Farm Crops, Kansas State Agricultural College, 1910—.
Office G 55; Res. 917 Fremont St.

LAURA BOYNTON STORMS, B. S.,

Assistant in Domestic Science.

B. S. in D. S., Iowa State College, 1910; Assistant in Domestic Science, Kansas State Agricultural College, 1910—.
Office L 42; Res. 607 Houston St.

WILLIAM TIMOTHY STRATTON, A. B.,

Assistant in Mathematics.

A. B., University of Indiana, 1906; Superintendent, Oneida (Illinois) Public Schools, 1906-1907; Principal, McCray-Dewey Academy (Troy, Illinois), 1907-1910; Graduate Student, University of Indiana, Summers, 1910 and 1911; Instructor, Jewell County Normal Institute, 1911; Assistant in Mathematics, Kansas State Agricultural College, 1910—.
Office A 54; Res. 806 Poyntz Ave.

FLOYD EMERA WILSON, B. S.,

Assistant in Power and Experimental Engineering.

B. S., Kansas State Agricultural College, 1910; Assistant in Gas Engineering, ibid., 1910-1912; Assistant in Power and Experimental Engineering, ibid., 1912—.
Office S 30; Res. 711 Osage St.

JOE GRIGSBY LILL, M. S.,

Assistant in Soils.

B. S., Kansas State Agricultural College, 1909; Graduate Student, ibid., 1910-1911; M. S., ibid., 1911; Assistant in Soils, ibid., 1910—.
Office G 28; Res. 1215 Laramie St.

CHARLES WILBUR McCAMPBELL, D. V. M.,

Assistant in Animal Husbandry.

B. S., Kansas State Agricultural College, 1906; Graduate Student, ibid., 1906-1907; D. V. M., ibid., 1910; Assistant in Animal Husbandry, ibid., 1910—.
Office G 30; Res. 801 Laramie St.

NELL BEACH,

Assistant in Music.

Graduate, University School of Music, Ann Arbor, Michigan, 1905; Piano Instructor, Pawnee City (Nebraska) Academy, 1905-1909; Graduate Student and Assistant, University School of Music, Ann Arbor, Michigan, 1909-1910; Assistant in Music, Kansas State Agricultural College, 1910—.
Office M 53; Res. 601 Humboldt St.

FRANK CARL GUTSCHE, B. S.,

Assistant in Chemistry.

B. S., University of Minnesota, 1910; Night Chemist, Carver County Sugar Company, Chaska, Minnesota, Campaign of 1910; Assistant in Chemistry, Kansas State Agricultural College, 1911—.
Office C 64; Res. 511 N. Juliette Ave.

HARLAN DAVID SMITH, B. S.,

Assistant in Industrial Journalism.

B. S., Kansas State Agricultural College, 1911; Assistant in Industrial Journalism, ibid., August 1, 1911—.
Office K 51; Res. 626 Moro St.

BRUCE STEINHOFF WILSON, B. S.,

Assistant in Agronomy, Foreman of Experimental Farm.

B. S., Kansas State Agricultural College, 1908; Farm Foreman, Kansas State Agricultural College, 1910-1911; Assistant in Agronomy and Foreman of Experimental Farm, ibid., 1911—.
Office G 28; Res. 520 N. Manhattan Ave.

LEBBEUS BLAIR BARBER, D. V. M.,

Assistant in Veterinary Medicine.

D. V. M., Kansas State Agricultural College, 1911; Assistant in Veterinary Medicine, ibid., 1911—.
Office V 2; Res. 914 Bluemont Ave.

ANNA ELIZA BAYHA, A. B.,

Assistant in Domestic Art.

Student, Maryland College, 1906-1907; Student, Ohio State University, 1907-1910; A. B., ibid., 1910; Instructor, De Soto (Indiana) High School, 1910-1911; Assistant in Domestic Art, Kansas State Agricultural College, 1911—.
Office L 64; Res. 1001 Humboldt St.

DAVID GEORGE BLATTNER, B. S.,

Assistant in Physics.

B. S., Kansas State Agricultural College, 1911; Assistant in Physics, ibid., 1911—.
Office C 57; Res. 1104 Vattier St.

ALBERT LOGAN BURNS, A. M.,

Assistant in Chemistry.

A. B., Wabash College, 1909; Fellow in Chemistry, Ohio State University, 1909-1910; A. M., ibid., 1911; Assistant in Chemistry, Kansas State Agricultural College, 1911—.
Office W 26; Res. 617 Houston St.

JENNIE ELIZABETH CATON, B. S.,

Assistant in Domestic Science.

Student, School of Science, Simmons College, 1904-1908; Student, School of Household Economics, ibid., 1910-1911; B. S., ibid., 1911; Assistant in Domestic Science, Kansas State Agricultural College, 1911—.
Office L 42; Res. 910 Fremont St.

WILLIAM FREDERICK DROGE, B. S.,

Deputy State Dairy Commissioner.

B. S., Kansas State Agricultural College, 1910; Graduate Student, ibid., 1910-1911; Deputy State Dairy Commissioner, 1911—.
Office X; Res. 108 S. Juliette Ave.

CARLOTTA MARKS FORD, A. B.,

Assistant in Domestic Science.

Instructor, Geneva (Illinois) Schools, 1903-1904; Student, Northern Illinois State Normal School, Summer, 1904; Instructor, North Aurora (Illinois) School, 1906-1907; A. B., University of Illinois, 1911; Assistant in Domestic Science, Kansas State Agricultural College, 1911—.
Office L 35; Res. 829 Leavenworth St.

FORREST FAYE FRAZIER,

Assistant in Civil Engineering.

Student, Liberal Arts, Miami University, 1904-1906; Student, Engineering Course, Ohio State University, 1907-1910; Graduate, ibid., 1910; Assistant in Engineering Corps, Cincinnati, Hamilton and Dayton Railway, Summer, 1909; Inspector of Concrete Bridges, ibid., 1910; Assistant Superintendent on Excavation and Fill, with Railroad Contractors, 1910-1911; Assistant Engineer on Construction, Pennsylvania Railway, 1911; Assistant in Civil Engineering, Kansas State Agricultural College, 1911—.
Office S 63; Res. 821 Humboldt St.

JOHN B. GINGERY, D. V. M.,

Assistant in Veterinary Medicine.

D. V. M., Kansas State Agricultural College, 1910; Quarantine Field Work, Bureau of Animal Industry, United States Department of Agriculture, Summer, 1910; Assistant in Field Work, Kansas Live-stock Sanitary Commissioner, 1910-1911; Assistant in Veterinary Medicine, Kansas State Agricultural College, 1911—.
Office Serum Plant; Res. 601 Manhattan Ave.

HELEN VICTORIA HOBBS,

Assistant in Domestic Art.

Student, Stout Institute, 1909-1911; Assistant in Domestic Art, Kansas State Agricultural College, 1911—.
Office L 64; Res. 512 Houston St.

NETTIE BERTHA HUMFELD,

Assistant in Domestic Art.

Instructor in Domestic Art, Manual Training High School, Kansas City, Missouri, 1904-1909; Student, Teachers' College, Columbia University, 1909-1910; Student, University of Missouri, 1910-1911; Assistant in Domestic Art, ibid., 1910-1911; Assistant in Domestic Art, Kansas State Agricultural College, 1911—.
Office L 25; Res. 1001 Humboldt St.

OLIVER WILLIAM HUNTER, M. S.,

Assistant in Bacteriology.

B. S., Kansas State Agricultural College, 1909; Student Assistant and Graduate Student in Bacteriology, ibid., 1909-1910; M. S., University of Wisconsin, 1911; Assistant in Bacteriology, Kansas State Agricultural College, 1911—.
Office V 52; Res. 122 S. Juliette Ave.

JOHN GROVER JACKLEY, V. M. D.,

Assistant in Bacteriology.

Research Assistant in Bacteriological Laboratory of Pennsylvania State Live Stock Sanitary Board, Philadelphia, 1908-1909; V. M. D., University of Pennsylvania, 1910; Demonstrator and Instructor in Pathological Histology, ibid., 1910-1911; Assistant in Bacteriology, Kansas State Agricultural College, 1911—.
Office V 52; Res. 805 Poyntz Ave.

DAVID ERNEST LEWIS, B. S.,

Assistant in Horticulture.

B. S., Kansas State Agricultural College, 1910; Graduate Student, ibid., 1910-1911; Assistant in Horticulture, ibid., 1911—.
Office H 32; Res. 1020 Osage St.

VERA VIRGINIA MUTCHLER, B. S.,

Assistant in Domestic Art.

B. S., University of Wisconsin, 1911; Assistant in Domestic Art, Kansas State Agricultural College, 1911—.
Office L 64; Res. 512 Houston St.

ELLA MAY NASH, B. S.,

Lecturer on Domestic Science, Department of College Extension.

A. B., University of Kansas, 1906; Instructor, Lyons (Kansas) High School, 1906-1908; Graduate Student, University of Chicago, Summer, 1908; Instructor in Botany, Hutchinson (Kansas) High School, 1908-1909; Principal and Instructor in Botany, Lyons High School, 1909-1910; B. S., Simmons College, 1911; Lecturer on Domestic Science, Department of College Extension, Kansas State Agricultural College, 1911—.

Office A 37; Res. 910 Fremont St.

BURR HOWEY OZMENT,

Band Leader.

Band-master, Baker University, 1900-1903; Band-master, University of Missouri, 1904-1910; Band-master, Kansas State Agricultural College, 1911—.

Office N 35; Res. 714 Houston St.

GROVER MARTIN PRATT, B. Ar.,

Assistant in Architecture.

B. Ar., Syracuse University, 1911; Assistant in Architecture, Kansas State Agricultural College, 1911—.

Office A 55; Res. 617 Houston St.

MARY EDNA SIMMONS, B. S.,

Lecturer on Domestic Science, Department of College Extension.

Instructor, Kansas Public Schools, 1895-1903; B. S., Kansas State Agricultural College, 1911; Lecturer on Domestic Science, Department of College Extension, ibid., 1911—.

Office A 37; Res. 1019 Humboldt St.

GRACE FLORENCE SMILEY, B. S.,

Assistant in Domestic Art.

B. S., Ohio State University, 1909; Assistant in Domestic Art, South Dakota State College, 1910-1911; Assistant in Domestic Art, Kansas State Agricultural College, 1911—.

Office L 65; Res. 426 Leavenworth St.

HAL SMITH,

Assistant in Gas Engineering.

Assistant in Electrical Signal and Interlocking Department, Union Pacific Railroad Company, 1903-1906; Supervisor of Signals, ibid., 1906-1911; Assistant in Mechanical Engineering, Kansas State Agricultural College, 1911-1912; Assistant in Gas Engineering, ibid., 1912—.

Office E 7; Res. 830 Ratone St.

NELLIE LUCY THOMPSON, B. S.,

Assistant in Home Economics, Department of College Extension.

B. S., Kansas State Agricultural College, 1910; Instructor in Home Economics, North Dakota Agricultural College, 1910-1911; Assistant in Home Economics, Department of College Extension, Kansas State Agricultural College, 1911—.

Office A 36; Res. 927 Moro St.

ALLISON MORRIS WOODMAN, B. S. A.,

Assistant in Botany.

B. S. A., University of California, 1911; Graduate Student, ibid., Summer, 1911; Assistant in Botany, Kansas State Agricultural College, 1911—.

Office H 51; Res. 928 Leavenworth St.

WARREN LALE BLIZZARD, B. S.,

Assistant in Animal Husbandry.

B. S., Kansas State Agricultural College, 1910; Manager of Stock Farm, 1910-1911; Assistant in Animal Husbandry, Kansas State Agricultural College, October, 1911—.

Office G 30; Res. 914 Osage St.

GRACE EMILY DERBY, A. B.,

Reference Librarian.

A. B., Western College for Women, Oxford (Ohio), 1905; Graduate Student, Illinois State Library School, 1905-1906; Reference Assistant in Library, University of Illinois, 1906-1907; Librarian, Western College for Women, 1907-1911; Reference Librarian, Kansas State Agricultural College, October 23, 1911—.
Office F 32; Res. 426 Leavenworth St.

RAY EDWIN GILMAN, A. B.,

Assistant in Mathematics.

Instructor, Leavenworth Public Schools, 1905-1908; A. B., University of Kansas, 1911; Instructor, Chanute High School, 1911; Assistant in Mathematics, Kansas State Agricultural College, November 1, 1911—.
Office A 54; Res. 617 Houston St.

PERRY VAN EWING, B. S. A.,

Assistant to the President.

J. Ogden Armour Scholarship, Ohio State University, 1909-1910; Student Assistant in Animal Husbandry, ibid., 1910-1911; B. S. A. and Graduate Student, ibid., 1911; Secretary and Agriculturalist, Cottage Hill Farm, Ravenna (Ohio), 1911; Assistant to the President, Kansas State Agricultural College, January 1, 1912—.
Office A 30; Res. 830 Laramie St.

DUNCAN STUART, B. S.,

Assistant to the Dean of the Division of Agriculture, Assistant in Experimental Dairying.

Graduate, McGill Normal School (Montreal), 1892; Graduate, Dairy School, University of Vermont, 1894; Dairyman, Vermont Experiment Station, 1894; B. S., University of Vermont, 1898; Assistant, Vermont Experiment Station, 1899; Graduate Student, University of Vermont, 1899-1900; Assistant in Dairy School, ibid., 1895-1902; Assistant in Bureau of Chemistry, United States Department of Agriculture, 1901; Assistant in Dairy Division, ibid., 1902-1911; Assistant to the Dean of the Division of Agriculture, Kansas State Agricultural College, January 1, 1912—.
Office A 33; Res. 1025 Bluemont Ave.

FLORA COWELL,*

Assistant in Domestic Art.

ETHELYN JEWELL SANBORN,* B. S.,

Assistant in History.

B. S., Kansas State Agricultural College, 1910; Instructor, Kansas Public Schools, 1910-1912; Assistant in History, Kansas State Agricultural College, 1912.
Office F 1; Res. 1000 Humboldt St.

RAY IAMS THROCKMORTON, B. S.,

Assistant in Soils.

B. S., Pennsylvania State College, 1911; Assistant in Soils, Kansas State Agricultural College, February, 1912—.
Office G 27; Res. 711 Humboldt St.

MABEL REA HAMMOND, B. S.,

Assistant in Domestic Science.

B. S., Kansas State Agricultural College, 1911; Assistant in Domestic Science, June, 1912—.
Office L 43; Res. 265 Fairchild Ave.

HILMER HENRY LAUDE, B. S.,

Assistant in Farm Crops.

B. S., Kansas State Agricultural College, 1911; Graduate Student, ibid., 1911-1912; Assistant in Farm Crops, ibid., June, 1912—.
Office G 28; Res. 628 Fremont St.

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* Winter term, 1912.

* Winter and Spring terms, 1912.

JOHN CORNELIUS CHRISTENSEN, B. S.,
Financial Secretary.

B. S., Kansas State Agricultural College, 1894; Instructor, Kansas Public Schools, 1894-1896; Graduate Student, University of Kansas, 1897; Bookkeeper and Office Clerk, 1898-1907; County Treasurer, Riley county, Kansas, 1903-1907; Office Clerk and Bank Cashier, 1907-1909; Deputy Bank Commissioner of Kansas, 1909-1911; Financial Secretary, Kansas State Agricultural College, 1911—.
Office A 28; Res. 625 Leavenworth St.

MARGARET ANNA BUTTERFIELD,
Secretary.

Instructor in Public Schools of Kansas and Nebraska, 1889-1903; Bookkeeper, Kansas State Agricultural College, 1904-1909; Secretary, ibid., 1909—.
Office A 29; Res. 1114 Houston St.

WILLIAM RILEY LEWIS,
Custodian.

Head Janitor, Kansas State Agricultural College, 1899-1908; Custodian, ibid., 1908—.
Office A 47; Res. on College Campus.

GUY DAVID NOEL, B. S.,
Foreman in Charge, Dodge City Branch Agricultural Experiment Station.

B. S., Kansas State Agricultural College, 1909; Assistant, South Dakota Agricultural Experiment Station, 1909; Instructor, Olathe High School, 1909-1910; Instructor in Science, Dickinson County High School, 1910 - April, 1911; Foreman in Charge, Dodge City Branch Agricultural Experiment Station, April 1, 1911—.
Office and Res. Dodge City, Kansas.

FRANCIS JOHN TURNER,
Foreman, Ogallah Branch Agricultural Experiment Station.

With Dillon Nursery Company, McLouth, Kansas, 1902-1904; Farmer and Fruit Grower, 1904-1908; Student, Kansas State Agricultural College, 1908-1909; Foreman, Ogallah Branch Forestry Station, 1909—.
Office and Res. Ogallah, Kansas.

EDWARD CLAEREN,
Commissary Sergeant, U. S. A. (Retired), Assistant to the Commandant.

Commissary Sergeant, U. S. A. (Retired); Assistant to the Commandant, Kansas State Agricultural College, 1910—.
Office N 29; Res. 1125 Poyntz Ave.

ARCHIE KANE,
Dairy Herdsman.

TRYGGVE EMIL SCHREINER,*
Superintendent of Poultry.

NORTON LEWIS HARRIS,†
Superintendent of Poultry.

LESLIE ROSS,
Herdsman.

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* Resigned December 1, 1911.

Agricultural Experiment Station

Officers of the Station

H. J. WATERS, *President of the College.*

ADMINISTRATION—
- ED. H. WEBSTER, Director.
- J. T. WILLARD, Vice-Director.
- DUNCAN STUART, Assistant to the Director.
- ETHEL ROBBINS, Executive Clerk.

AGRONOMY—
- W. M JARDINE, in Charge.
- L. E. CALL, Soils.
- A. H. LEIDIGH, Assistant in Crops.
- H. J. C. UMBERGER, Assistant in Coöperative Experiments.
- E. G. SCHAFER, Assistant in Crops.
- C. F. CHASE, Assistant in Farm Mechanics.
- J. G. LILL, Assistant in Soils.
- C. C. CUNNINGHAM, Assistant in Coöperative Experiments.
- H. H. LAUDE, Assistant in Crops.
- R. I. THROCKMORTON, Assistant in Soils.
- B. S. WILSON, Foreman of Experimental Farm.

ANIMAL HUSBANDRY—
- W. A. COCHEL, in Charge.
- P. N. FLINT, Experimental Feeding.
- T. G. PATERSON, Assistant in Experimental Feeding.
- TURNER R. H. WRIGHT, Assistant in Animal Nutrition.
- C. W. MCCAMPBELL, Assistant in Experimental Horse Feeding.
- LESLIE ROSS, Herdsman.

BACTERIOLOGY—
- L. D. BUSHNELL, in Charge.
- O. W. HUNTER, Assistant in Bacteriology.
- OTTO MAURER, Assistant in Egg Investigations.
- J. G. JACKLEY, Assistant in Bacteriology.

BOTANY AND PLANT BREEDING—
- HERBERT F. ROBERTS, in Charge.
- D. H. ROSE, Assistant in Seed Control and Plant Breeding Investigations.
- E. C. MILLER, Assistant in Plant Physiological Investigations.
- NEIL E. STEVENS, Assistant in Plant Disease Investigations.

DAIRY HUSBANDRY—
- O. E. REED, in Charge.
- ED. H. WEBSTER, in Charge of Special Field Investigations.
- D. S. BURCH, Dairy Commissioner, Assistant in Special Field Investigations.
- WM. F. DROGE, Assistant in Field Investigations.
- DUNCAN STUART, Assistant in Special Field Investigations.
- A. W. RUDNICK, Assistant in Dairy Manufactures.
- J. B. FITCH, Assistant in Dairy Production.
- ARCHIE KANE, Dairy Herdsman.

CHEMISTRY—
J. T. WILLARD, in Charge.
C. O. SWANSON, General Chemical Investigations.
R. C. WILEY, Inspector Feed and Fertilizer Control.
J. W. CALVIN, Assistant in Animal Nutrition.
C. E. MILLAR, Assistant in Soil Analysis.

POULTRY HUSBANDRY—
W. A. LIPPINCOTT, in Charge.
N. L. HARRIS, Superintendent of Poultry.

ENTOMOLOGY AND ZOOLOGY—
THOMAS J HEADLEE, in Charge.
GEO. A. DEAN, Assistant in Mill and Grain Insect Investigations.
—— ———, Assistant in Field Crop Insect Investigations.
J. H. MERRILL, Assistant in Fruit Insect Investigations.
F. B. MILLIKEN, Assistant in Field Crop Investigations.
R. K. NABOURS, Assistant in Animal Breeding Investigations.

FORESTRY—
C. A. SCOTT, in Charge.

HORTICULTURE—
ALBERT DICKENS, in Charge.
D. E. LEWIS, Assistant in Horticulture.

MILLING INDUSTRY—
L. A. FITZ, in Charge.

VETERINARY SCIENCE—
F. S. SCHOENLEBER, in Charge.
T. P. HASLAM, Assistant in Pathology.
J. B. GINGERY, Assistant in Hog-Cholera Serum Production.
L. B. BARBER, Assistant in Serum and Bacterin Production.

Fort Hays Branch Station

A. M. TENEYCK, Superintendent.
GEO. K. HELDER, Assistant Superintendent.
A. L. HALLSTED, Assistant in Dry Farming.

Garden City Branch Station

E. F. CHILCOTT, Superintendent.
R. W. EDWARDS, Assistant in Dry Farming.

Dodge City Branch Station

GUY D. NOEL, Foreman in Charge.

Ogallah Branch Station

F. J. TURNER, Foreman in Charge.

Tribune Branch Station

E. F. CHILCOTT, Superintendent.
CHAS. E. CASSEL, Foreman.

Engineering Experiment Station

Officers of the Station

H. J. WATERS, *President of the College.*

ADMINISTRATION—
E. B. McCORMICK, Director.
MARGARET BUTTERFIELD, Secretary.

APPLIED MECHANICS AND HYDRAULICS—
R. A. SEATON, in Charge.
ELMER JOHNSON, Assistant in Strength of Materials.

ARCHITECTURE—
J. D. WALTERS, in Charge.
FRANK HARRIS, Assistant.

CHEMISTRY—
J. T. WILLARD, in Charge.
H. H. KING, Assistant.

CIVIL ENGINEERING—
L. E. CONRAD, in Charge.
F. F. FRAZIER, Assistant.

ELECTRICAL ENGINEERING—
B. F. EYER, in Charge.
W. C. LANE, Assistant.

HEATING AND SANITATION—
——— ———, in Charge.

MACHINE DESIGN—
CHAS. JABLOW, Assistant.

PHYSICS—
J. O. HAMILTON, in Charge.
G. E. RABURN, Assistant.

SHOP METHODS AND PRACTICE—
G. E. BRAY, in Charge.
W. W. CARLSON, Assistant.

STEAM AND GAS ENGINEERING—
A. A. POTTER, in Charge of Steam and Gas Engineering.
B. S. ORR, Assistant in Power Engineering.
F. E. WILSON, Assistant in Power and Experimental Engineering.

The College Cadet Corps

The following is a roster of the commissioned and noncommissioned officers of the Corps of Cadets of the Kansas State Agricultural College for the year 1911-'12:

COMMANDANT OF CADETS,

FIRST LIEUTENANT ROBERT PATTISON HARBOLD, Twenty-Fifth U. S. Infantry, Professor of Military Science and Tactics.

Assistant to the Commandant,

Commissary Sergeant EDWARD CLAEREN, U. S. A. (Retired).

Band Leader,

BURR HOWEY OZMENT.

CORPS ORGANIZATION.

FRANK BUZARD, Adjutant.
L. E. HUTTO, Quartermaster.
B. F. BUTLER, Sergeant Major.
L. L. HORR, Quartermaster Sergeant.

COMPANY A.

Captain:
C. F. Turner.
Lieutenants:
A. B. Hungerford.
Ned Smith.
First Sergeant:
J. W. Linn.
Sergeants:
G. D. M. Jones.
G. D. Hungerford.
L. A. O'Brien.
F. E. Hartzler.
J. O'Connell.
Corporals:
J. C. Gist.
A. G. Beckman.
O. E. Smith.
S. G. Fell.
E. W. Kern.
P. R. Neal.

COMPANY B.

Captain:
C. A. Leech.
Lieutenants:
R. Kerr.
H. M. Hutchinson.
First Sergeant:
A. C. Townsend.
Sergeants:
J. H. Loomis.
B. J. Taylor.
S. A. Blackman.
H. R. Joslin.
Corporals:
C. P. Lillard.
E. Q. Perry.
G. Williamson.
H. English.
F. L. Fleming.
L. V. Cummings.

COMPANY C.

Captain:
H. L. Cole.
Lieutenants:
J. D. Colt.
M. H. Davis.
First Sergeant:
W. A. Sutton.
Sergeants:
P. E. Jackson.
L. A. Richards.
R. S. Orr.
H. M. Fellows.
Corporals:
W. S. Acton.
G. Gray.
B. Scalopino.
W. Smith.
G. J. Graham.
D. B. Coleman.

COMPANY D.

Captain:
C. J. Jones.

First Sergeant:
R. T. Wilson.

Sergeants:
P. L. Mize.
E. A. O'Brien.
M. A. Lathrop.
G. F. Hass.
L. B. Robinson.

Lieutenants:
G. R. Fickel.
A. P. Immenschuh.

Corporals:
J. T. Hutchinson.
V. S. Rader.
E. G. Shaad.
A. A. Anderson.
C. A. Barrows.
G. H. Sechrist.

College Band

The following is a list of the College Band for the year 1911-'12:

BAND LEADER,

BURR HOWEY OZMENT.

Sergeants: C. C. WOLCOTT, J. H. GILL, C. C. STRAUB, E. H. SMICE, L. L. JENSON.

Corporals: H. C. IRA, I. V. HOWENSTINE, HOMER MCNAMARA, H. E. NEWHOUSE, S. L. REEVES.

Piccolo:
W. A. Sumner.
L. G. Geisendorf.

Flute:
H. O. Wagner.

Oboe:
H. H. McLean.

Bb Clarionets:
H. E. Ira.
F. B. Oshaut.
D. A. Robbins.
W. B. Smith.
R. W. Taylor.
H. C. McKinney.
A. R. Tanner.
Alvin Black.

Cornets:
C. C. Wolcott.
R. J. Hanna.
E. C. Jones.
Fred Milner.
J. G. Blunt.
C. W. Hanes.
S. K. Varcoe.

Saxophones:
R. B. Howell.
H. A. Wagner.

Horns:
Walter Smith.
H. E. Newhouse.
Homer McNamara.
F. M. Bealey.

Trombones:
C. C. Straub.
E. H. Smice.
Chas. Shaver.
W. L. Rynerson.

Baritones:
S. L. Reeves.
Fay Buck.

Basses:
J. H. Gill.
I. V. Howenstine.
R. H. Brown.
L. L. Jenson.

Drums:
G. S. Gillespie.
G. S. McNamara.
C. W. Rose.

History of the College

The Kansas State Agricultural College had its origin in the Bluemont Central College, an institution established at Manhattan under the control of the Methodist Episcopal Church of Kansas. The charter for this sectarian institution, approved February 9, 1858, provided for the establishment of a classical college, but contained the following interesting section:

"The said association shall have power and authority to establish, in addition to the literary departments of arts and sciences, an agricultural department, with separate professors, to test soils, experiment in the raising of crops, the cultivation of trees, etc., upon a farm set apart for the purpose, so as to bring out to the utmost practical results the agricultural advantages of Kansas, especially the capabilities of the high prairie lands."

The corner-stone of the new College was laid on May 10, 1859, and instruction began about a year later. On March 1, 1861, a bill passed the legislature establishing a State university at Manhattan, the Bluemont Central College building to be donated for the purpose. This measure, however, was vetoed by Governor Robinson.

On July 2, 1862, President Lincoln signed the Morrill Act, "An act donating public lands to the several states and territories which may provide colleges for the benefit of agriculture and the mechanic arts." Section 1 of this act provides—

"That there be granted to the several states, for the purposes hereinafter mentioned, an amount of public lands to be apportioned to each state a quantity equal to 30,000 acres for each senator and representative in Congress to which the states are respectively entitled by the apportionment under the census of 1860."

Section 4 requires that the money from the sale of these lands "shall constitute a perpetual fund, the capital of which shall remain forever undiminished, and the interest of which shall be inviolably appropriated by each state which may take and claim the benefit of this act, to the endowment, support and maintenance of at least one college, where the leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts, in such manner as the legislatures of the states may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life."

Because of the nature of the endowment made by Congress, the institutions founded in accordance with this act are generally known as the "land-grant" colleges. It may well be said that this was the most far-reaching and statesmanlike stroke of educational policy that any government has ever initiated.

On February 3, 1863, Governor Carney signed a joint resolu-

tion passed by the Kansas legislature, in accordance with which the provisions of the Morrill Act "are hereby accepted by the State of Kansas; and the State hereby agrees and obligates itself to comply with all the provisions of said act." On February 16 of the same year the governor signed an act which permanently located the College at Manhattan, and provided—

"That the location of the said college is upon this express condition, that the Bluemont Central College Association . . . shall . . . cede to the State of Kansas, in fee simple, the real estate, . . . together with all buildings and appurtenances thereunto belonging; and shall . . . transfer and deliver to said State the apparatus and library belonging to said Bluemont Central College Association."

The three commissioners appointed by the governor selected 82,313.52 acres of the 90,000 granted by Congress. The deficiency of 7686.48 acres—an amount selected and found to lie within a railroad grant—was not made up by Congress till 1907.

After the passage of the creative act, no subsequent legislation was enacted by the federal government with reference to the "land-grant" colleges until the second Morrill Act, for the further endowment of agricultural colleges, was passed. This bill received the signature of President Harrison on August 30, 1890.

This act applied "a portion of the proceeds of the public lands to the more complete endowment and support of the colleges for the benefit of agriculture and the mechanic arts established under the provision of an act of Congress approved July second, eighteen hundred and sixty-two." It provided—

"That there shall be and hereby is annually appropriated, out of any money in the treasury not otherwise appropriated, arising from the sales of public lands, to be paid as hereinafter provided, to each state and territory for the more complete endowment and maintenance of colleges for the benefit of agriculture and the mechanic arts now established or which may be hereafter established, in accordance with an act of Congress approved July 2, 1862, the sum of $15,000 for the year ending June 30, 1890, and an annual increase of the amount of such appropriation thereafter for ten years by an additional sum of $1000 over the preceding year, and the average amount to be paid thereafter to each state and territory shall be $25,000, to be applied only to instruction in agriculture, the mechanic arts, the English language, and the various branches of mathematics, physical, natural and economic science, with special reference to the industries of life and to the facilities for such instruction."

The third and latest act of Congress increasing the income of agricultural colleges is the Nelson amendment to the agricultural appropriation bill, which was approved March 4, 1907. In addition, however, to providing for an increase in the support of these institutions from federal funds, the law contains the very significant provision specially authorizing the agricultural colleges to use a portion of this federal appropriation for the special preparation of instructors for teaching agri-

culture and mechanic arts. The essential features of the Nelson amendment are embodied in the following quotation from the bill:

"That there shall be and hereby is annually appropriated out of any money in the treasury not otherwise appropriated, to be paid as hereinafter provided, to each state and territory for the more complete endowment and maintenance of agricultural colleges now established, or which may hereafter be established, in accordance with the act of Congress approved July 2, 1862, and the act of Congress approved August 30, 1890, the sum of $5000, in addition to the sums named in the said act, for the fiscal year ending June 30, 1908, and an annual increase of the amount of such appropriation thereafter for four years by an additional sum of $5000 over the preceding year, and the annual sum to be paid thereafter to each state and territory shall be $50,000, to be applied only for the purposes of the agricultural colleges as defined and limited in the act of Congress approved July 2, 1862, and the act of Congress approved August 30, 1890; provided, that said colleges may use a portion of this money for providing courses for the special preparation of instructors for teaching the elements of agriculture and the mechanic arts."

The Development of the Kansas Agricultural College

The President and Faculty of the Bluemont Central College became the first board of instruction of the Kansas State Agricultural College, when the former institution was transferred to the State and assumed its present name. The Bluemont Central College was a small institution of the older American classical type, the curriculum resting upon Greek, Latin, and mathematics as the chief fundamentals. Its transfer to the State, and its conversion into the State Agricultural College, involved at the time merely a change in name. The President and Faculty, and the curriculum, remained unchanged. The second catalogue, that of 1864-'65, mentions an "agricultural" course, comprising one preparatory and two collegiate years; but, although this course was strengthened from time to time, the classical studies nevertheless remained until the year 1873, when the character of the institution was radically changed. Intensely practical courses replaced the then existing ones. The new scheme of instruction involved the abolition of the classical course, and the introduction of a practical scheme of industrial education, which comprised a farmer's course of six years, a mechanic's course covering four years, and a woman's course requiring six years. Strong opposition to the new educational policies was encountered, but the authorities of the institution adhered to them unswervingly, until the complete success of the new method silenced criticism. Thus the institution became in fact what it had hitherto been only in name—an agricultural college. In 1879 the Faculty consisted of the President, five professors, and six instructors of lesser rank, with a student body of 207. During this period of development the College was removed from the original Bluemont College site to its present campus, two miles nearer Manhattan.

From 1879 to 1897 no radical changes were made in the courses of study, but the work was systematized and strengthened in many directions, retaining, however, the distinctive stamp of a college related to the industries. In 1897 the student enrollment was 734—an increase of over 250 per cent during the period of eighteen years. The Faculty had grown in numbers, and the activities of the institution along investigative lines had been well begun through the organization of the Agricultural Experiment Station. In the spring of 1897, owing to certain political changes in the State, and to the appointment of a new Board of Regents that sought radical changes along certain directions, the College entered upon what seemed at the time a rather serious and critical stage. Under the new management greater stress was laid upon the study of financial, economic, and social problems. Several men of considerable note were added to the Faculty for the purpose of strengthening these phases of educational work. In 1897, four professional courses, each four years in length, were organized—in agriculture, in mechanical engineering, in domestic science, and in general science. These years, therefore, mark the beginning of an era of broadening and diversification of the lines of instruction.

In 1899, political changes set aside the then existing administration. During the ten undisturbed years that followed, however, the institution experienced an era of solid, substantial, and uninterrupted growth, gaining steadily in recognition and in influence over the State.

In 1911-'12, the number of heads of departments and full professors was 36, while the entire Board of Instruction and employees numbered 190. The student enrollment for the year 1910-'11 was 2407. During the decade 1899-1909, additional buildings to the value of about $250,000 were erected on the campus.

The history of the Kansas State Agricultural College may well be divided into five epochs.

The first ten years, from 1863 to 1873, may be called the classical period of the College. The succeeding period, from 1873 to 1879, was the formative stage, the years of the foundation of the Agricultural College properly so called, and bore the stamp of a spirit of pure industrialism of the most intensely "practical" type—an era of ultraradical revulsion from the literary-classical type of instruction which had been supplanted.

The next eighteen years, from 1879 to 1898, may be called the scientific culture period—a period in which, under modified ideals, the institution was sought to be used not so much as a tool to teach young men and women how to make a living as to teach them *how to live,* and strove to accomplish the end of character building by means of scientific and technical training having especial reference to agriculture.

The following period of two years, brief and to a considerable extent marked by revolutionary changes, may well be united with the succeeding decade, and may be designated in general as the period of expansion and diversification. Expansion of courses, with consequent increased flexibility, plasticity, and adaptability of the means of instruction to the various ends of industrial life, marked this epoch of twelve years. In this period we see a rising tendency toward an increased acknowledgment of the Agricultural College as the guardian and custodian of the State's industrial interests, and a steady growth of settled confidence over the State in its ability to solve the State's industrial problems.

The present time, therefore, finds the College and its inseparable coadjutor, the Experiment Station, occupying a position of far-reaching power and influence in connection with the most vital interests of the State of Kansas.

The Agricultural College accomplishes the objects of its endowment in several ways. It offers a substantial training in mathematics, in the fundamental sciences, in language, in history and civics, and in such other branches of human knowledge as experience has shown to be best adapted to give mental discipline, to develop good citizenship, and to furnish a proper equipment for entering upon active life. The combination of industrial training with the usual class and laboratory work has a special educational value. By the training of the hands the student is made more efficient in every way, is brought into contact with actual practical things, and is educated toward, rather than away from, an interest in industry and manual exertion. All history and experience demonstrate the necessity to the race of the habit of work, of respect for physical labor, and of a widespread capacity among men for using the brain through the hands. The general training which the College offers aims, therefore, at an equally efficient development of the physical and the mental powers. The greatest immediate aid to improvement in social well-being and to betterment of the conditions of life is a thorough knowledge of science as applied to daily existence. In chemistry and physics, in geology, in botany, in bacteriology, in entomology, in mechanics, the student is brought to an understanding of the relation of man to the world around him, and to a knowledge of how to utilize natural forces for the protection and improvement of his own life.

In the practical arts of agriculture, horticulture, engineering, and home economics, opportunity and inducement are offered every student to enter a productive occupation which will insure his direct usefulness in the world, and at the same time offer him an attractive and profitable calling.

The College trains directly toward these productive occupations in a considerable number of specialized branches. For example: In agriculture, the student may specialize in

agronomy, horticulture, forestry, animal husbandry, dairying, poultry husbandry, or veterinary science. He may follow mechanical, electrical, or civil engineering; architecture; or printing. For the young women, training in domestic science, domestic art, home furnishing, home decoration, etc., is offered.

To summarize: The ideal of the College as an educational institution is to train young men and women for the highest efficiency in the productive arts, the aim being to combine therewith as large a measure of purely cultural training as it is possible to give, thus fulfilling the fundamental purposes for which the College was endowed.

A second large object of the Agricultural College, made effective through the Experiment Station, is to investigate the problems of agriculture in the widest sense. By conducting the researches of the Experiment Station in close connection with the educational work of the College, opportunity is afforded students to gain an understanding and an appreciation of the work of scientific investigation, and to become better able to appreciate the relation of science to agriculture. Opportunity is thus also offered for obtaining such training as will fit competent students to become investigators, and to enter fields of agricultural leadership in the experiment stations, with the United States Department of Agriculture, as heads of private agricultural enterprises, or in the capacity of superintendents and managers of such undertakings.

In addition to the regular educational work, the College now maintains, through the Department of College Extension, a highly organized system of agricultural education among the farmers themselves. A corps of trained and efficient institute lecturers hold meetings in every county in the State, conduct seed, dairy, corn, alfalfa, and poultry trains, and publish two series of pamphlets of information and instruction—one for rural teachers, the other for members of farmers' institutes. In addition to the regular staff of the Extension Department, many members of the College Board of Instruction, and of the staff of the Experiment Station, give several weeks of each year to the public work of the farmers' institutes.

Finally, the College and the Station together are being increasingly charged by the State government with State industrial and police duties, such as pure food investigations, control of feeding stuffs and fertilizers, State forestry, etc.

The Experiment Stations

The Agricultural Experiment Station

The Kansas Agricultural Experiment Station was organized under the provisions of an act of Congress, approved on March 2, 1887, which is commonly known as the "Hatch Act," and is officially designated as—

"An act to establish agricultural experiment stations in connection with the colleges established in the several states under the provisions of an act approved July 2, 1862, and the acts supplementary thereto."

The wide scope and far-reaching purposes of this act are best comprehended by an extract from the body of the measure itself, in which the objects of its enactment are stated as being "to aid in acquiring and diffusing among the people of the United States useful and practical information on subjects connected with agriculture, and to promote scientific investigation and experiment respecting the principles and practice of agricultural science." The law specifies in detail "that it shall be the object and duty of said experiment stations to conduct original researches or verify experiments on the physiology of plants and animals; the diseases to which they are severally subject, with remedies for the same; the chemical composition of useful plants at their different stages of growth; the comparative advantages of rotative cropping as pursued under a varying series of crops; the capacity of new plants or trees for acclimation; the analysis of soils and waters; the chemical composition of manures, natural or artificial, with experiments designed to test their comparative effects on crops of different kinds; the adaptation and value of grasses for forage plants; the composition and digestibility of the different kinds of food for domestic animals; the scientific and economic questions involved in the production of butter and cheese; and such other researches or experiments bearing directly on the agricultural industry of the United States as may in each case be deemed advisable."

On the day after the Hatch Act had received the signature of the President, the legislature of Kansas, being then in session, passed a resolution, dated March 3, 1887, accepting the conditions of the measure, and vesting the responsibility for carrying out its provisions in the Board of Regents of the Kansas State Agricultural College.

Until 1908 the expenses of the Experiment Station were provided for entirely by the federal government. The original creative act (the Hatch Act) carried an annual congressional

appropriation of $15,000. No further addition to this amount was made until the passage of the Adams Act, which was approved by the President on March 16, 1906. This measure provided, "for the more complete endowment and maintenance of agricultural experiment stations," a sum beginning with $5000, and increasing each year by $2000 over the preceding year for five years, after which time the annual appropriation was to be $15,000, "to be applied to paying the necessary expenses of conducting original researches or experiments bearing directly on the agricultural industry of the United States, having due regard to the varying conditions and needs of the respective states or territories."

It is further provided that "no portion of said moneys exceeding five per centum of each annual appropriation shall be applied, directly or indirectly, under any pretense whatever, to the purchase, erection, preservation or repair of any building or buildings, or to the purchase or rental of land."

The Adams Act, providing as it does for original investigations, supplied the greatest need of the Experiment Station—the means of providing men and equipment for advanced research. Only such experiments may be entered upon, under the provisions of this act, as have first been passed upon and approved by the Office of Experiment Stations of the United States Department of Agriculture. At present, thirty-four such investigations, called "projects," have been thus approved, and are being conducted under the Adams Act.

In addition to these, there are now in progress, under the Hatch Act and by means of the State fund, a total of over fifty lines of investigation and experiment, covering all phases of agricultural investigation.

The farms, live stock, laboratories, and general equipment of the College are all directly available for the use of the Experiment Station.

In 1911 the legislature of Kansas appropriated the sum of $22,500 a year for the next biennium, for the further support of the Experiment Station. The income of the Experiment Station for the year 1911-'12 is therefore derived as follows:

Hatch fund (federal)	$15,000
Adams fund (federal)	15,000
State appropriation (general)	22,500
State appropriation (special):	
Coöperative seed experiments	7,500
Irrigation investigations	2,000
Soil survey	5,000
Total	$67,000

The work of the Experiment Station is published in the form of bulletins, which record the results of investigations along agricultural lines. These bulletins are of three sorts: technical bulletins, which record the results of researches of a purely scientific character, provided for under the Adams Act;

farm bulletins which present the data of the technical bulletins in a simplified form, suitable for the general reader; farm bulletins in which a brief, condensed and popular presentation is made of data which call for immediate application, and can not await publication in the regular bulletin series.

In addition to the bulletins, which report original investigations, the Station also publishes a series of circulars for the purpose of conveying needed or useful information, not necessarily new or original.

To date the publications of the Station number 180 bulletins and twenty-two circulars.

All bulletins and other publications from the Experiment Station are sent without charge to citizens of the State. Any person in the State who so desires may have his name placed on the permanent mailing list of the Station.

Letters of inquiry and general correspondence should be addressed: "Agricultural Experiment Station, Manhattan, Kan." Special inquiries should be directed, so far as possible, to the heads of departments having in charge the matters concerning which information is desired.

PUBLIC WORK OF THE STATION

In addition to the work of agricultural investigation and research, the State has enlarged the activities of the Station along various lines of State executive or control work.

One of the most important of these adjunct offices is that of State Dairy Commissioner, for which an appropriation of $7500 a year was made for the biennium 1912-'13. This official, appointed by the Board of Regents, and having his office at the seat of the Agricultural College, is required (Laws of 1909, ch. 237) "to inspect or cause to be inspected all the creameries, public dairies, butter, cheese and ice-cream factories, or any place where milk or cream or their products are handled or stored within the State, at least once a year, or oftener if possible."

He may, in connection with the Board of Regents of the College, "formulate and prescribe such reasonable rules and regulations for the operation of creameries, butter, cheese and ice-cream factories and public dairies as shall be deemed necessary by such board to fully carry out the provisions of this act."

He may act on complaints regarding the sale of unwholesome or unclean dairy products, and may prohibit their sale. He may "condemn for food purposes all unclean or unwholesome milk, cream, butter, cheese or ice-cream, wherever he may find them."

Another important State function is that of the State Entomological Commission. (Laws of 1907, ch. 386; 1909, ch. 27.) This commission, created in 1907, was established "to sup-

press and eradicate San José scale and other dangerous insect pests and plant diseases throughout the State of Kansas."

The professors of entomology at the Agricultural College and at the State University are by law designated as two of the five members of the above commission. Acting under the title of State entomologists, they divide between them the territory of the State, for purposes of inspection.

They are empowered "to enter upon any public premises . . . or upon any land of any firm, corporation or private individual within the State of Kansas, for the purpose of inspection, destroying, treating or experiment upon the insects or diseases aforesaid."

They may treat or cause to be treated "any and all suspicious trees, vines, shrubs, plants, and grains," or, under certain conditions, may destroy them. They must annually inspect all nursery stock, and no nursery stock is to be admitted within the State without such inspection.

For the expenses of the work of the commission, $10,000 was appropriated in 1911 for each of the following two years.

Concerned with the live-stock interests of the State is the State Live Stock Registry Board, with regard to which there is the following provision (Laws of 1909, ch. 168):

"Every person, persons, firm, corporation, company or association standing or traveling any stallion in this State shall cause the name, description and pedigree of such stallion to be enrolled by the State Live Stock Registry Board, said board to consist of the dean of agriculture, the head of the Veterinary Department and the head of the Animal Husbandry Department of the Kansas State Agricultural College, and to procure a certificate of such enrollment from said board."

To this board is assigned the registry of pedigrees of stallions used for breeding purposes within the State, and authority to pass upon such pedigrees. No animal not thus approved and registered with the board is permitted to be used for public breeding purposes.

The suppression of tuberculosis in cattle is also delegated by the State to the Agricultural College. (Laws of 1909, ch. 160.)

Another provision for encouraging the improvement of live stock is embodied in an act of the legislature (Laws of 1909, ch. 46) "providing for experimental and demonstration work with live stock at the Kansas State Agricultural College." For this purpose there was appropriated the sum of $7500, "which shall be known as a revolving fund, to be used in providing experimental and demonstration work with live stock at the Kansas State Agricultural College, at Manhattan, Kan., under the direction and approval of the Board of Regents of said institution; which said fund shall be used only for the purpose of purchasing live stock and feed, and such other expenses as may be necessary for caring for said stock and conducting demonstrations and experiments therewith."

Stock thus acquired can be sold by the Board of Regents, when in the judgment of the Board is seems advisable, and the receipts from such sales are to be turned over to the State treasurer's office, there to constitute a "revolving fund," to be drawn upon for new purchases of live stock.

By legislative act (Laws of 1909, ch. 49), a "division of forestry" at the Agricultural College is also provided for in the following terms:

> "For the promotion of forestry in Kansas there shall be established at the Kansas State Agricultural College, under the direction of the Board of Regents, a division of forestry. The Board of Regents of the Kansas State Agricultural College shall appoint a State forester, who shall have general supervision of all experimental and demonstration work in forestry conducted by the Experiment Station. He shall promote practical forestry in every possible way, compile and disseminate information relative to forestry, and publish the results of such work through bulletins, press notices, and in such other ways as may be most practicable to reach the public, and by lecturing before farmers' institutes, associations, and other organizations interested in forestry."

For carrying into effect the provisions of this act, there was appropriated for the fiscal years 1912 and 1913, $2000 each.

The State has also placed the Experiment Station in charge of the execution of the acts concerning the manufacture and sale of concentrated feeding stuffs, and of fertilizers (Laws of 1907, chs. 407 and 217), it being provided by the statutes that "every brand of concentrated feeding stuff offered or held for sale or sold within the State of Kansas shall be registered in the office of the director of the Agricultural Experiment Station of the Kansas State Agricultural College, and each sale of any concentrated feeding stuff not so registered shall constitute a separate violation of this act," and "except as herein provided, it shall be unlawful within the State of Kansas to sell, offer for sale or possess for sale any commercial fertilizer which has not been officially registered by the director of the Agricultural Experiment Station of the Kansas State Agricultural College."

These general provisions are limited in their application by important exceptions stated in the laws. The fees from the registrations made under these two acts and certain inspection taxes imposed are appropriated to the use of the Station.

It will thus be seen that the State of Kansas is making increasing use of the scientific staff of the Experiment Station in matters of State importance requiring the application of technical knowledge.

A late and important addition to the Experiment Station is the recently established Department of Milling Industry. The great economic importance of the wheat and milling interests of this State, and the difficult nature of the problems connected with the milling and baking quality of wheat, render it imperative that scientific researches on the subject be con-

ducted. The hearty coöperation and financial support of all of the millers' associations and many other commercial bodies has rendered it financially possible to inaugurate this important experimental work immediately, in the absence of a special legislative appropriation.

The work includes a complete study of growing, handling and marketing methods, and their relation to the milling value of wheat; of systems of grading, and their effect upon the market value of grain; of insect enemies of wheat in the field and in storage; and of flour and its by-products. There will also be conducted a comprehensive study of the effects of climate and soil upon the chemical composition of wheat and upon its subsequent milling and baking quality.

It is hoped that there may be established here later a State milling plant and a testing and baking laboratory of sufficient size to give results of greater commercial value.

By act of the legislature (Laws of 1911, ch. 22, p. 45) an appropriation of $3000 was made, to be used for the production of serum at the College and Station, for the cure of hog cholera within the State.

By the act of the legislature (Laws of 1911, ch. 23, p. 46) the Regents of the Agricultural College are authorized "to investigate the present methods used in growing and distributing agricultural seeds in the State; to determine by experiments the methods of growing seed best adapted to different localities; to encourage farmers in the use of the best methods of seed production; to determine by investigation those localities most in need of improved seed, and to aid such localities in securing desirable seed." For carrying out the provisions of this act, the sum of $7500 is appropriated for each of the two years 1912 and 1913.

A soil survey has been authorized by act of the legislature (Laws of 1911, ch. 22, p. 45), whereby the Board of Regents of the Agricultural College are authorized "to make a soil survey and soil analysis of the State of Kansas and to conduct such cropping tests and other tests as shall establish the agricultural value of Kansas soils." For this purpose an appropriation of $5000 is made for each of the years 1912 and 1913.

Experiments and demonstrations on the proper use of irrigation waters, in coöperation with the irrigation investigations of the United States Department of Agriculture, are authorized by act of the legislature (Laws of 1912, ch. 214, p. 378). For this purpose there is appropriated the sum of $2000 annually for the years 1911-'12 and 1912-'13.

Branch Agricultural Experiment Stations

Fort Hays Branch Station

The land occupied by this Station is a part of what was originally the Fort Hays military reservation. Being no longer required for military purposes, it was turned over to the Department of the Interior on October 22, 1889, for disposal under the act of Congress of July 5, 1884. Before final disposition of this land was made, however, the Kansas legislature, in February, 1895, passed a resolution requesting the Congress of the United States to donate the entire reservation of 7200 acres to the State of Kansas for the purposes of agricultural education and research, for the training of teachers, and for the establishment of a public park. Bills giving effect to this request were introduced into Congress without avail, until the fifty-sixth Congress, when, through the influence of Senator, later Regent, W. A. Harris, and of Congressman Reeder, a bill was passed, setting aside this reservation "for the purposes of establishing an experimental station of the Kansas Agricultural College and a western branch of the Kansas State Normal School thereon and a public park." This bill was approved by the President on March 28, 1900. By act of the State legislature, approved on February 7, 1901, the act of Congress donating this land and imposing the burden of the support of these institutions was accepted. The same session of the legislature passed an act providing for the organization of a branch experiment station and appropriating a small fund for preliminary work.

The land at the Fort Hays Branch Station consists mainly of high rolling prairie, with a limited area of rich alluvium bordering on a creek, and is situated on the edge of the semi-arid plain region. It is well suited for experimental and demonstration work in dry farming, in irrigation, and in crop, forestry, and orchard tests, under conditions of limited rainfall and high evaporation.

The work of this Station is confined to the study of the problems peculiar to the western half of the State, and relates especially to crop production under limited rainfall, to the origination of varieties better adapted to the climatic conditions there prevailing, and to studies of the systems of animal husbandry suited to this region. A systematic study of the value of trees as preventives of soil drifting is being made on a scale sufficiently large to bring definite conclusions. The facilities of this Station are being used for the growing of large quantities of pure seed of the strains and varieties which have proved in actual test to be most productive in the western part of the State.

This Station is supported entirely by State funds and by the sale of farm products. Under the terms of the acts of Congress establishing and supporting agricultural experiment stations, and under the rulings of the United States Department of Agriculture, none of the funds appropriated by the federal government may be used for the support of branch experiment stations.

The State appropriation for the maintenance of the Fort Hays Branch Experiment Station is $27,500 for 1912 and $18,800 for 1913.

Garden City Branch Station

In 1906 the county commissioners of Finney county purchased, for purposes of agricultural experimentation, a tract of land amounting to 320 acres, situated four and one-half miles from Garden City, on the unirrigated upland.

This land has been leased for a term of ninety-nine years to the Kansas Agricultural Experiment Station as an "experimental and demonstration farm," for the purpose of determining the methods of culture, crop varieties, and crop rotations best suited to the southwestern portion of the State, under dry-land farming conditions. A pumping plant irrigating from eighty to one hundred acres has been installed for the purpose of investigating the expense of pumping and the cost of equipment necessary for plants of this type which are common in the shallow-water district between Garden City and Scott City and along the Arkansas valley. The duty of water and the methods of applying water are objects of investigation. For improvements and maintenance of this Station the sum of $7500 was appropriated for the year 1912-'13.

Other Branch Stations

Branch stations are maintained at Dodge City, Ogallah, and Tribune and at these stations experimental and demonstration work is conducted for the benefit of the districts surrounding these points. Cropping systems, summer fallow methods, time of planting, variety testing, and breeding of special crops are the principal work undertaken. At Dodge City a dairy herd is maintained.

Engineering Experiment Station

The Engineering Experiment Station was established by the Board of Regents for the purpose of carrying on a continued series of tests of engineering and manufacturing value to the State of Kansas, on a scale sufficiently large for the results to be of direct commercial value.

For the past four years tests of cement and concrete have

been conducted, using principally Kansas-made cements and such materials for the aggregate in the concrete as can be found in different localities in the State. In connection with this series of tests, a study is being made of the waterproofing and coloring of cement building blocks.

Tests of Kansas coals are now in progress. The coals are being tested by hand firing, and by firing by means of three different types of mechanical stokers. The coals being tested include mine run, slack, nut, screened, lump, and washed pea coals. The purpose is not only to determine the relative values of the different coals for steam generation, but more particularly to ascertain the best methods of firing the coals of each locality, and the relative values of the different kinds of coal obtained from any single mine. These tests are conducted with both natural and induced draft, the Station owning an induced-draft equipment and economizer.

The Station owns a 100-horsepower gas producer using bituminous coal. So far, the gas from this producer has been used only for laboratory and cooking purposes, and the tests that have been carried on have been for the purpose of determining the relative values of the various coals as regards (1) cost per cubic foot of gas; (2) adaptability with respect to mechanical manipulation in the producer; (3) freedom from sulphur and disagreeable gases; (4) the production of tar and other by-products.

The tests will be extended to include an investigation of the possibilities of lighting with gas. Subsequently, by means of internal-combustion engines, the efficiency of such an installation for power production, the purpose for which the producer was designed, will be determined by experiment.

The producer testing equipment includes calorimeters for the analysis of solid, liquid, and gaseous fuels, a Venturi tube for the measurement of gas, a thermo-electric pyrometer, and such other apparatus as is essential for the carrying out of complete tests. Each test is conducted for a period of several weeks, in order to eliminate errors in the estimation of the coal and stand-by losses.

As there are but very few other plants in the country satisfactorily using bituminous coal for producer gas, it is believed that the experiments now being carried on will give valuable results.

For some time, in coöperation with the Office of Public Roads of the United States Department of Agriculture, the College has been carrying on traction tests to determine the effective width of tire on different road surfaces. The equipment for this purpose includes a recording traction dynamometer designed by the College and built by the Office of Public Roads. The first two series of these tests are ready for publication, and will be issued by the Office of Public Roads. It is

the intention to conduct further experiments of this nature for an indefinite period.

Two years ago there was completed a series of pipe-covering tests, the purpose of which was to determine the relative values of different pipe coverings for high- and low-pressure steam, both as compared with one another and as compared with bare pipe. These tests are made when the pipe is first covered, and are repeated after the covering has been subjected to hard usage.

Other experiments now in progress are concerned with: (1) lubricants and bearings; (2) power required for driving machine tools; (3) loss of power in transmission by shaft, bearings, chains, and gears; (4) the relative adaptability, efficiency, and cost of gasoline, kerosene, and denatured alcohol for internal-combustion engines; (5) the cost of compressing air and the efficiency of compressed air for power purposes; (6) endurance of paints. As applied to roofs, the paint tests have been in progress for five years, and they will be extended to include other cases of exposure to weather. The investigation is directed especially to the relation of the chemical nature of the pigments and of the oils employed in painting to the durability of the paints.

Among the projected investigations are: (1) underground water flow in various parts of the State, and methods of developing it for irrigation; (2) the possibilities of developing water-power for small plants to be used on farms and in isolated communities for driving machinery, either directly or by electric transmission, and for lighting, this investigation to include the preparation and publication of plans for these plants; (3) the continuation of investigations as to the strength of structural details in timber, metal, and reinforced concrete; (4) studies of the tractive effect or efficiency of draught of horses; (5) tests of small gasoline-electric units; (6) methods of cooling condensed steam; (7) tests of Kansas brick and other road material.

As soon as a series of tests is completed, the results are published in bulletin form, and may be had on application to the director. Besides the results of investigations, compilations of engineering data and important principles are made from various sources and are published in bulletins for the assistance of engineers, mechanics, and others in their respective lines of work.

Grounds, Buildings, and Equipment

The College campus occupies a commanding and attractive site upon an elevation adjoining the western limits of the city of Manhattan, with electric car service into town and to the railway stations. The grounds are tastefully laid out according to the designs of a landscape architect, and are extensively planted with a great variety of beautiful and interesting trees, arranged in picturesque groups, masses, and border plantings, varied by banks of shrubbery and interspersed with extensive lawns, gardens, and experimental fields. Broad, well-shaded macadamized avenues lead to all parts of the grounds. Cement walks connect all of the buildings with one another and with the entrances. Including the campus of 160 acres, the College owns 748 acres of land at Manhattan, valued at $185,000, and rents 390 acres in addition. Outside the campus proper, all of the land is devoted to educational and experimental work in agriculture. Within the College grounds, most of the space not occupied by buildings, and needed for drives and ornamental planting, is devoted to orchards, forest and fruit nurseries, vineyards, and gardens. A number of fields in the northern and western portions of the campus are used for general experimental work by various departments.

The College buildings, twenty-one in number, are harmoniously grouped, and are uniformly constructed of the attractive white limestone obtained from the College quarries. A central power plant furnishes steam heat and electric light and power to the buildings, and a plant for the manufacture of producer gas supplies some of the laboratories and shops. The College owns and operates its own system of waterworks and is provided with a complete sewerage system.

AGRICULTURAL HALL (NEW). Cost of portions now authorized and contracted for, $125,000; cost of building when developed and completed as planned, $500,000. The completed building will consist of a central portion (130 x 80 feet), with basement and three stories; of two wings (each 80 x 169 feet), with basement and three stories, and with a sub-basement under half of the east wing; and of a stock-judging pavilion placed back of the central portion and between the wings. This pavilion is now completed, and contains tie and box stalls and two large stock-judging rooms (45 x 100 feet), each having a seating capacity of 475. Each of these rooms may be divided into two, with a passage between, by the use of curtains. The east wing of the building will be ready for occupancy at the beginning of the fall term of 1912, and will

be used by the Departments of Agronomy, Animal Husbandry, and Milling Industry. This wing will contain, besides offices and recitation rooms, a complete small flour mill, laboratories for grain judging, etc.

AGRICULTURAL HALL (OLD). Erected, 1900; cost, $25,000; dimensions, 90 x 95 feet; two stories and basement. Occupies the original site of the president's house, destroyed by lightning in 1896. Contains the laboratories, class rooms, and offices of the Department of Agronomy (east half) and the Department of Animal Husbandry (west half). Value of equipment and apparatus: Agronomy, $6310; Animal Husbandry, $430.

ANDERSON HALL. Erected, 1879; cost, $79,000; dimensions, 152 x 250 feet; two stories and basement. Contains the offices of administration of the College, a lecture hall, the College post office, the offices of the Director of the Agricultural Experiment Station, offices of the Department of College Extension, and offices and class rooms of the Departments of Mathematics, English Language and English Literature, Architecture and Drawing, and Economics. Value of equipment and apparatus, $18,035.

AUDITORIUM. Erected, 1904; cost, $40,000; dimensions, 113 x 125 feet. Seating capacity, 3000. Contains also the offices and music rooms of the Department of Music. Value of equipment, Department of Music, $3797.

CHEMISTRY ANNEX. Erected, 1877; cost, $8000; dimensions, 35 x 110 and 46 x 175 feet, in the form of a cross. Originally erected as a chemical laboratory; occupied by the Department of Chemistry until 1900, when a fire destroyed the interior. The building was reconstructed in 1902, at a cost of $5000, for use as a women's gymnasium. Since the fall of 1911 the building has been used by the Department of Chemistry. Value of apparatus and equipment, $3000.

DAIRY BARN. Erected, 1900; cost, $4000; dimensions, 40 x 175 feet. Fitted with modern swinging stalls for eighty head of cows, and arranged in two rows with driveway between. Value of equipment, Department of Dairy Husbandry, $1411.

DAIRY HALL. Erected, 1904; cost, $15,000; dimensions, 72 x 103 feet; one story and basement. Contains butter-manufacturing rooms, hand-separator room, laboratory, class room, three offices, and two refrigerating rooms. Occupied entirely by the Department of Dairy Husbandry. Value of equipment and apparatus, $9558.

DOMESTIC SCIENCE AND ART HALL. Erected, 1908; cost, $70,000; dimensions, 92 x 175 feet; two stories and basement. The first floor and basement are occupied by the laboratories, class rooms, and offices of the Department of Domestic Sci-

ence; the second floor is occupied by the laboratories, class rooms, and offices of the Department of Domestic Art. Value of equipment and apparatus: Domestic Science, $9551; Domestic Art, $2705.

ENGINEERING SHOPS. These consist of several connected structures, erected at different times. The original building, now used as the woodworking shop, was erected in 1876; a series of additions having later been successively made, the present group is the result. The cost of the whole amounts to $35,000. The woodworking shop (40 x 103 feet; two stories high) has on the upper floor the offices and drafting rooms of the Departments of Civil Engineering, Steam and Gas Engineering, and Shop Methods and Practice, and contains on the lower floor benches for 220 students, these benches being completely equipped with woodworking machinery and tools. Adjoining is the machine shop (40 x 50 feet), supplied with benches and the usual bench tools, and amply equipped with machine tools. The blacksmith shop (40 x 50 feet) contains forty forges of modern type, connected with a power blast and down-draft exhaust. Adjoining is a lecture hall, with demonstration forge and equipment. An iron foundry (40 x 50 feet), a brass foundry (16 x 30 feet), a pipe-fitting and work room (55 x 40 feet), and a boiler room (40 x 75 feet) complete the series of shops. Value of equipment and apparatus, $40,107.

FAIRCHILD HALL. Erected, 1894; cost, $67,750; dimensions, 100 x 140 feet; two stories, basement, and attic. On the first floor are the College library and reading rooms, a newspaper reading room, offices of the librarian and his assistants, and the general museum. On the second floor are the offices, class rooms and laboratories of the Departments of Zoölogy, Entomology, and Geology, and of History and Civics. The museums of natural history are placed here also. The basement is occupied largely by recitation rooms and offices of the Department of History and Civics. Value of equipment and apparatus, $111,714.

FARM BARN. Erected, 1878-1886; cost, $10,831; a double, connected stone structure, dimensions, 50 x 75 feet and 48 x 96 feet, with an addition of sheds and experiment pens 40 x 50 feet. The south wing, 48 x 96 feet, is the feed and storage room. A basement underlies the entire building. Value of equipment, Department of Animal Husbandry, $513.

FARM MECHANICS HALL. Erected, 1870; cost, $11,250; dimensions, 46 x 95 feet; two stories. The first building erected on the present campus. Originally designed as a College barn, and first used for that purpose. Later used as a general College building, then by the Department of Botany, and afterwards by the Department of Veterinary Medicine. The first floor, a large hall, was used by the Department of Military

Science for many years, as an armory. The entire building has been given over for the use of the Department of Farm Mechanics, and is filled with all types of farm machinery. Value of equipment, $5500.

HORTICULTURAL BARN. Erected, 1880; cost, $1000. Contains storeroom, granary, and stable room for several horses.

HORTICULTURAL HALL. Erected, 1907; cost, $50,000; dimensions, 72 x 116 feet. This building, one of the best and most commodious on the campus, is now used by the Departments of Botany, Horticulture and Forestry. Its class rooms, laboratories, museums, and equipment are modern and ample. Value of equipment: Department of Horticulture, $3553; Department of Forestry, $318; Department of Botany, $19,790.

HORTICULTURAL HALL (OLD). Erected, 1877; cost, $4000; dimensions, 32 x 80 feet; one story and basement.

HORTICULTURAL LABORATORY. Erected, 1888; cost, $5000; dimensions, 30 x 30 feet; one story and basement. Used for many years by the Department of Horticulture and Entomology, then for horticultural work when that was made a separate department. Contains offices occupied by the State Dairy Commissioner. Five propagating houses are connected with it. Value of equipment, $758.

KEDZIE HALL. Erected, 1897; cost, $16,000; dimensions, 70 x 84 feet; two stories and basement. The first floor and basement are occupied by the Department of Printing and by offices of the Department of the English Language; the second floor is divided into general class rooms and offices used by the Departments of Industrial Journalism and the English Language. Originally constructed for the use of the Departments of Domestic Science and Domestic Art, the building has been used for present purposes since 1908. Value of equipment and apparatus, $8066.

MECHANICAL ENGINEERING HALL. Erected, 1909; cost, $80,000; dimensions, 113 x 200 feet; three stories in height, but much of it built on the gallery plan rather than by complete floor separation into different stories. This building contains the general offices of the Division of Engineering, the offices and drafting-rooms of the Departments of Civil Engineering and Architecture, an engineering reference library and reading room, an amphitheater for lectures and demonstrations, and the experimental laboratories for applied mechanics, hydraulics, thermodynamics, transmission, and gas and oil engines. The engines, turbines, generators, and boilers that furnish power and light for the College are installed in this building. Adjoining is the frame structure containing the gas producers, which are used for supplying gas to the domestic science and veterinary buildings, and which are also used in connection with the experimental work of the laboratories. Value of equipment and apparatus, $85,671.

NICHOLS GYMNASIUM. Erected, 1911; cost, $122,000; dimensions, 102 x 221 feet; three stories and basement. The building consists of a main section and two wings. The main section (85 x 141 feet), consisting of two stories and a basement, is used as a men's gymnasium and armory, and contains a running-track, sixteen laps to the mile. The east half of the basement of the main section contains a swimming pool, baths, rest room, etc., for women; the west half contains a swimming pool and baths for men. The east wing (40 x 102 feet) contains the women's gymnasium, class rooms and offices of the Departments of Military Training, Public Speaking, and Philosophy, and several literary society halls. The west wing (40 x 102 feet) contains the offices of the Director of Physical Training, a large locker room for men, class rooms and offices of the Department of German, and several literary society halls. This building, which is modern in every respect, is constructed on the old armory-castle type and is a magnificent piece of architecture. Value of apparatus and equipment, $2713.

PHYSICAL SCIENCE HALL. Erected, 1902; cost, $70,000; dimensions, 96 x 166 feet; two stories and basement. The east wing is occupied throughout by the laboratories, class rooms, and offices of the Department of Chemistry. The west wing is occupied by the Department of Electrical Engineering and by the Department of Physics. Value of equipment and apparatus: Chemistry, $19,500; Electrical Engineering, $17,134; Physics, $8078.

VETERINARY HALL. Erected, 1908; cost, $70,000; dimensions, 133 x 155 feet; two stories and basement. Occupied by the laboratories, demonstration and dissecting rooms, class rooms and offices of the Departments of Veterinary Medicine and Bacteriology. Value of equipment and apparatus: Veterinary Medicine, $9155; Bacteriology, $4628.

LIBRARY

The general College Library consists of all books belonging to the College, including the library of the Experiment Station, which is incorporated with it. On June 30, 1911, the Library contained 35,650 bound volumes, besides much unbound material. It receives currently about four hundred serial publications. As a depository the Library receives the documents and other publications of the United States government. The books are classified according to the Dewey system and are indexed in a dictionary card catalogue.

All students, as well as all officers of administration and instruction, have the privilege of direct access to the book stacks. The Library is primarily for free reference use, but the privilege of drawing books is accorded to all those connected with the College as registered students or as members of the Fac-

ulty. Books not specially reserved may be drawn for home use for two weeks. All books are subject to recall at any time.

General reference books, books reserved for classes, general periodicals, and certain other groups of books are to be consulted only in the reading rooms. They may not be loaned from the Library except when the reading rooms are closed. They must then be returned to the Library by the time it next reopens. Any violation of the regulations of the Library subjects the offender to a fine, or to a withdrawal of Library privileges, or to both, according to the gravity of the offense. More serious offenses, such as mutilation or theft of books or periodicals, are considered just causes for suspension or expulsion of the offender, who is also required to make good the loss incurred.

Reading Rooms.—Four reading rooms are maintained in connection with the Library: the general reference room, containing encyclopedias, dictionaries, atlases, bibliographies, and general reference books; the special reference room, containing books reserved for classes; the newspaper room, containing the important daily and weekly Kansas newspapers; and the agricultural reading room, containing the latest State Experiment Station bulletins, the publications of the United States Department of Agriculture, and about 125 general agricultural journals. These rooms are freely open to the students and to the public for purposes of reading and study. The utmost quiet and decorum, however, is required of every reader. Unseemly conduct, removing books, hiding them or unduly appropriating their use, are considered just causes for the withdrawal of Library privileges.

Divisional Libraries.—Divisional and departmental collections are deposited in certain College buildings apart from the main Library. These collections are for the special convenience of the instructors and students of the departments concerned. They are under the direction of the Librarian and are accessible to all students at regular hours.

Hours of Opening.—The Library is open daily, except on legal holidays, from 7:30 o'clock A. M. to 5:30 o'clock P. M. during the regular College year. During vacation periods it is open daily from 8 o'clock A. M. to 5 o'clock P. M.

Requirements for Admission

Persons, to be admitted to any department of the College, must be fourteen years of age or older. Eight units, or two full years of high-school work, are required for admission to the freshman class. A unit is defined to be the work done in an accredited high school or academy in five recitation periods a week for one school year. Entrance credits may be offered as follows:

ENGLISH. Two units. Required of all students.

MATHEMATICS. Two units. Either one and one-half units in algebra and one-half of a unit in geometry, or one unit in algebra and one unit in geometry. Required of all students.

PHYSICS. One unit. Required of all students.

PHYSICAL SCIENCE. Chemistry, one unit; physical geography, one unit or one-half of a unit. A maximum of one unit may be presented from subjects in this group.

BIOLOGICAL SCIENCE. Botany, one unit; zoölogy, one unit; physiology, one unit. A maximum of two units may be presented from subjects in this group.

HISTORY. Ancient history, one unit; medieval and modern history, one unit; English history, one unit; American history, one unit; economics, one unit; civics, one-half of a unit. A maximum of two units may be presented from subjects in this group.

ANCIENT LANGUAGES. Latin, two units; Greek, two units. A maximum of two units may be presented from subjects in this group.

MODERN LANGUAGES. German, two units; French, two units; Spanish, two units. A maximum of two units may be presented from subjects in this group.

VOCATIONAL SUBJECTS. Agriculture, one unit; woodwork or ironwork, one unit; drawing, one unit; domestic science and art, one unit or one-half of a unit; bookkeeping, one-half of a unit; stenography, one-half of a unit; typewriting, one-half of a unit; commercial law, one-half of a unit; school management, one-half of a unit. A maximum of two units may be presented in subjects in this group.

DEFICIENCIES

For the benefit of those students whose facilities for obtaining a high-school education are limited, the College maintains a subfreshman course, based upon the work of the eighth grade. Students who are unable to meet the foregoing en-

trance requirements have, therefore, the opportunity of enrolling in this department and making up the subjects in which they are deficient. For details of the subfreshman course, see page 70.

All such entrance deficiencies, however, must be made up before the beginning of the sophomore year. No student is registered in the senior class unless all deficiencies of the preceding years have been provided for. Candidates for graduation must make up all deficient subjects before the beginning of the spring term of the senior year. No student is considered a candidate for graduation the next June who is deficient more than three full subjects in addition to his regular assignment at the beginning of the fall term. No student who fails or is conditioned or found deficient in any subject, or whose grade in more than one subject falls below G in any term, is allowed to carry extra work during the succeeding term.

ADVANCED CREDIT

Students who have completed a four-year course in an accredited high school will receive advanced credit in the purely academic work of the freshman year at the discretion of the President of the College.

METHODS OF ADMISSION

ADMISSION BY EXAMINATION. Examinations for admission will be held at the College on Tuesday, September 17, 1912; Monday, January 6, 1913, for the winter term; and Monday, March 31, 1913, for the spring term.

ADMISSION BY CERTIFICATE. The applicant is required to submit to the committee on admission by diploma, a certificate of his high-school or academy credits, properly certified to by the authorities of the institution in which the work was done. Blanks will be furnished by the College for this purpose. It is requested that all work done in such high school or academy be presented upon these blanks, in order to expedite the granting of credit to such applicants as are entitled to it.

SPECIAL STUDENTS

In recognition of the fact that experience and maturity tend to compensate, in a measure at least, for lack of scholastic attainments, the College admits as special students those who are twenty-one years of age or older, without requiring them to pass the regular examinations, provided (1) they show good reason for not taking a regular course; (2) they be assigned only to such work as they are qualified to carry successfully; (3) the work done be not counted toward graduation; (4) they do superior work in the subjects assigned.

A special student is assigned by the dean of the division in which occur the major subjects to be pursued.

Requirements for Graduation

UNDERGRADUATE DEGREES

The degree of bachelor of science (B. S.) is conferred upon those completing the four-year course in agronomy, horticulture, animal husbandry, dairy husbandry, mechanical engineering, electrical engineering, civil engineering, architecture, printing, industrial journalism, home economics, or general science.

The degree of doctor of veterinary medicine (D. V. M.) is conferred upon those completing the four-year course in veterinary medicine.

The degree of bachelor of agriculture is conferred upon students who have completed the freshman and sophomore work of the four-year course in agriculture, who have been conspicuously successful in farming for a period of five years under the supervision of the Faculty of the College, and who have furnished the Faculty, through the Dean of the Division of Agriculture, acceptable reports of their work and progress.

CERTIFICATES

A certificate in agriculture is granted students completing the first two years of the four-year course in agriculture.*

A certificate is granted to those completing either of the two-year short courses in agriculture.

A certificate is granted to those teachers completing the six-month housekeeper's course.

ADVANCED DEGREES

The degree of master of science is conferred upon graduates of this College and of other institutions after all the requirements incident to the bestowal of the degree have been complied with.

For graduates of this institution the work for the degree of master of science consists of ninety-six credit units. The work of applicants who are graduates of other institutions is evaluated by a committee consisting of the chairman of the committee on advanced credit and of the dean of the division

* Under certain conditions and restrictions, students of mature years who can not spend four years in college, and who may be applicants for the degree of bachelor of agriculture or for the certificate in agriculture, may, on the completion of all of the work required in the freshman year, have the privilege of selecting such courses in advance of the sophomore year, under the advice and with the approval of the Dean of the Division of Agriculture, as may be especially adapted to their needs; but in no case can courses based on prerequisites not yet completed be undertaken.

and the head of the department in which the major is to be taken, and the student is given proper standing.

Forty-eight of the required ninety-six credit units are designated as supplementary minors, and are to be derived from studies that are intended to strengthen the student's general preparation; the remaining forty-eight are taken from studies of a special nature. Of the forty-eight credit units derived from special training, thirty-two are given to the major subject and sixteen to the minors. The nature and distribution of the major and minors are determined in each individual case by a committee, consisting of the dean of the division and the head of the department in which the major is taken.

Credit units due an honor student are applied on supplementary minors. In case a student nearing graduation has time, he may be permitted, by arrangement with the dean of the division and the head of the department in which he expects to do the major work, to spend his extra time on studies which will count toward the degree of master of science.

A thesis consisting of a clear statement of the investigation of some worthy original problem is required. The candidate is subjected to a rigid oral examination, covering both the general and special fields of his preparation, including his thesis, by a committee consisting of the dean of the division, the heads of the departments in which his major and regular minors have been taken, and the chairman of the standing committee on graduate study.

The full responsibility for the successful conduct of the graduate work is lodged in a representative standing committee of the Faculty, consisting of five members selected by the President, and this committee has the right to pass on all courses offered, on all assignments taken out, and on the standing of all graduate students.

General Information

DUTIES AND PRIVILEGES

Good conduct in general, such as becomes men and women everywhere, is expected of all students. Every possible aid and stimulus toward the development of sound and rational character, and toward the formation of high standards of personal honor and ideals of conduct, is given by the various Christian organizations of the College and the town. Every student is accordingly expected to render a good account of himself in the College community life. For those who are high-minded and reasonable, no other requirements need be expected. On the other hand, the demands of the College life leave no room for the idle or self-indulgent, for those who are too reckless to accept reasonable or wholesome restraint, or for those who are too careless or indifferent to take proper advantage of their opportunities. The College discipline is confined chiefly to sending away those whose conduct, after fair trial, makes their further attendance at the College unprofitable or inadvisable.

Absences from class or laboratory periods must be accounted for to the instructor concerned. Permission for absence from College for one or more days must be secured in advance from the dean of the division in which the student is registered. Students can not honorably leave the College before the close of a term except by previous arrangement with the deans concerned.

Opportunities for general scientific, literary, and forensic training are afforded, in addition to the College courses, by various literary and scientific societies and clubs. The Science Club, meeting semi-monthly, admits to membership all instructors and students interested in science. The College branch of the American Institute of Electrical Engineers, the Agricultural Association, and the Architectural Club admit to their membership young men interested in the fields indicated by their names. Of the strictly literary and debating clubs, the Alpha Beta and the Franklin are open to both sexes; the Ionian, the Eurodelphian, and the Browning are women's societies; the Webster, the Hamilton, and the Athenian admit only young men to membership.

At various times during the year, the College halls are opened for social, literary, musical, and dramatic entertainments furnished by lecture courses, by the literary societies, by the Department of Music, by the Dramatic Club, by the

Oratorical Association, and by other organizations of students and instructors. Addresses by prominent speakers, men of affairs, and persons prominent in scientific, educational, and social work are of frequent occurrence.

EXPENSES

Tuition is free. An incidental fee of three dollars a term is charged all students resident in Kansas. For non-residents, a matriculation, or entrance, fee of ten dollars, and an incidental fee of ten dollars a term, are charged. A medical fee of fifty cents a term is also collected from each student, in return for which he receives medical treatment in case of sickness. Receipts for these fees must be presented before enrollment in the College classes. No other fees are charged. The student is at no expense for laboratory materials, for musical instruction, or for the College diploma. Rooms and board are not furnished by the College. Table board in private families and at boarding houses varies from $3.25 to $4.50 a week, the average being about $3.75. Rooms are obtainable at from $5 to $12 a month, the highest-priced accommodations including light, heat, and bath.

The College Young Men's Christian Association offers accommodations in its building to a limited number of students, at prices from $10 to $13 a month for rooms with modern conveniences, and $3.25 a week for table board. As the number of rooms in the building is limited, applications should be made to the secretary of the association a year in advance. Board can usually be obtained at any time.

The cost of rooms is of course reduced by half the quoted prices where two students arrange to take a room together. Some students board themselves at less cost than the prices charged for table board, and unfurnished rooms may sometimes be obtained very cheaply. Washing costs from 50 to 75 cents a dozen pieces. Books cost on the average about $3 a term.

Each young man who takes military drill is required to have a military uniform, costing about $15, and each young woman who takes physical training must have a physical-training suit, costing about $4. Ordinary expenditures, aside from clothing and traveling expenses, range from $175 to $200 a year.

SELF-SUPPORT

The courses of instruction are based upon the supposition that the student is here for study, and therefore a proper grasp of the subjects can not be obtained by the average student unless the greater part of his time is given to College work. Students of limited means are encouraged and aided in every possible way, but unless exceptionally strong, both mentally

and physically, such students are advised to take lighter work by extending their courses, in case they are obliged to give any considerable time to self-support. As a rule, a student should be prepared with means for at least a term, as some time is required in which to make acquaintances and to learn where suitable work may be obtained.

There are various lines in which students may find employment. The College itself employs labor to the extent of about $1200 per month, at rates varying from 12½ to 16 cents an hour, according to the nature of the employment and the experience of the employee. Most of this labor is upon the College farm, in the orchards and gardens, in the shops and the printing-office, for the janitor, etc. Various departments utilize student help to a considerable extent during the vacations. Students demonstrating exceptional efficiency, ability, and trustworthiness obtain limited employment in special duties about the College. Many students secure employment in various lines in the town, and some opportunity exists for obtaining board in exchange for work, with families either in town or in the neighboring country. Labor is universally respected in the College community, and the student who remains under the necessity of earning his way will find himself absolutely unhampered by discouraging social conditions. False standards regarding physical work do not exist, and are not tolerated by the board of instruction or by the student body as a whole. Absolutely democratic standards prevail at the College, and students are judged on the basis of their personal worth and efficiency alone.

Students are assisted to obtain employment by means of the employment bureaus maintained by the Young Men's Christian Association and by the Young Women's Christian Association of the College, with secretaries of which organizations correspondence is encouraged. New students are also met at the trains by committees from these two bodies, and are assisted in the finding of rooms, and in various other helpful ways.

BUSINESS DIRECTIONS

General information concerning the College may be obtained from the President or the Secretary.

Scientific and practical questions, and requests for special advice along lines in which the College and the Experiment Stations are prepared to give information, should be addressed to the heads of the departments concerned with the work in which the information is sought.

Applications for farmers' institutes should be made as early in the season as possible to the Department of College Extension. Applications for the publications of the Agricultural Experiment Station should be addressed to the Director of the Station.

Donations to the Library should be addressed to the Librarian, and donations to the Museum to the Curator of the Museum.

STUDENT ASSEMBLY

The Student Assembly is held from ten until ten-thirty o'clock on four mornings of each week. At this time, offices, classrooms, and laboratories are closed and the students gather *en masse* in the College Auditorium. These assembly exercises consist of devotional services, music, and addresses. The devotional exercises are conducted by members of the Faculty, by resident ministers of the various denominations, or by prominent visitors. Excellent music is provided by the College Orchestra, by members of the Department of Music, and by available outside talent. In addition to the short, pointed addresses delivered by the President and by members of the Faculty, many prominent leaders of state and national reputation are invited to address the assembly. Thus the Student Assembly has become a center of true culture and enlightenment. Although attendance is not compulsory, it is common to see nearly two thousand enthusiastic students present during these exercises.

COLLEGE PUBLICATIONS

The official organ of the College is *The Kansas Industrialist,* published weekly in the Department of Industrial Journalism, and printed at the College by the Department of Printing. Its pages are filled with articles of interest, with special reference to agriculture and the industries. Particular attention is paid to information concerning the work of the College, to investigations of the Experiment Stations, and to local and alumni news. *The Kansas Industrialist* will be sent to any citizen of the State for fifty cents a year, and to any nonresident for seventy-five cents a year. The alumni may have *The Kansas Industrialist* free upon application.

The Department of College Extension issues a monthly publication entitled *Agricultural Education,* of special interest to institute members. The students of the College publish a semiweekly periodical, *The Students' Herald,* in the interest of the students at large. This paper is edited and managed by a staff elected by students.

EXAMINATIONS

Examinations are held on the six days set aside for them at the end of each term. Examinations to remove conditions are held on the next to the last Saturday of each term. A student who has received the grade C is entitled to take such special examination, provided the instructor be notified of the student's desire to take the examination not later than the

Tuesday evening preceding the Saturday set for the examinations. No other arrangements with respect to time or place may be made, except by a two-thirds vote of the Faculty. A grade of P, only, is to be reported for a student who passes the examination to remove a condition. A grade of F is to be reported for one who fails to pass. If a subject in which a student is conditioned is not passed at the first opportunity, the grade is changed from C to F. In industrial subjects the instructor will report as deficient (D) any student whose work, while satisfactory in quality, is lacking in the quantity required. The deficiency in such cases is removed when the student completes the required quantity of work in a satisfactory manner. With the consent of the head of the department, a deficiency may be made up outside of class, but if it is not made up by the last Saturday of the first term during which the student is in attendance following the term in which the deficiency occurred, the student's grade is changed from D to F, and he is required to make up the deficiency by repeating the work in a regular class. Deficiencies made up are to be reported as P.

Permission for examination in subjects not taken in class must be obtained, on recommendation of the professor in charge, from the dean of the division in which the student is assigned, at least two months before the examination is held. Permission to take such examination is not granted unless the preparation for it is made under an approved tutor. All such examinations are under the immediate supervision of the professor in whose department the subject falls.

GRADES

Students' grades are based upon the completed work of a term, and are designated by letters having the following signification and rank:

E, signifying excellent.
G, signifying good.
P, signifying passed.
C, signifying conditioned.
D, signifying deficient (applied only to shop and laboratory work, drawing, etc.).
F, signifying failed.

Any student who receives a grade of E for the term, in any subject, and who is charged with not to exceed six absences for all causes from the class in such subject during the term, may be excused from the final examination in that subject, at the discretion of the instructor; provided, however, that instructors are to announce such exemption lists in their respective subjects not earlier than the last session of the class preceding the final examinations.

Examinations to remove conditions are reported simply as P (passed) or F (failed), and such examinations not taken, or taken and not passed, are recorded F (failed).

HONORS

A system of honors exists as follows:

To not exceeding five per cent of the students of the junior class having the highest standing for the College year, "junior honors" are awarded at Commencement.

To not exceeding five per cent of the senior class having the highest standing for the College year, "senior honors" are awarded at Commencement. Any student achieving senior honors receives two credit units toward the master's degree; a student achieving both junior and senior honors receives six credit units toward the master's degree.

The following is the system of awarding honor points: The grades received by the student carry plus and minus "points" as follows:

Grade E (excellent) carries + 2 points.
Grade G (good) carries + 1 point.
Grade P (passed) carries 0 point.
Grade C (conditioned) carries — 1 point.
Grade F (failed) carries — 2 points.

When grade C (conditioned) is subsequently changed by the examination to remove a condition to grade P (passed) or grade F (failed) the points are changed accordingly.

In the estimation of honor points, the number of points attached to any given grade is multiplied by the number of hours a week required in the subject. In the case of a subject consisting wholly or in part of shop practice or laboratory work, *one-half* the number of hours required in such shop practice or laboratory work is taken in computing the multiplying factor.

The award of honors is to those achieving the highest *algebraic sum* of honor points, according to the foregoing schedule, and under the limitations provided above.

The Subfreshman Course

For the benefit of those students whose facilities for obtaining a high-school education are limited, the College maintains a subfreshman course, based upon the work of the eighth grade, as follows:

Subfreshman Course

The Arabic numeral immediately following the name of a subject indicates the number of credit units, while the numerals in parentheses indicate the number of hours a week of recitation and of laboratory, respectively. Physical training is required of all students throughout the time they are enrolled in this course.

FIRST YEAR

FALL TERM	WINTER TERM	SPRING TERM
Advanced Grammar 4 (4-0)	English Readings 4 (4-0)	Elementary Composition 4 (4-0)
Algebra I 4 (4-0)	Algebra II 4 (4-0)	Algebra III 4 (4-0)
Ancient History 3 (3-0)	Medieval History 3 (3-0)	Modern History I 3 (3-0)
Elementary Botany I 3 (2-2)	Elementary Botany II 3 (2-2)	Elementary Botany III 3 (2-2)
Sewing I* 3 (1-4)	Sewing II* 3 (1-4)	Sewing III* 3 (1-4)
Woodwork I† 2 (0-4)	Woodwork II† 2 (0-4)	Blacksmithing I† 2 (0-4)
Stock Judging I† 2 (0-4)	Grain Production I† 2 (1-2)	Stock Judging II† 2 (0-4)

SECOND YEAR

English Classics 4 (4-0)	Paragraph Writing 4 (4-0)	Elementary Rhetoric 4 (4-0)
Plane Geometry I 4 (4-0)	Plane Geometry II 4 (4-0)	Solid Geometry 4 (4-0)
Modern History II 3 (3-0)	The American Nation 3 (3-0)	Bookkeeping 3 (3-0)
Elementary Physics I 3 (3-0)	Elementary Physics II 3 (2-2)	Elementary Physics III 3 (2-2)
Free-hand Drawing 1 (0-2)	Geometrical Drawing 2 (0-4)	Object Drawing I 2 (0-4)
Cookery I* 2 (0-4)	Cookery II* 2 (0-4)	Cookery III* 2 (0-4)
Fruit Judging† 2 (0-4)	Blacksmithing II† 2 (0-4)	Grain Production II† 2 (1-2)
Poultry Judging† 1 (0-2)		

Students fourteen years of age or older are admitted upon completion of the standard eighth-grade course of the State. Students having had a partial course in a high school or academy may receive advanced credit in the subfreshman course.

* For young women. † For young men.

INDUSTRIAL SUBJECTS

It will be noted that industrial, or technical, work is introduced into these subfreshman courses. This is a technical institution, and, in keeping with its spirit, the Faculty and the Board of Regents have decided that it is proper to offer students instruction in practical technical subjects from the outset.

For the young women this work consists of sewing, cooking, free-hand and geometrical drawing, and bookkeeping. For young men it consists of stock judging, grain judging, fruit judging, poultry judging, woodwork, blacksmithing, mechanical drawing, and bookkeeping.

Instruction in these subjects is of a very practical nature, being given mainly by means of laboratory exercises, which are supplemented by such lectures and demonstrations as may be necessary to explain properly the principles involved.

Division of Agriculture

The teaching of a rational, practical system of agriculture is fundamental to industrial development in a State whose entire resources are derived from agricultural pursuits. This State has permanent prosperity in direct proportion to the producing capacity of her land. The unit of production is the acre, and the most successful farmer is necessarily the one who can produce a maximum quantity of the highest quality of agricultural products to the acre, at minimum cost.

In order to do this, it is necessary to know something of the soil, the conservation of its fertility and moisture, and its proper cultivation; the kinds of plants to grow and how to improve them; the selection, breeding, and feeding of live stock; the maintenance of orchards, gardens, and attractive surroundings; farm buildings and the equipment of the farm home with modern conveniences; the best methods of marketing the product of the farm; and, in addition to all these, the making of the farm home the center of influence in good citizenship and fellowship in the neighborhood.

A man may get many of these things through practical experience, and thus become an exponent of modern farming, but the cost entailed is usually unnecessarily great. The Agricultural College furnishes a means of acquiring a thorough systematic training in agriculture, which fits young men adequately for the farm, at a minimum of time and financial cost.

EQUIPMENT

The facilities for such training are unexcelled. The College owns 748 acres of land, which is used for instruction and demonstration in the various courses in agriculture and allied branches. The campus, which comprises 160 acres, affords one of the best examples of ornamental tree planting and forestry in the State. Students working daily amid such surroundings can scarcely fail to gain an appreciation of and love for the beautiful. To the work in agronomy is devoted a tract of 320 acres, purchased with an appropriation made by the legislature of 1909. For horticultural and forestry work, eighty acres are used; for dairy, about seventy acres; and for animal husbandry purposes, 140 acres. The herds and flocks contain all the important breeds of dairy and beef cattle, hogs, horses, and sheep, among which are included the world's champion steers of a recent international stock show at Chicago, and many animals that have won championships at local and state

fairs in the past five years. With this class of stock available for the work in judging, the student is supplied with types of the best breeds and becomes familiar with these types by actual handling of the stock.

The College has one of the best-equipped schools of veterinary medicine in the West. It is rated in class "A" by the United States Department of Agriculture, which rating places it among the best in the United States and Canada. In addition to giving the student the best possible technical training in veterinary medicine, the course is designed to give the broad culture necessary for men who are to take their place in society and public affairs. Professional men, such as veterinarians, are placed in a more or less public relation to the community they serve. They must be more than technicians; they must have a broad groundwork in cultural and ethical training which will win them the confidence and respect of their communities. Success is measured in something more than dollars and cents, and the man whose view of life is no broader than his profession, adds but little to the world and its happiness. The training given by the College in all its courses in agriculture seeks to emphasize the value of the man as a man, as much as his value as a specialist in agriculture.

COURSES OF STUDY

The various needs of the student are met by offering in the division of agriculture the following courses:

A four-year course in agronomy.
A four-year course in animal husbandry.
A four-year course in dairying.
A four-year course in horticulture.
A four-year course in veterinary medicine.
A two-year course in agriculture.
A two-year short winter course in agriculture.
A two-year short winter course in dairying.
A one-year short winter course in dairy manufactures.
A short course in testing dairy products.
A six-week summer course for teachers.

DEGREES AND CERTIFICATES

The four-year courses in agronomy, animal husbandry, dairy husbandry, and horticulture lead to the degree of bachelor of science in agriculture. The four-year course in veterinary medicine leads to the degree of doctor of veterinary medicine. A certificate in agriculture is granted to a student completing the two-year course. A short-course certificate is granted to a student completing either of the two-year short courses in agriculture.

The degree of bachelor of agriculture may be conferred upon

students who have completed the freshman and sophomore work in the four-year course in agriculture and who have been conspicuously successful in farming for a period of five years, under the direct supervision of the Faculty of the College, and who have made acceptable reports of their work and progress to the Faculty, through the Dean of the Division of Agriculture.

Under certain conditions and restrictions, students of mature years who can not spend four years in College, and who may be applicants for the degree of bachelor of agriculture or for the certificate in agriculture, may, on the completion of all the work required in the freshman year, have the privilege of selecting such courses in advance of the sophomore year, under the advice and with the approval of the dean, as may be especially adapted to their needs, but in no case can courses based on prerequisites not yet completed be undertaken.

The four-year courses, with the exception of the course in veterinary medicine, are designed to meet the needs primarily of the student who expects to return to the farm. However, the student who completes any of the courses offered will have had sufficient training to enable him to enter some one of the many lines of agricultural industry as a specialist. The demand for men thus trained is constantly increasing, and such positions offer attractive opportunities for men who by nature and training are adapted to the work. The United States Department of Agriculture, the state schools and departments of agriculture, high schools, private schools of secondary and college rank, and a great variety of commercial interests, are constantly demanding men trained in agriculture.

The young man who expects to make farming his life work can start with no better asset than the thorough training in practical and scientific agriculture afforded by any one of the four-year courses. The American farmer needs more of the skill that comes through the training of the hand in order that he may better do the work of farming; but infinitely more, he needs the training of the mind in the fundamental truths that lie back of every operation in farming in order that he may use the skill of the craftsman with reason and judgment. One may learn to plow a field with the greatest skill; the work may be a model of its kind. If, however, it is plowed with utter disregard of the moisture conditions which prevail, the result may be failure. To understand the conditions which should determine when and how to plow is the work of the trained mind—the other is the work of the trained hand. The farmer and the teacher in farming must possess both kinds of training, and the courses of study have been revised with this fact in view, and have been so arranged that *the student begins his practical training in agriculture from the first day he enters College and continues it throughout the course.*

SUBFRESHMAN WORK

The student who enters College through the two years of subfreshman work which fills the gap between the common school and the freshman year of College will get, during the first year, in addition to his academic work (see page 70), two terms of stock judging, one term of grain judging, two terms of woodwork, one term of blacksmithing; and in the second year, one term of fruit judging, one term of grain judging, one term of poultry judging, one term of blacksmithing, and three terms of drawing.

These subjects are treated from a practical standpoint, and the student, after finishing the two years' work, should be able to judge the general quality of stock and grain and to use the ordinary wood- and iron-working tools needed on the farm. Should the student be unable to go farther than these two years in his education, he will have had eight hours a week of practical work, under the best instruction the State can afford, that will be of every-day use to him on the farm.

COLLEGE WORK

The student who completes the freshman and sophomore years will have had, in addition to the fundamental work in chemistry, zoölogy, and botany, practical studies each term in farm crops, cattle, hogs, horses, sheep, dairying, poultry, horticulture, and farm mechanics. The judging of the subfreshman year is continued, supplemented by lectures and studies from standard textbooks. These two years give the student a general knowledge of the whole range of practical agriculture. One-third of the student's time is devoted to these subjects.

During the junior and senior years the student continues his studies of fundamental science, and learns to apply science to practical agriculture. He is led step by step to understand the scientific relation of every farming operation. There is so much of agriculture to be taught that it becomes necessary for the student to choose in which of the general lines—agronomy, animal husbandry, dairy husbandry, or horticulture—he will find that which best suits his needs or liking, and the time is spent in fully developing one subject rather than in trying to gain a partial knowledge of several.

THE COURSE IN AGRONOMY

The foundation of all agricultural work is the soil and the crops grown upon it. Success in live stock or dairying depends, in a great measure, upon the ability of the soil to produce, with economy, sufficient crops of the right character. Success in grain farming depends wholly on the productiveness of the soil and the selection of the crops and methods of culture adapted to the region under cultivation.

In grain farming, stock farming, or mixed stock and grain farming, the farmer must have a knowledge of the soil, its needs and limitations; of crops and the methods of planting, cultivating, and harvesting; and of the machinery of the farm. A knowledge of these subjects from a practical standpoint is essential to success, but there is even greater need among our farmers of a more fundamental knowledge, based on the physical and biological sciences.

In the courses in agronomy, the student is taught to be skillful in selecting farm products by the practice gained in judging grains, grasses, and forage crops; and as he acquires knowledge in chemistry, physics, botany, entomology, and other more or less abstract sciences, he learns to apply it to the problems of the farm, thus acquiring ability to use his skill to the best advantage in producing maximum yields of highest quality at lowest cost. The student desiring to specialize in crop production may, during his junior and senior years, select the major part of his work in the Department of Agronomy and in other departments offering subjects relating directly to some phase of crop production.

THE COURSE IN HORTICULTURE

There is ever-increasing opportunity for remunerative returns from small areas devoted to the growing of vegetables, fruits, and flowers. The supply of men trained to do careful and scientific work in commercial orchards and in truck gardens is not equal to the demand, and the call for men who are competent to teach the principles of horticulture becomes greater as the schools of the land recognize the educational value of such work.

The courses in horticulture, grounded as they are upon a very thorough course in botany, entomology, chemistry, and other fundamental branches of science, are proving well adapted to give young men the necessary training to succeed in these lines of work. The young man who would succeed in commercial lines of horticulture must be prepared to recognize and to solve the difficult problems of soil fertility, destructive parasites, and insect infestations. The principles of soil fertility and crop production apply to garden and orchard work no less than to field and pasture, and these subjects are studied in classes under the instruction of other departments and are prerequisites to horticultural studies.

The garden and the orchard are essential to a comfortable farm home, and every home needs the elevating influence of trees and flowers. All students in the agricultural courses are given instruction in plant propagation, and may elect other courses if they desire. The young women of the home economics course are given instruction in gardening, both the

homely art of growing vegetables for the kitchen and the fine art of producing pictures with nature's wealth of materials comprised in the lists of trees, shrubs, and flowers.

THE COURSE IN ANIMAL HUSBANDRY

A permanent agriculture includes live stock as a fundamental part of the farm equipment. Soil can not be cropped indefinitely. Not all crops, and not even all portions of any single crop, can be disposed of to advantage without live stock. A combination of live stock and grain farming in most situations is the most economical one in operation, and returns the greatest revenue to the owner.

Many farmers are so situated that they can turn their attention primarily to stock farming, either by growing and feeding, or by raising pure-bred stock. To young men who desire to take up this line of farming, the course in animal husbandry offers the opportunity to secure special training in live-stock raising without excluding the fundamental principles of plant production and other related farm subjects.

The farmer who expects to make live-stock production the principal object of his farm operations must have a thorough training in the selection of stock and must understand the principles of breeding and feeding.

There are very promising things in store for the man who can enter the ranks of the breeder and produce strains of live stock adapted to Kansas conditions and to the needs of the markets accessible to Kansas farmers.

THE COURSE IN DAIRY HUSBANDRY

Dairying is destined to become a very important part of Kansas agriculture. The climate and soil are such as to make the growing of corn and alfalfa exceedingly profitable, and these crops rightly cared for make the best and cheapest dairy rotation obtainable.

Kansas can compete successfully with any region in the profitable manufacture of dairy products. As dairying is commonly conducted in Kansas at the present time, it is an adjunct to general farming or grain farming. The kind of live stock used is not well adapted to dairying. As the industry becomes better understood, and its true relation to the economy of the farm is more generally known, it will become a more prominent feature of our farming and there will be an increasing demand for better stock.

The course in dairy husbandry is planned primarily for the man who is operating a dairy farm, or who expects to make dairying a considerable part of his farm work. The fundamental subjects of breeding and feeding, and the study of the care, sanitation, and diseases of animals, are given the same prominence that they receive in the course in animal husbandry.

Special emphasis is given to dairy bacteriology and dairy chemistry, for the reason that these subjects are fundamental in the production of pure dairy products. The ultimate product from cattle or hogs is meat, while the ultimate product from the dairy herd is milk, or some of its various manufactured forms, and the dairyman must necessarily know much about the handling of milk and its products in order to market successfully the produce of his herd.

While dairy farming, as a rule, is conducted as a distinct line of business, the production of other classes of live stock and the cultivation of crops are necessary. The student is required to study the fundamental subjects relating to crop and live-stock production.

THE COURSE IN VETERINARY MEDICINE

Veterinary medicine has made remarkable advances within recent years, and is taking its place alongside of human medicine as a science. In truth, medical science and veterinary science are but specialized branches of the same science, and must be developed together. The modern veterinarian takes his place in the community as a professional man of education and culture. With the general improvement of the live stock on the farms, and with their advance in value, there is a constant increase in the demand for skilled physicians to care for them.

The veterinarian, while primarily trained to conserve the health of farm animals, has a yet larger service to render in preventing diseases common to both man and beast from being communicated from domestic animals to man. Moreover, he must see that the animals slaughtered for meat are healthy and that the products are handled under such conditions as to render them suitable for human food.

The public is now demanding that milk and other food products be free from contamination, and that they be incapable of transmitting dangerous diseases, like tuberculosis, typhoid fever, scarlet fever, diphtheria, etc. There is ample work for all of the thoroughly competent veterinarians that the schools of the country will train.

The course in veterinary medicine at the Agricultural College was established to give the young men of this State an opportunity to pursue these studies in an agricultural environment, where the facilities offered by other branches of the College would be at their command. While the instruction in this course is very largely technical, enough subjects of a general character are included to give a sound education and a broad outlook.

Better to fit the veterinarian to deal wisely with the live-stock problems which he has to meet, he is required to take the work in stock feeding, stock breeding, stock judging, pedigrees, milk inspection, vertebrate zoölogy, embryology, and

agricultural economics, in addition to his purely professional work.

The diploma from this school is recognized by the United States Department of Agriculture, by the United States Civil Service Commission, by the American Veterinary Medical Association, and by the various examining boards of the several states and territories of America where it has been presented.

Course in Agronomy

The Arabic numeral immediately following the name of a subject indicates the number of credit units, and the numerals in parentheses indicate the number of hours a week of recitation and of laboratory, respectively.

All young men in this course below the junior year are required to take military drill; except, that sophomores who have had one year of drill may take physical training instead of military drill, and that physical training taken in the preparatory course may be substituted for a like amount of physical training in this course. All men excused from military drill on account of physical disability are provided by their dean with an equivalent or stronger substitute from the regular work required in the course, and their normal work later in the course is increased by that much.

FRESHMAN

FALL TERM	WINTER TERM	SPRING TERM
Algebra IV 4 (4-0)	Narrative Writing 4 (4-0)	Theme Writing 4 (4-0)
Chemistry I 4 (2-4)	Chemistry II 4 (2-4)	Chemistry III 4 (2-4)
Zoology I 4 (2-4)	Zoology II 4 (2-4)	Zoology III 4 (2-4)
Live Stock I 3 (1-4)	Shop Work* 2 (0-4)	Live Stock II 3 (1-4)
Farm Crops I 2 (1-2)	Farm Crops II 4 (3-2)	Poultry Management I 2 (1-2)
Methods of Study 1 (1 0)		

SOPHOMORE

Hist. of English Literature 4 (4-0)	College Rhetoric 4 (4-0)	English Literature 4 (4-0)
Qualitative Analysis 4 (2-4)	El. Organic Chemistry 4 (4-0)	Agricultural Chemistry 2 (2-0)
Plant Morphology 4 (2-4)	Plant Physiology I 4 (2-4)	Plant Physiology II Lab. 2 (0-4)
Dairying 4 (2-4)	Public Speaking 4 (4-0)	Plant Propagation 5 (3-4)
Live Stock III 2 (0-4)	Farm Mechanics I 2 (1-2)	Live Stock IV 3 (1-4)
		Quantitative Analysis I 2 (0-4)

JUNIOR

General Bacteriology 4 (2-4)	General Geology 4 (4-0)	Agricultural Physics 4 (4-0)
Farm Mechanics II 4 (2-4)	Soils 4 (2½-3)	Soil Fertility 4 (2½-3)
Farm Crops III 4 (3-2)	Farm Forestry 4 (3-2)	Plant Breeding 4 (2-4)
Plant Pathology I 4 (2-4)	Civics 4 (4-0)	Farm Mechanics III 4 (2-4)
Elective 2 (-)	Elective 2 (-)	Elective 2 (-)

SENIOR

General Entomology 4 (3-2)	Agricultural Economics 4 (4-0)	Industrial History 4 (4-0)
Principles of Feeding 4 (4-0)	Farm Management 4 (3-2)	Irrigation and Drainage 4 (2-4)
Farm Crops IV 4 (1-6)	Grain Products 4 (3-2), *or*	Farm Crops V 4 (1-6), *or*
Advanced Soil Physics 4 (1-6)	Soil Research 4 (0-8)	Soil Survey 4 (2-4)
Elective 2 (-)	Elective 6 (-)	Seed Testing 1 (0-2)
		Elective 4 (-)

* Shop work suited to the previous training of the student is assigned.

Course in Horticulture

The Arabic numeral immediately following the name of a subject indicates the number of credit units, while the numerals in parentheses indicate the number of hours a week of recitation and of laboratory, respectively.

All young men in this course below the junior year are required to take military drill; except, that sophomores who have had one year of drill may take physical training instead of military drill, and that physical training taken in the preparatory course may be substituted for a like amount of physical training in this course. All men excused from military drill on account of physical disability are provided by their dean with an equivalent or stronger substitute from the regular work required in the course, and their normal work later in the course is increased by that amount.

FRESHMAN

FALL TERM	WINTER TERM	SPRING TERM
Algebra IV 4 (4-0)	Narrative Writing 4 (4-0)	Theme Writing 4 (4-0)
Chemistry I 4 (2-4)	Chemistry II 4 (2-4)	Chemistry III 4 (2-4)
Zoology I 4 (2-4)	Zoology II 4 (2-4)	Zoology III 4 (2-4)
Live Stock I 3 (1-4)	Shop Work* 2 (0-4)	Live Stock II 3 (1-4)
Farm Crops I 2 (1-2)	Farm Crops II 4 (3-2)	Poultry Management I 2 (1-2)
Methods of Study 1 (1-0)		

SOPHOMORE

Hist. of Eng. Literature 4 (4-0)	College Rhetoric 4 (4-0)	English Literature 4 (4-0)
Qualitative Analysis 4 (2-4)	El. Organic Chemistry 4 (4-0)	Agricultural Chemistry 2 (2-0)
Plant Morphology 4 (2-4)	Plant Physiology I 4 (2-4)	Plant Physiology II Lab. 2 (0-4)
Dairying 4 (2-4)	Public Speaking 4 (4-0)	Plant Propagation 5 (3-4)
Live Stock III 2 (0-4)	Farm Mechanics I 2 (1-2)	Live Stock IV 3 (1-4)
		Quantitative Analysis I 2 (0-4)

JUNIOR

General Bacteriology 4 (2-4)	General Geology 4 (4-0)	Agricultural Physics 4 (4-0)
Farm Mechanics II 4 (2-4)	Soils 4 (2½-3)	Soil Fertility 4 (2½-3)
Farm Crops III 4 (3-2)	Farm Forestry 4 (3-2)	Plant Breeding 4 (2-4)
Plant Pathology I 4 (2-4)	Civics 4 (4-0)	Small Fruits 2 (2-0)
Pomology I 2 (0-4)	Silviculture 2 (2-0)	Elective 4 (-)

SENIOR

General Entomology 4 (3-2)	Agricultural Economics 4 (4-0)	Industrial History 4 (4-0)
Principles of Feeding 4 (4-0)	Farm Management 4 (3-2)	Irrigation and Drainage 4 (2-4)
Advanced Soil Physics 4 (1-6)	Horticultural Entomology 2 (2-0)	Market Gardening 3 (2-2)
Pomology II 4 (3-2)	Spraying 1 (0-2)	Landscape Gardening II 3 (2-2)
Elective 2 (-)	Orcharding 3 (3-0)	Elective 4 (-)
	Elective 4 (-)	

* Shop work suited to the previous training of the student is assigned.

Course in Animal Husbandry

The Arabic numeral immediately following the name of a subject indicates the number of credit units, while the numerals in parentheses indicate the number of hours a week of recitation and of laboratory, respectively.

All young men in this course below the junior year are required to take military drill; except, that sophomores who have had one year of drill may take physical training instead of military drill, and that physical training taken in the preparatory course may be substituted for a like amount of physical training in this course. All men excused from military drill on account of physical disability are provided by their dean with an equivalent or stronger substitute from the regular work required in the course, and their normal work later in the course is increased by that amount.

FRESHMAN

FALL TERM	WINTER TERM	SPRING TERM
Algebra IV 4 (4-0)	Narrative Writing 4 (4-0)	Theme Writing 4 (4-0)
Chemistry I 4 (2-4)	Chemistry II 4 (2-4)	Chemistry III 4 (2-4)
Zoology I 4 (2-4)	Zoology II 4 (2-4)	Zoology III 4 (2-4)
Live Stock I 3 (1-4)	Shop Work* 2 (0-4)	Live Stock II 3 (1-4)
Farm Crops I 2 (1-2)	Farm Crops II 4 (3-2)	Poultry Management I 2 (1-2)
Methods of Study 1 (1-0)		

SOPHOMORE

Hist. of English Literature 4 (4-0)	College Rhetoric 4 (4-0)	English Literature 4 (4-0)
Qualitative Analysis 4 (2-4)	El. Organic Chemistry 4 (4-0)	General Bacteriology 4 (2-4)
Plant Morphology 4 (2-4)	Plant Physiology I 4 (2-4)	Plant Physiology II Lab. 2 (0-4)
Dairying 4 (2-4)	Public Speaking 4 (4-0)	Plant Propagation 5 (3-4)
Live Stock III 2 (0-4)	Farm Mechanics I 2 (1-2)	Live Stock IV 3 (1-4)

JUNIOR

Agricultural Chemistry 2 (2-0)	General Geology 4 (4-0)	Agricultural Physics 4 (4-0)
Farm Mechanics II 4 (2-4)	Soils 4 (2½-3)	Soil Fertility 4 (2½-3)
Farm Crops III 4 (3-2)	Farm Forestry 4 (3-2)	Civics 4 (4-0)
General Anatomy I 4 (1-6)	General Anatomy II 4 (2-4)	Animal Physiology 4 (3-2)
Pedigrees 2 (0-4)	History of Breeds 2 (2-0)	Advanced Judging I 2 (0-4)
Quantitative Analysis I 2 (0-4)		

SENIOR

General Entomology 4 (3-2)	Agricultural Economics 4 (4-0)	Diseases of Farm Animals and Obstetrics 4 (4-0)
Principles of Feeding 4 (4-0)	Farm Management 4 (3-2)	Animal Breeding 4 (4-0)
Advanced Judging II 2 (0-4)	Evolution of Dom. Animals 1 (1-0)	Horse Production 2 (2-0)
Embryology 4 (2-4)	Pork & Mutton Production 3 (3-0)	Beef Production 2 (2-0)
Industrial History 4 (4-0)	Meats 2 (1-2)	Live Stock Management 2 (2-0)
	Elective 4 (-)	Elective 4 (-)

* Shop work suited to the previous training of the student is assigned.

Course in Dairy Husbandry

The Arabic numeral immediately following the name of a subject indicates the number of credit units, while the numerals in parentheses indicate the number of hours a week of recitation and of laboratory, respectively.

All young men in this course below the junior year are required to take military drill; except, that sophomores who have had one year of drill may take physical training instead of military drill; and that physical training taken in the preparatory course may be substituted for a like amount of physical training in this course. All men excused from military drill on account of physical disability are provided by their dean with an equivalent or stronger substitute from the regular work required in the course, and their normal work later in the course is increased by that amount.

FRESHMAN

FALL TERM	WINTER TERM	SPRING TERM
Algebra IV 4 (4-0)	Narrative Writing 4 (4-0)	Theme Writing 4 (4-0)
Chemistry I 4 (2-4)	Chemistry II 4 (2-4)	Chemistry III 4 (2-4)
Zoology I 4 (2-4)	Zoology II 4 (2-4)	Zoology III 4 (2-4)
Live Stock I 3 (1-4)	Shop Work * 2 (0-4)	Live Stock II 3 (1-4)
Farm Crops I 2 (1-2)	Farm Crops II 4 (3-2)	Poultry Management I 2 (1-2)
Methods of Study 1 (1-0)		

SOPHOMORE

Hist. of Eng. Literature 4 (4-0)	College Rhetoric 4 (4-0)	English Literature 4 (4-0)
Qualitative Analysis 4 (2-4)	El. Organic Chemistry 4 (4-0)	Agricultural Chemistry 2 (2-0)
Plant Morphology 4 (2-4)	Plant Physiology I 4 (2-4)	Plant Physiology II Lab. 2 (0-4)
Dairying 4 (2-4)	Public Speaking 4 (4-0)	Plant Propagation 5 (3-4)
Live Stock III 2 (0-4)	Farm Mechanics I 2 (1-2)	Live Stock IV 3 (1-4)
		Quantitative Analysis I 2 (0-4)

JUNIOR

General Bacteriology 4 (2-4)	General Geology 4 (4-0)	Agricultural Physics 4 (4-0)
Farm Mechanics II 4 (2-4)	Soils 4 (2½-3)	Soil Fertility 4 (2½-3)
Farm Crops III 4 (3-2)	Farm Forestry 4 (3-2)	Civics 4 (4-0)
General Anatomy I 4 (1-6)	Dairy Bacteriology 4 (2-4)	Animal Physiology 4 (3-2)
Chemistry D-I 2 (0-4)	Chemistry D-II 2 (0-4)	Dairy Inspection I 2 (1-2)

SENIOR

General Entomology 4 (3-2)	Agricultural Economics 4 (4-0)	Diseases of Farm Animals and Obstetrics, 4 (4-0)
Principles of Feeding 4 (4-0)	Farm Management 4 (3-2)	Animal Breeding 4 (4-0)
Pure-Bred Dairy Cattle 2 (1-2)	Butter Mkg. and Cr'y Mgt. 5 (3-4)	Dairy Bldgs. and Equipm't 2 (2-0)
Embryology 4 (2-4)	Milk Prod. and Herd Mgt. 3 (3-0)	Cheese & Ice-cream Mkg. 4 (2-4)
Industrial History 4 (4-0)	Refrigeration D 3 (1-4)	Elective 4 (-)

* Shop work suited to the previous training of the student is assigned.

Course in Veterinary Medicine

The Arabic numeral immediately following the name of a subject indicates the number of credit units, and the numerals in parentheses indicate the number of hours a week of recitation and of laboratory, respectively.

All young men in this course below the junior year are required to take military drill; except, that sophomores who have had one year of drill may take physical training instead of military drill, and that physical training taken in the preparatory course may be substituted for a like amount of physical training in this course. All men excused from military drill on account of physical disability are provided by their dean with an equivalent or stronger substitute from the regular work required in the course, and their normal work later in the course is increased by that much.

FRESHMAN

FALL TERM	WINTER TERM	SPRING TERM
Narrative Writing 4 (4-0)	Methods of Study 1 (1-0)	Theme Writing 4 (4-0)
Chemistry I 4 (2-4)	Chemistry II 4 (2-4)	Chemistry III 4 (2-4)
Anatomy I 6 (1-10)	Anatomy II 4 (1-6)	Anatomy III 4 (1-6)
General Zoology I-V 4 (2-4)	General Zoology II-V 4 (2-4)	Public Speaking 4 (4-0)
	Histology I 6 (3-6)	Histology II 2 (1-2)

SOPHOMORE

Hist. of English Literature 4 (4-0)	Philosophy 4 (4-0)	College Rhetoric 4 (4-0)
Comparative Physiology I 2 (2-0)	Comparative Physiology II 6 (4-4)	Comparative Physiology III 4 (2-4)
Anatomy IV 4 (1-6)	Anatomy V 4 (1-6)	Anatomy VI 3 (1-4)
Qualitative Analysis 4 (2-4)	General Bacteriology 4 (2-4)	Pathology I 4 (4-0)
Histology III 4 (2-4)		Pharmacy 1 (0-2)
		Medical Botany 2 (1-2)

JUNIOR

Pathology II 4 (2-4)	Pathology III 4 (2-4)	Pathology IV 4 (2-4)
Surgery I 2 (1-2)	Surgery II 4 (2-4)	Surgery III 2 (1-2)
Embryology 4 (2-4)	Medicine I 4 (4-0)	Medicine II 4 (4-0)
Materia Medica I 4 (4-0)	Materia Medica II 4 (4-0)	Pathogenic Bacteriology 4 (2-4)
Industrial History 4 (4-0), *or*	Business Law 2 (2-0), *or*	Agricultural Economics 4 (4-0), *or*
Elementary German I 4 (4-0)	Elementary German II 4 (4-0)	German Readings 4 (4-0)
Clinic*	Clinic*	Clinic*

SENIOR

Parasitology 3 (2-2)	Dairy Inspection II 2 (0-4)	Meat Inspection 3 (3-0)
Surgery IV 4 (4-0)	Surgery V 4 (4-0)	Surgery VI 4 (0-8)
Medicine III 4 (4-0)	Infectious Diseases 4 (4-0)	Medicine IV 4 (4-0)
Principles of Feeding 4 (4-0)	Obstetrics 4 (3-2)	Animal Breeding 4 (4-0)
Live Stock III 3 (1-4)	Live Stock V 4 (1-6)	Live Stock IV 3 (1-4)
Clinic*	Clinic*	Clinic*

* One to six hours daily, depending on the cases on hand.

Department of Agronomy

Professor JARDINE, Agronomy.
Associate Professor CALL, Soils.
Assistant Professor LEIDIGH, Crops.
Assistant Professor UMBERGER, Crops.
Assistant SCHAFER, Crops.
Assistant CHASE, Farm Mechanics.
Assistant LILL, Soils.
Assistant CUNNINGHAM, Crops.
Assistant LAUDE, Crops.
Assistant THROCKMORTON, Soil Survey.

The College farm used by the Department of Agronomy comprises 320 acres of medium rolling upland soil, well suited to experimental and demonstration work. It is well equipped with all kinds of farm machinery necessary in crop production. The general fields and experimental plots used for the breeding and testing of farm crops and for conducting soil fertility experiments and experiments in methods of soil culture, afford the student excellent opportunities for study and investigation.

A large and well-equipped laboratory for soil physics and soil fertility work is maintained for the regular use of students. Laboratories for grain judging and crop judging are maintained for students taking this work. Material is provided for the use of students in the study and determination of the grains and forages best adapted to different purposes and most suitable for growing under different soil and climatic conditions. Ample greenhouse space is provided for the students' use in germinating seeds under varying soil-moisture conditions, at different depths of planting, and with varying degrees of temperature, and for research work in soils during the winter months.

The farm mechanics laboratory is well supplied with representative types of farm machinery for demonstration and illustrative purposes in farm mechanics. Different makes of all kinds of farm machinery are supplied by implement manufacturers for study and investigation.

The Department of Agronomy offers courses in grain judging, crop production, soil physics, soil fertility, soil surveying, farm mechanics, irrigation and drainage, and farm management.

The following detailed description of courses will give a definite understanding of each subject given, its position in the course, and the proportion of time devoted to class and to laboratory work:

COURSES IN FARM CROPS

1. **Grain Production I.** Subfreshman, first year, winter term. Class work, one hour; laboratory, two hours. Two credits. Required of all men in the subfreshman course.

A study of corn and of the small-grain cereals. The history, importance, and distribution of each of the grain crops receives attention. The selection and the care of the seed, the preparation of the seed-bed, methods of planting and cultivation, are all considered. Special emphasis is laid on the production of these crops with reference to Kansas conditions.

Laboratory.—The laboratory work is planned to give the student training in the selection of corn and of the small grains for seed.

2. **Crop Production II.** Subfreshman, second year, spring term. Class work, one hour; laboratory, two hours. Two credits. Required of all men in the subfreshman course.

A study of grasses and forage crops with reference to Kansas conditions alone. The history, importance, and distribution of each of these crops is given attention. The selection, care, and testing of the seed, the preparation of the seed-bed, planting, cultivation, harvesting for seed and for various other purposes, and the storing, grading, and marketing of the crops, are considered. The use of forage crops and grasses for the maintenance of fertility is dealt with, together with an elementary study of crop sequence and rotation. Prerequisite: Crop Production I.

Laboratory.—The laboratory work is planned to give the student training in the identification of the different crops and their seeds. A study is also made of methods of cleaning and of grades of seed. The question of equality, mixtures, and adulterations of seeds receives attention, with a consideration of the quality and the commercial grades of hay and other forages.

3. **Farm Crops I.** Freshman year, fall term. Class work, one hour; laboratory, two hours. Two credits. Required of all students in agricultural courses; elective in the course in general science.

This is a study of corn, largely from the standpoint of production. The history and the botanical characters of the plant are considered. The structure and the manner of growth of the roots, culms, leaves, and inflorescence are studied in detail. The origin of varieties and their improvement through selection and breeding receive special attention.

The importance of high vitality, the effect of climate on the crop, and the distribution of corn over the United States are considered. Seed-bed preparation and planting, and cultural methods are discussed. Methods for the eradication and destruction of weeds and insect enemies which largely affect the yield of this crop are considered. Methods of harvesting, storing, and marketing are also taken up. Textbook, Hunt's *Cereals in America.* Prerequisite: Crop Production II.

Laboratory.—The laboratory work consists of a study of the

actual plant and ears of corn. A study in variation is made with different types of plants, and with different shapes of ears and kernels as illustrations. Differences in texture and structure of kernels of the same type and of different types of corn are studied.

Practical demonstrations of seed germination are made. A study of the worth of individual ears, according to the best known standards, constitutes a part of the work. The commercial grading of corn is illustrated and studied.

4. **Farm Crops II.** Freshman year, winter term. Class work, three hours; laboratory, two hours. Four credits. Required of students in all agricultural courses; elective in the course in general science.

This is a study of cereal crops other than corn. The principal crops considered are wheat, oats, rye, barley, and the grain sorghums. The origin of each, with the history of its development, and the factors influencing it, are studied. Special emphasis is placed upon environmental factors, such as rainfall, temperature, altitude, etc., all of which materially influence the development, distribution, and yield of crops. Since these are factors which can not be controlled, a careful study is made of crop rotation and of the cultural methods best suited to special conditions in order to produce maximum yields. Textbook, Hunt's *Cereals in America.* Prerequisite: Farm Crops I.

Laboratory.—In the laboratory a study of the physical characteristics of each of these crops is made. Type and structure are considered, with mature samples for illustrations. Living specimens are accessible either in the field or in the greenhouse, where their development and growth may be observed. A score-card study of the different cereals is made. The commercial standards governing the grading of these grains are considered.

5. **Farm Crops III.** Junior year, fall term. Class work, three hours; laboratory, two hours. Four credits. Required of students in all agricultural courses; elective in the course in general science.

A study of forage and fiber crops, with special reference to their importance, history, method of development, growth, distribution, culture, and uses. The culture and adaptation of perennial grasses for hay and pasture are considered. Annual forage crops, including not only sorghums, rape, millets, and legumes, but also corn, wheat, and rye, which are commonly known as cereals, but which are also used for silage, soiling, fodder, and hay, are studied. Attention is given to the planting, culture, and uses of both annual and perennial legumes, root crops, and fiber crops. The relative feeding value of the respective crops for different purposes, whether for silage,

soiling, or hay, is taken into account. The cultural methods best suited to individual crops, the character of the soil, the lay of the land, etc., receive their share of attention. Textbook, *Forage and Fiber Crops,* by Hunt. Prerequisite: Farm Crops II.

Laboratory.—In the laboratory both sheaf and mounted specimens of these crops are studied. In the greenhouse about fifty types of forage plants are kept growing for laboratory use. The student is therefore given an opportunity to become familiar with the structure of the plant, the arrangement of the leaves, the inflorescence, etc.—information that can be accurately obtained only by actually studying the plant itself. The student is also taught to identify the different commercial tame grasses and clovers and their seeds with special reference to quality, purity, and freedom from adulterants and weed seeds. Commercial hay grading is likewise made a part of the work. Textbooks, *Forage Crops,* by Voorhees, and *Department of Agronomy Forage-judging and Seed-grading Guide.*

6. **Farm Crops IV.** Senior year, fall term. Class work, one hour; laboratory, six hours. Four credits. Required in the course in agronomy.

This is an advanced study of the cereal grains and of crop-improvement methods, especially from the breeder's standpoint. The class work consists of lectures and the assignment to each student of general reading and study of the work of investigators along this line. The laws and principles underlying the breeding of cereals are given special attention. Prerequisite: Farm Crops II.

Laboratory.—The laboratory period is given over to the collecting, compiling, classifying, and card-indexing of data along the lines discussed in the classroom. Subjects are assigned to each student from time to time for investigation.

7. **Farm Crops V.** Senior year, spring term. Lecture, one hour; laboratory, six hours. Four credits. Optional with Soil Survey in the course in agronomy.

This course is similar to Farm Crops IV, except that it deals with forage crops instead of with grain crops. A study of the principles of breeding of the forage crops in connection with their improvement. Little work has thus far been done along this line, and this course is, therefore, primarily for the purpose of drawing the attention of the student to the need of improving the forage crops, and to the methods of selection and breeding. Prerequisite: Farm Crops III.

Laboratory.—The laboratory period is devoted to a study of records and to the classification of data along special lines, as in the laboratory work of the preceding courses.

COURSES IN SOILS

8. **Soils.** Junior year, winter term. Class work, two and one-half hours; laboratory, three hours. Four credits. Required in the agricultural courses and in the agricultural option in the course in industrial journalism; elective in the course in general science.

This course comprises a study of the physical nature of soils, and deals with: the origin of soils and their formation; soil texture as influencing aëration, capillarity and diffusion; soil moisture and means for its conservation; the washing of soils and preventive measures; the effect of different methods of cultivation upon the liberation of plant foods, soil moisture, and soil temperature; the use of tillage implements and their effect on the physical condition of the soil. Prerequisites: Chemistry I, II, and III.

Laboratory.—The practicums demonstrate the principles of soil physics discussed in the class.

9. **Soil Fertility.** Junior year, spring term. Class work, two and one-half hours; laboratory, three hours. Four credits. Required of students in all agricultural courses.

This course involves a study of: the food requirements of plants and the effect of different amounts and combinations of plant food upon plant growth; the effect of different crops and different systems of farming upon the depletion of soil fertility; the use of barnyard manure, including proper methods of handling, preserving, and applying it; a determination of the need of the soil for commercial fertilizers and the kind of fertilizers to apply. It includes a consideration of the effect of crop rotation and of green manuring upon soil fertility. Prerequisites: Agricultural Chemistry, Quantitative Analysis I, and Soils.

Laboratory.—The laboratory exercises supplement the class work in demonstrating the effect of fertilizers and manures upon plant growth. Determinations of the lime requirements of soils and of the fixation of plant food in the soil are made. The effect of continuous cropping upon the depletion of plant food is illustrated. One hundred and twenty one-tenth-acre plots devoted to soil fertility work on the Station farm are used for illustrative work in this course.

10. **Advanced Soil Physics.** Senior year, fall term. Class work, one hour; laboratory, six hours. Four credits. Required in the courses in agronomy and horticulture.

A brief study of the principal soil-forming rocks and minerals and their influence on the texture, physical properties, and fertility of the soil. The various methods of determining the physical composition of the soil are considered. Problems of handling special soils, such as hardpan, gumbo, and alkali, are studied. Prerequisites: General Geology; Soils.

Laboratory.—The laboratory exercises continue the work begun in Soils and consist of a detailed study of special soils as revealed by mechanical analysis. The exercises include field work on the effect of rolling, and methods of cultivation upon the temperature and moisture of the soil; and also embrace a study of the methods used by the Bureau of Soils of the United States Department of Agriculture, in conducting both laboratory and field investigations on the physical properties of soils.

11. **Soil Research.** Senior year, winter term. Laboratory, eight hours. Four credits. Optional with Grain Products in the course in agronomy.

The student taking this course carries out a definite line of laboratory work in soil physics or soil fertility. During the winter term the work is conducted principally in the greenhouse and laboratory, with assigned library readings. In the spring term, an opportunity is afforded to carry into the field lines of research started in the laboratory and in the greenhouse. Prerequisites: Agricultural Chemistry, Soils, Soil Fertility, and Advanced Soil Physics.

12. **Soil Survey.** Senior year, spring term. Class work, two hours; laboratory, four hours. Four credits. Optional with Farm Crops V in the course in agronomy.

This subject is pursued by means of lectures and recitations, which deal with the types of soils in the United States, as classified by the Bureau of Soils of the United States Department of Agriculture, and with adaptability of different crops to these soil types. A study is also made of the soil surveys of different states, and especially of the soil survey of Kansas. Prerequisite: Soils.

Laboratory.—Field work in mapping soils. Students electing this course must not elect other work on Monday, as this day is frequently used for all-day field exercises.

COURSES IN AGRICULTURAL ENGINEERING

13. **Farm Mechanics I.** Sophomore year, winter term. Class work, one hour; laboratory, two hours. Two credits. Required in all the agricultural courses, elective in the course in general science.

This constitutes a beginning course in farm mechanics. Certain important definitions and mechanical principles, such as force, work, power, the lever, eveners, tackles, etc., are carefully considered. Methods of power transmission, belting, splicing, etc., and the strength of materials are studied. The history, development, and construction of such tillage machinery as plows, harrows, rollers, subsurface packers, cultivators, etc., are fully discussed. Text, *Farm Machinery and Farm Motors.* Prerequisite: Elementary Physics II.

14. **Farm Mechanics II.** Junior year, fall term. Class work, two hours; laboratory, four hours. Four credits. Required of students in all agricultural courses.

This course covers a study of farm machinery, including seeding, grading, harvesting, haying, and fertilizing operations; threshing and corn-grinding machinery; the use of transportation and pumping outfits, with appropriate instruction on the value and care of farm machinery in general. Textbook, *Farm Machinery and Farm Motors.* Prerequisite: Farm Mechanics I.

15. **Farm Mechanics III.** Junior year, spring term. Class work, two hours; laboratory, four hours. Four credits. Required in the course in agronomy.

This is an advanced course for the consideration of farm machinery, farm conveniences, etc. It involves a study of the permanent equipment and conveniences of the farm, such as fences, outbuildings, cribs, barns, and machine sheds; the use of concrete and concrete construction. Practical field and laboratory tests of farm machines are conducted with various forms of power. Prerequisite: Farm Mechanics II.

16. **Irrigation and Drainage.** Senior year, spring term. Class work, two hours; laboratory, four hours. Four credits. Required in the courses in agronomy and horticulture.

This course involves study and field practice in the fundamentals common to both irrigation and drainage. Problems are given on the length of pace, on the determination of distances by pacing and by the use of the surveyor's chain, and in farm mapping. A study is made of drainage systems in operation. The College has a drainage system under way, and practical work is given the student in running levels and in trenching and placing tile. This system is also arranged with catch-basins in such a way as to allow close observations and calculations of the run-off through underground tiling to be made. Each student is required to plan an entire drainage system and to estimate its cost. Textbook, Elliot's *Practical Farm Drainage,* and irrigation bulletins. Prerequisite: Soils.

17. **Farm Buildings.** Elective, fall term. Laboratory, four hours. Two credits.

This course calls for research work, and for a study of equipment and construction with a definite end in view, such as the arrangement or rearrangement of buildings on the home farm, or on an imaginary farm, at the student's option, and includes a study of materials of construction, etc.

COURSE IN FARM MANAGEMENT

18. **Farm Management.** Senior year, winter term. Class work, three hours; laboratory, two hours. Four credits. Required in all the agricultural courses.

The purpose of this course is: first, to assemble and to correlate the principles taught in the agricultural courses of the institution; second, to aid the student in applying these principles to the successful management of a farm. Lectures are given on the points to be considered in the selection of a farm, on types of farming, on the planning and arrangement of the farmstead, the fields, and the crops. Different regions are discussed with especial reference to their adaptability to certain types of farming. Farm records and accounts are kept. The labor question is analyzed. The distribution of capital, its relation to profit, and the relation of live stock to crop production and to the maintenance of a permanent agriculture, receive consideration.

At the beginning of the course the students are required to furnish plans and inventories of their own farm or of farms with which they are familiar, together with a record of one year's operations. As a final exercise, this same farm is replanned in accordance with the principles developed in this course. Whenever practicable, neighboring farms are visited and studied with the idea of securing first-hand information as to the farm plan, especially with respect to the arrangement of the fields, to the buildings, to the farmstead, and to the rotation of crops used. The 320-acre agronomy farm receives special consideration. A plan is prepared by each student for the operation of this farm under the type of farming for which he believes it best adapted. Market situations are studied. Rural conditions with respect to people, roads, schools, churches, and social conveniences, all find consideration in the course.

Department of Animal Husbandry

Professor COCHEL.
Assistant Professor FLINT.
Assistant PATERSON.
Assistant MCCAMPBELL.
Assistant WRIGHT.
Assistant BLIZZARD.

The Department of Animal Husbandry uses about 140 acres of land devoted largely to pasture and to alfalfa. The herds and flocks comprise the best types of pure-bred horses, cattle, sheep, and hogs, and contains many prize-winners of national and international reputation.

The feed yards and barns are well arranged for experimental feeding and the maintenance of the herds. The laboratory of the animal husbandry student is, as a matter of fact, the feed yard and the animal. He studies the animal from the standpoint of the breeder and of the feeder, and learns to combine the needs of each and to find these qualities exemplified in the perfect animal.

The courses of study in this department are so arranged as to give the student special instruction in the selection, breeding, feeding, marketing, and management of all classes of live stock. Attention is also given to the sanitary conditions and treatment of the more common forms of disease to which the animals are subject.

COURSES IN ANIMAL HUSBANDRY

1. **Stock Judging I.** Subfreshman, first year, fall term. Laboratory, four hours. Two credits. Required of all young men in the subfreshman course.

The work consists of score-card practice in judging horses and hogs, in which the student becomes familiar with the general points to be observed in judging stock.

2. **Stock Judging II.** Subfreshman, first year, spring term. Laboratory, four hours. Two credits. Required of all young men in the subfreshman course.

This work is similar to Stock Judging I, except that sheep and cattle are used. The latter half of the subject is taught in the Department of Dairy Husbandry, and consists of the judging of dairy stock.

3. **Live Stock I.** Freshman year, fall term. Class work, one hour; laboratory, four hours. Three credits. Required in all agricultural courses, and in the agricultural and general science options in the course in industrial journalism; elective in the course in general science.

This course consists of a study of the market types and classes of hogs and horses.

Laboratory.—Practice in judging.

4. **Live Stock II.** Freshman year, spring term. Class work, one hour; laboratory, four hours. Three credits. Required in all agricultural courses and in the agricultural option in the course in industrial journalism; elective in the course in general science.

This course comprises a study of the market types of sheep and cattle, including both the feeder and the fat classes. The different grades and classes of wool also receive careful consideration.

Laboratory.— Practice in judging.

5. **Live Stock IV.** Sophomore or senior year, spring term. Class work, one hour; laboratory, four hours. Three credits. Required in all agricultural courses and in the course in veterinary medicine; elective in the course in general science.

This course consists of a study of breeding classes of domestic animals and a study of the selection of pure-bred animals for breeding purposes. Prerequisites: Live Stock I and II.

Laboratory.— Practice in judging.

6. **Pedigrees.** Junior year, fall term. Laboratory, four hours. Two credits. Required in the course in animal husbandry.

This course includes the study of the herd books, with a view to acquainting the student with pedigrees of all breeds, and with the leading strains and families of the different breeds of live stock.

7. **History of Breeds.** Junior year, winter term. Class work, two hours. Two credits. Required in the courses in animal husbandry.

A study of the early history and development of all of the pure-bred strains of domestic animals.

8. **Advanced Judging I.** Junior year, spring term. Laboratory, four hours. Two credits. Required in the course in animal husbandry.

This course deals with the judging of market classes as well as with all of the different breeds of pure-bred stock. They are judged in groups of from four to six animals in the same manner that is customary at county or state fairs. Prerequisites: Live Stock I, II, and IV.

9. **Advanced Judging II.** Senior year, fall term. Laboratory, four hours. Two credits. Required in the course in animal husbandry.

A continuation of Advanced Judging I. During the work of this term occasional trips are made to the best live-stock farms of the State, where the students have an opportunity to judge and to observe the management of herds and flocks as handled by the most successful stock men in the State. Prerequisite: Advanced Judging I.

10. **Principles of Feeding.** Senior year, fall term. Class work, four hours. Four credits. Required in all the agricultural courses, in the course in veterinary medicine, and in the agricultural option in the course in industrial journalism.

This course involves a study of the digestive system and processes of nutrition; and the theory of practical economy of rations, both for the maintenance and for the fattening of all classes of farm animals. Prerequisite: Agricultural Chemistry.

11. **Pork and Mutton Production.** Senior year, winter term. Class work, three hours. Three credits. Required in the course in animal husbandry.

This course comprises a systematic study of the most successful and economical methods of growing and finishing hogs and sheep, both for breeding purposes and for pork and mutton production. Prerequisite: Principles of Feeding.

12. **Meats.** Senior year, winter term. Class work, one hour; laboratory, two hours. Two credits. Required in the course in animal husbandry.

This course includes a study of the killing, dressing, cutting, and curing of beef, pork, and mutton. Prerequisite: Principles of Feeding.

13. **Live Stock V.** Senior year, winter term. Class work, one hour; laboratory, six hours. Four credits. For veterinary students only.

This work is a combination of Live Stock I and II. Market classes of stock are briefly considered.

14. **Beef Production.** Senior year, spring term. Class work, two hours. Two credits. Required in the course in animal husbandry.

This course is devoted to a study of the most successful and economical methods of producing beef cattle for market. Various rations, comparisons of long and short feeds, the advisability of grain and of grass feed, and all questions pertaining to the production of beef, are considered. Prerequisite: Principles of Feeding.

15. **Horse Production.** Senior year, spring term. Class work, two hours. Two credits. Required in the course in animal husbandry.

This course involves a study of the most successful methods of growing and developing young horses and of the most satisfactory rations for light- and medium-weight horses, together with an investigation of the best methods of preparing horses for market. Prerequisite: Principles of Feeding.

16. **Live Stock Management.** Senior year, spring term. Class work, two hours. Two credits. Required in the course in animal husbandry.

This course deals with the practical side of the care and management of horses, cattle, sheep, and hogs, and with the arrangement of yards, barns, feed lots, etc. Prerequisite: Principles of Feeding.

17. **Animal Breeding.** Senior year, spring term. Class work, four hours. Two credits. Required in all of the agricultural courses, in the course in veterinary medicine, and in the agricultural option in the course in industrial journalism.

This course embraces the general study of the principles of breeding, including a study of selection, variation, heredity, atavism, etc. Prerequisites: Zoölogy I, II, and III; Embryology.

Department of Dairy Husbandry

Assistant Professor REED.
Assistant RUDNICK.
Assistant FITCH.

The College dairy farm, including the buildings and yards, consists of about seventy acres of medium upland. This land is used for growing corn, alfalfa, and other crops, such as cow-peas, field peas, and sorghum, and for the pasture used by the dairy herd.

The barn is built on the most approved model for the housing of dairy cattle, and is light, well-ventilated, and sanitary, with stalls for seventy cows. Three silos of modern type, feed rooms, a milk room, a boiler room, and a laboratory are built in connection with the barn. Each of these illustrates some especially desirable feature in dairy building and construction.

The dairy herd consists of excellent types of the four dairy breeds: Jersey, Guernsey, Ayrshire, and Holstein. These animals are pure-bred, and a number have been entered in the advanced registry of their respective breeds. The Department of Dairy Husbandry purposes to keep one animal for each acre in cultivation, raising all of the corn needed for silage, as well as alfalfa necessary for the animal for one year, and furnishing all of the pasture required by the young stock.

The dairy building houses the creamery, the cheese rooms, classrooms, and offices, and the necessary laboratories for testing and hand-separator work. Refrigeration is secured from a small refrigerating machine and ice plant installed in the building. These facilities of barn, herd, and laboratories are in constant use by the students of dairying. The instruction in dairy husbandry includes the study of the selection and breeding of dairy animals, the production of milk, its manufacture into butter, cheese, and other dairy products, or its sale on the market.

COURSES IN DAIRY HUSBANDRY

1. **Stock Judging II.** Subfreshman, first year, spring term. Laboratory, four hours. Two credits. Required of all subfreshman young men.

This is an elementary course in dairy stock judging. The work consists of score-card practice in selecting the dairy cow from the utility standpoint. The first half of the work consists of general stock judging, and is given in the Department of Animal Husbandry.

2. **Dairying.** Sophomore year, fall term. Class work, two hours; laboratory, four hours. Four credits. Required in all of the courses in agriculture and in the agricultural option in the course in industrial journalism; elective in the course in general science.

This is a general course in dairying, dealing with the secretion, composition, and properties of milk; with the factors influencing the quantity and quality of milk; and with the care of milk and cream on the farm. It includes a study of the different methods of creaming, the construction and operation of farm separators, the principles and application of the Babcock test, the use of the lactometer, and butter-making on the farm. Lectures supplemented by textbook, *Milk and Its Products,* by H. H. Wing.

Laboratory.—Practice in operating the Babcock test and lactometer, separation of milk, and farm butter-making.

3. **Live Stock III.** Sophomore or senior year, fall term. Laboratory, four hours. Two credits. Required in the courses in agriculture, in the course in veterinary medicine, and in the agricultural option in the course in industrial journalism; elective in the course in general science.

This course calls for the judging of dairy stock from the standpoint of economical production and breed type. Score-cards are used for the purpose of training the student to become accurate, thorough, and systematic in the selection of animals as representatives of breeds or for breeding purposes. No textbook is required. *Types and Breeds of Farm Animals,* by C. S. Plumb, and Breed Association literature are used as references.

4. **Dairy Inspection I.** Junior year, spring term. Class work, one hour; laboratory, two hours. Two credits. Required in the course in dairy husbandry.

Advanced work is given in the testing of dairy products, including testing for adulterations. Practice is given in the use of score-cards for inspecting and grading milk depots, dairy farms, and creameries. The course is designed to give training in the duties of a city, state, or government inspector or commissioner. State and city ordinances governing the handling and public sale of dairy products are outlined. Textbook, *Testing Milk and Its Products,* by Farrington and Woll. Prerequisites: General Bacteriology, Dairy Bacteriology, and Chemistry D-I and D-II.

5. **Pure-Bred Dairy Cattle.** Senior year, fall term. Class work, one hour, laboratory, two hours. Two credits. Required in the course in dairy husbandry.

Lectures are given on the origin, history, and development of breeds of dairy cattle, their distribution, and their distinctive characteristics.

Laboratory.—This work consists of a study of methods of registering animals, and of practice in tracing and making pedigrees and in keeping advanced registry records.

6. **Milk Production and Herd Management.** Senior year, winter term. Class work, three hours. Three credits. Required in the course in dairy husbandry.

This course deals with the economical production of milk, and with the most approved methods of handling a dairy herd. Special attention is given to breeding, feeding, keeping herd records, the forming of test associations and of organized plans for improving the quality of dairy cattle. Prerequisite: Principles of Feeding.

7. **Butter-Making and Creamery Management.** Senior year, winter term. Class work, three hours; laboratory, four hours. Five credits. Required in the course in dairy husbandry.

This course comprises a study of the principles of creamery butter-making, the construction and care of creameries and their appliances, methods of sampling and grading cream, pasteurization, starter-making, cream-ripening, and creamery accounting. Textbook, *Principles and Practice of Butter Making,* by McKay and Larsen.

Laboratory.—Practice is given in the sampling and grading of milk and cream; in separating and ripening cream; in the preparation and use of the starter in pasteurized and in raw cream; in churning; in working, washing, salting, and packing of butter; and in keeping complete records of each operation. The work also includes the making of salt, fat, and moisture determinations of the finished product, and judging and scoring butter.

8. **Dairy Inspection II.** Senior year, winter term. Laboratory, four hours. Two credits. Required in the course in veterinary medicine.

This course comprises the testing of dairy products, the inspection and scoring of dairies, milk depots, and creameries, and the testing for adulterants in dairy products. Textbook, *Testing Milk and Its Products,* by Farrington and Woll.

9. **Cheese and Ice-Cream Making.** Senior year, spring term. Class work, two hours; laboratory, four hours. Four credits. Required in the course in dairy husbandry.

This course includes the making of cheese on the farm for home use and for sale, and the commercial manufacture of Cheddar cheese, comprising each detail from the receipt of the milk to the marketing of the finished product. The cheese work is given in the first half of the term, and ice-cream making in the last half. Lectures are given on the manufacture of ice-cream and ices for the retail and wholesale trade. Textbook, *The Science and Practice of Cheese Making,* by Van Slyke-Publow. Prerequisites: Chemistry D-I and D-II, and Dairy Bacteriology.

Laboratory.—Practice is given in making cheese under farm conditions and on a commercial scale. Records are kept of the different operations, and their influence upon the finished product is noted. Exercises are given in testing, judging, and scoring cheese. The last half of the term is devoted to the making of ice-cream and ices.

10. **Dairy Buildings and Equipment.** Senior year, spring term. Class work, two hours. Two credits. Required in the course in dairy husbandry.

This work consists in drawing plans for the construction of dairy barns, storage barns, silos, milk rooms, dairies, ice houses, fences, and shelters, and in planning and laying out dairy plants for special purposes. Prerequisite: Dairy Inspection I.

11. **Advanced Dairy Judging.** Elective, spring term. Laboratory, two hours. One credit.

This course is a continuation of Live Stock III. Visits are made to the best dairy farms in the State, and students are given an opportunity to judge and to handle stock kept by the most successful breeders.

12. **Dairy Seminar.** Elective, spring term. Class work, two hours. Two credits.

This course includes a study and review of dairy periodicals and experiment station bulletins, books, and other dairy literature. Prerequisites: Courses 6, 7, and 10.

Department of Poultry Husbandry

Professor LIPPINCOTT
Superintendent HARRIS

The Poultry Plant is situated on a gentle south slope lying just north of the new Agricultural Building. The plant occupies eight acres, which are devoted to the breeding and rearing of the birds used for class work. It is equipped with different types of incubators, brooders, houses, and runs, and with flocks of the leading breeds of fowls.

There is an increasing demand for men with a systematic training in the poultry business. There are constant calls for trained men of experience in the Government and state experiment stations, in the state colleges, and in correspondence schools, as well as for men capable of managing poultry-farming enterprises of considerable proportions.

COURSES IN POULTRY HUSBANDRY

1. **Poultry Judging.** Subfreshman, second year, fall term. Laboratory, two hours. One credit. Required of subfreshman men.

This is a course in the judging of poultry from the utility and fancy standpoints. The breeds most commonly found on

Kansas farms are used as a basis of this work. Reference book, *American Standard of Perfection.*

2. **Poultry Management I.** Freshman year, spring term. Lectures, one hour; laboratory, two hours. Two credits. Required in the agricultural courses, and in the agricultural option in the course in industrial journalism; elective in the course in general science.

This is a general introduction to the problems of poultry management. It takes up a discussion of the importance of the industry, of housing, feeding, and marketing.

Laboratory.—Practice is given in scoring eggs and dressed poultry, and in killing and dressing.

3. **Poultry Management II.** Elective, winter term. Lectures, one hour; laboratory or library assignment, two hours. Two credits.

The subjects of breeding, incubating, and brooding are discussed in the lectures.

Laboratory.—The laboratory work consists of a detailed study of incubators, brooders, and brooder houses.

4. **Practice in Poultry Feeding.** Elective, spring term. Three times a day for a period of three weeks, at hours outside of the regular schedule. One credit. Time by arrangement with the instructor. Class limited to six.

The course consists in the actual care of a flock of birds by the students under the supervision of an instructor. Careful records are kept of food consumed, and of the eggs produced. A financial statement is required at the end of the feeding period.

5. **Practice in Incubation.** Elective, spring term. Three times a day for a period of three weeks, at hours outside of the regular schedule. One credit. Time to be arranged for with the instructor. Class limited to six.

This course consists of the care of an incubator throughout the incubation period, testing the eggs, and bringing off the hatch. Careful records of fertility, cost of incubation, etc., are kept.

6. **Practice in Brooding.** Elective, spring term. Three times a day for a period of three weeks, at hours outside of the regular schedule. One credit. Time to be arranged for with the instructor. Class limited to six.

Each student handles a flock of chicks, having the entire care of brooding and feeding them during the three most critical weeks. A report of cost of fuel and feed, gain in weight, and mortality is required. This course must be preceded or accompanied by Practice in Incubation.

Department of Forestry

Forester SCOTT

The Department of Forestry, established by authority of an act of the legislature in 1909, is in charge of forestry extension and investigations throughout the State, and of the College instruction in these subjects.

The great importance to the State and nation of conserving the present area of woodland and of adding to it by plantings upon every farm is universally acknowledged. The direct value to the farm of supplies of posts, poles, and fuel is readily computed, but the value to the State of these timber areas in the protection to soil, the conservation of moisture, and the improved landscape effect, is even more important in the agricultural welfare of the State and of the citizen.

COURSES IN FORESTRY

1. **Farm Forestry.** Junior year, winter term. Class work, three hours; laboratory, two hours. Four credits. Required in all agricultural courses; elective in the course in general science.

This course covers, in a general way, the propagation of forest trees; nursery methods and practices; the cultivation and care of trees in farm wood-lots; the preparation of planting plans for farm wood-lots; a detailed study of trees suitable for such planting in the various parts of the State; the value of the timber crop; the composition and location of windbreaks, their value in the protection of growing crops and in the conservation of soil moisture. Lectures and mimeographed notes.

2. **Silviculture.** Junior year, winter term. Class work, two hours. Two credits. Required in the horticultural course; elective in other courses.

A study of the forest regions of the United States; the commercial range of the important economic species, their soil and climatic requirements; a study of forest types; tolerance and intolerance of trees; factors determining reproduction and rate of growth; the protection of forests against injury by fires, winds, and insects, including the application of several silvicultural systems. Prerequisite: Farm Forestry.

Department of Horticulture

Professor DICKENS
Assistant Professor AHEARN
Assistant LEWIS

A wealth of illustrative material for classes in all horticultural subjects is found in the large collection of species growing upon the College campus, in the orchard plantations, and

in the greenhouses. The erection of the new greenhouses has added greatly to the possibility of effective laboratory work.

The horticultural grounds consist of eighty acres of land devoted exclusively to horticultural and forestry work and gardens, and to nurseries on the campus. Orchards and vineyards are maintained for experimental and demonstrative work. A full equipment of tools, spraying machinery, and special apparatus used in horticulture, floriculture, and gardening, is available for the use of the students. The College grounds furnish one of the finest laboratories in the State for the study of landscape gardening.

The instruction in the Department of Horticulture covers fruit judging, plant propagation, pomology, gardening, small fruits, spraying, orcharding, and landscape gardening. The following descriptions give detailed accounts of the instruction in these various fields.

COURSES IN HORTICULTURE

1. **Fruit Judging.** Subfreshman, second year, fall term. Laboratory, four hours. Two credits.

An acquaintance with the standard varieties of Kansas fruits is acquired, and the requirements of the different commercial grades are studied. The student becomes familiar with the injuries inflicted by insects, and with the diseases that render fruit unmarketable. Practice is given in judging collections and commercial packages, and in using score-cards, premium lists, and judges' rules.

2. **Plant Propagation.** Sophomore year, spring term. Class work, three hours; laboratory, four hours. Five credits. Required in all the agricultural courses and in the agricultural option in the course in industrial journalism; elective in the course in general science.

A discussion of natural and cultural methods of propagation; seeds, seed testing, and seed growing; the treatment required for different kinds of seeds, the production of seedlings for stock; grafting, budding, layering; the making of cuttings, and the special requirements for propagating commercial fruits and ornamental plants. Lectures and assigned readings. Prerequisite: Plant Anatomy.

Laboratory.—Practical work in the preparation of seeds and in seed testing; in the preparation of seed-beds, and the use of seeding machinery; in transplanting, grafting, budding; and in general nursery practice.

3. **Pomology I.** Junior year, fall term. Laboratory, four hours. Two credits. Required in the course in horticulture.

Exercises in grading and packing fruit, in selecting specimens, and in the preparation of exhibits. Identification and description of varieties; identification of diseases, and of injuries which damage storage fruits.

4. **Kitchen Gardening.** Junior year, spring term. Class work, two hours. Two credits. Required in the course in home economics.

Lectures on the requirements for home-grown vegetables and other plants; on soils, fertilizers, and seeds; on the planting, cultivation, and needs of various groups of species.

5. **Small Fruits.** Junior year, spring term. Class work, two hours. Two credits. Required in the course in horticulture.

The small fruits of commercial importance are considered with reference to their requirements as to soil, fertilizers, cultivation, and protection. The management of small areas designed to furnish a supply of fruits for home use, and the handling of commercial plantations, are considered. Prerequisite: Plant Propagation.

6. **Landscape Gardening I.** Senior year, fall term. Class work, two hours. Two credits. Required in the course in home economics and in the home economics option in the course in industrial journalism.

Lectures are given on the principles of landscape art, and their application to the problems of lawns, yards, country homes, school grounds, and larger plantations. Opportunity is afforded for an acquaintance with the species used for obtaining the best results.

7. **Pomology II.** Senior year, fall term. Class work, three hours; laboratory, two hours. Four credits. Required in the course in horticulture.

A detailed study of systems of classification, natural and artificial; the influence of conditions and culture upon variation. Systems of description and nomenclature. Textbook, *Systematic Pomology,* by F. A. Waugh. Prerequisite: Pomology I.

Laboratory.—Identification and description of varieties; observations on variations in specimens grown in different localities and under varying conditions.

8. **Spraying.** Senior year, winter term. Laboratory, two hours. One credit. Required in the course in horticulture.

Practice is given in preparing spray mixtures, and in the use of spraying machinery. Prerequisites: Chemistry I and II.

9. **Orcharding.** Senior year, winter term. Class work, three hours. Three credits. Required in the course in horticulture.

A discussion of the conditions necessary for success with orchards. Location; improvement of soil, application of fertilizers; pruning; prevention of loss from frost; marketing and storage. Textbook, *Principles of Fruit Growing,* by L. H. Bailey. Prerequisites: Plant Propagation and Pomology II.

10. **Market Gardening.** Senior year, spring term. Class work, two hours; laboratory, two hours. Three credits. Required in the course in horticulture.

A study of the problems and possibilities of the market garden, the necessary equipment, and soil requirements therefor; the individual demands of special crops; and the value and cost of fertilizers. Textbook, *Principles of Vegetable Gardening*, by L. H. Bailey.

Laboratory.—Plans for gardens, seed testing, the construction of the hotbed, the use of tools and machines, observations on the growth of crops. Management of hotbeds and forcing-houses.

11. **Landscape Gardening II.** Senior year, spring term. Class work, two hours; laboratory, two hours. Three credits. Required in the course in horticulture; elective in the course in general science.

A study of the ideals of landscape work and the means adopted to secure the best results in lawns, parks, public grounds, and cemeteries. Textbook, *Landscape Gardening*, by F. A. Waugh.

Laboratory.—Making plans for plantings of various types, including lawns, parks, and cemeteries.

Department of Milling Industry

Professor FITZ

The Department of Milling Industry was primarily established by the Board of Regents to undertake investigations in the handling and milling of wheat. Every student of agronomy should have some knowledge of this subject, and also of the handling of grain products other than those obtained from wheat. A full and complete knowledge of the needs of grain growing as an industry must necessarily include the utilization of grains in the manufacture of food and of numerous articles of commerce. The following course is offered to supply this information to the student:

1. **Grain Products.** Senior year, winter term. Class work, three hours; laboratory, two hours. Four credits. Optional with Soil Research in the course in agronomy.

This is a course dealing with commercial methods of grading, handling, storing, and marketing all kinds of grains and hay, and includes discussion of deterioration and loss in storage or transit. It also includes a brief study of the manufacture of the various food products from the grains. Prerequisite: Farm Crops I and II.

Laboratory.—Actual practice in grading samples, determining dockage, and studying the kinds of damage in commercial grains, with relation to their effect on market value.

Department of Veterinary Medicine

Professor SCHOENLEBER
Assistant Professor STOUDER
Assistant Professor GOSS
Assistant Professor BURT
Assistant Professor DYKSTRA
Instructor ROGERS
Assistant KUBIN
Assistant BARBER
Assistant GINGERY

The Department of Veterinary Medicine gives most of the technical work in the course in veterinary medicine, a general description of which is given elsewhere. The department is housed in the Veterinary Building, which was erected at a cost of over $60,000 and is thoroughly equipped throughout. It contains modern class rooms, and its laboratories possess the necessary appliances for illustrating the several subjects required. The mode of instruction is more specifically detailed in succeeding sections.

The courses in anatomy require several lecture rooms, which contain models, skeletons, and bones of all kinds, and a thoroughly sanitary dissecting room, equipped with all of the latest materials necessary to give a course in anatomy second to none on the continent. The dissecting materials are provided by the department without charge.

For work in histology and pathology the department has excellent facilities. It has over thirty compound microscopes, equipped with both high and low powers, and several oil immersion objectives, microtomes, the best reflectoscope and projectoscope obtainable, and a large assortment of histological and pathological slides, materials, and specimens for use in demonstration work in class and laboratory.

The equipment for instruction in physiology is ample to give the student a thoroughly comprehensive laboratory course.

For a study of materia medica and pharmacy, there is a general pharmacy laboratory, containing all the drugs used in the practice of veterinary medicine, and a practicing pharmacy, where medicines are compounded for the every-day practice connected with the College.

For instruction in surgery and clinic the equipment is excellent. The surgical amphitheater, an annex to the main Veterinary Building, seats over three hundred people, and is equipped with every modern appliance for performing before the classes the most delicate operations upon both large and small animals. The hospital has a capacity of about thirty animals, and is nearly always filled with patients, giving ample material as well for the study of internal medicine. The outclinic furnishes several thousand cases yearly, giving the student opportunity to become familiar with the diseases and their treatment, under the guidance of proficient practitioners.

The policy adhered to in the instruction in all the depart-

ments is that the science of veterinary medicine is the foundation, and the art merely supplementary. A thorough drill is given in the foundation studies, while later in the course the practical application of these principles is made in actual field work. This method results in a thoroughly scientific veterinary education.

COURSES IN ANATOMY

A few years ago there was inaugurated an entirely new method of anatomical instruction, hitherto untried in any school of human or veterinary medicine, and its success was so marked that it has become a permanent feature of the teaching of the department. This method rests upon a zoölogical basis. Anatomy I, including dissection, takes up the bones of the trunk, *i. e.*, the vertebræ, ribs, sternum, and pelvis. The ligaments which hold these bones together are next considered, and are followed immediately by a study of the muscles of the trunk, which inclose the abdominal and thoracic cavities. The student is now ready to fill in and locate properly, and to study thoroughly, the important organs in these two body cavities. This work is immediately followed by the study of the blood supply of these organs, and this in turn by the study of the nerve supply controlling them, including that of the spinal cord—the vessels and nerves being carried to their point of exit from the trunk.

After the completion of Anatomy I of this course, the student has actually seen and dissected every essential organ in its gross anatomy, and to some extent in its microscopic.

He is now thoroughly prepared for the study of histology, after which follows physiology, or the functional study of organs, and the detail of their cell structure.

The limbs, the main functions of which are locomotion, are, together with the head and neck, usually in need of surgical rather than of medicinal treatment in veterinary practice. The practitioner, therefore, requires an extremely accurate knowledge of these parts, and when this anatomical study is brought closer in point of time to the study of surgery concerned, its practical application emphasizes the essential facts most effectively. By mutual consent, the dissection by one class occurs every morning at seven o'clock, thus giving higher classmen who desire to specialize in anatomy an opportunity to review, and to demonstrate by working with and by assisting the under classmen.

Before actually dissecting the ligaments and muscles of any part, the student is required to study them upon a mounted skeleton, thus ascertaining the exact points at which they attach to the bones. He then goes over the same muscles on the Azoux model, afterwards dissecting them and proving the facts already learned, thereby acquiring a perfect mental picture of the animal body.

In Anatomy I, II, III, and IV, each student is required to pass one perfect examination upon the origins and insertions of all the equine muscles of the part dissected, and he is marked, not upon the degree of perfection of the examination, but upon whether perfection was accomplished in the first, second, third, or fourth trial. He must also give a satisfactory tree outline of the circulatory and nervous systems, showing their distribution and branches, and their relationships. A satisfactory knowledge of the nerve supply of each muscle and each cutaneous area is required.

In the winter term of the freshman year the class is divided into two equal sections, one half studying the anterior limb, in Anatomy II, and the other half studying the posterior limb, in Anatomy III, while the reverse arrangement is followed in the spring term.

The dissecting room is situated in the basement of the Veterinary Building, and possesses the best of sanitary and other equipment. The instruction in the class room consists of quizzes, recitations, special dissections of the part under discussion, and study of an Azoux model of the horse. Mounted skeletons and limbs and loose bones are abundant in the museum.

The subjects for dissection are preserved by the injection of a formaldehyde solution, followed by a red starch solution that hardens within and fills the arteries. The veins are also injected, but with a bluish medium. The subjects are further preserved by immersion in a large concrete tank containing 15,000 pounds of solution specially prepared for this purpose. McFadyean's *Osteology and Anatomy of the Horse* is required in Anatomy I, II, III, and IV; Sisson's *Veterinary Anatomy* is required in addition in Anatomy V and VI, but those students who can afford it are urged to purchase both at the beginning of the course.

1. **Anatomy I.** Freshman year, fall term. Class work, one hour; dissection, ten hours. Six credits. Required in the course in veterinary medicine.

The course consists of supplemental lectures, demonstrations, and quizzes upon the bones, ligaments, and muscles; splanchnology, angiology and neurology of the trunk, including the introductory work to each of these divisions of systematic anatomy. Textbook, *Osteology and Anatomy of the Horse,* by McFadyean.

2. **Anatomy II.** Freshman year, winter or spring term. Class work, one hour; dissection, six hours. Four credits. Required in the course in veterinary medicine.

This comprises a review of Anatomy I, and lectures, demonstrations and quizzes upon the bones, ligaments, myology, neurology and angiology of the anterior limb, including the foot, with the exception of the digital vessels.

Dissection.—The course includes a laboratory study of the bones and a dissection of the ligaments, muscles, vessels, and nerves of the anterior limb.

3. **Anatomy III.** Freshman year, winter or spring term. Class work, one hour; dissection, six hours. Four credits. Required in the course in veterinary medicine.

Both the class work and the dissection deal with the posterior limb in a manner exactly similar to the method employed in Anatomy II, but include the study of the circulation of the foot.

4. **Anatomy IV.** Sophomore year, fall term. Class work, one hour; dissection, six hours. Four credits. Required in the course in veterinary medicine.

The course deals first with the osteology, then with the musculature of the head and neck, after which are considered the angiology and the neurology of these parts, including the brain.

Dissection.—The course includes a very thorough laboratory study of the bones of the head, collectively and individually, special reference being given to the teeth, sinuses, cavities, and foramina. The cephalic muscles, the pharynx, the guttural pouches, the ear, the eye, and the tongue are then dissected, together with the brain.

5. **Anatomy V.** Sophomore year, winter term. Class work, one hour; dissection, six hours. Four credits. Required in the course in veterinary medicine.

A correlative review of the entire subject is given, taking successively the bones, the ligaments, the muscles, the viscera, the blood vessels, and the nerves in their entirety, and in the order here specified. The locomotor, respiratory, digestive, urinary, and reproductive systems are then dealt with in such a manner as to build up a mental image of each structure in the student's mind.

Dissection.—In the dissection room each division of systematic anatomy is taken up as a whole, the full treatment, each subject for dissection being preceded by regional and flap dissections of the principal operative areas, and by the isolation of the structures to be operated upon. The work also includes a mapping out in crayon of the important structures beneath the skin of a dark-colored horse. Textbook, *Veterinary Anatomy,* by Sisson.

6. **Anatomy VI.** Sophomore year, spring term. Class work, one hour; dissection, four hours. Three credits. Required in the course in veterinary medicine.

This course consists of a comparative study, accompanied by work in dissection, of the principal structural differences in the ox, sheep, hog, dog, and chicken, upon the basis of the

facts learned concerning the horse in Anatomy I, II, III, IV, and V.

7. **General Anatomy I.** Junior year, fall term. Class work, one hour; laboratory, six hours. Four credits. Required in the courses in animal husbandry and dairy husbandry.

The course is intended to give the agricultural students a general idea of the anatomy of domestic farm animals; to aid them in understanding conformation by means of the study and dissection of the structures beneath the skin, and at the same time in observing the muscles of locomotion and speed, of the muscles of draught, and the various levers of the locomotory apparatus. The members of the class study the foot thoroughly, so as to understand shoeing; the digestive organs, so as to understand thoroughly the physiologico-anatomical phases of digestion and nutrition. Textbook, *Osteology and Anatomy of the Horse,* by McFadyean.

Laboratory.—This consists of a study of the principal bones, and a dissection of the muscles and other important structures of each limb, and an observational study of demonstrations on prodissected abdominal and thoracic organs.

8. **General Anatomy II.** Junior year, winter term. Class work, two hours; laboratory, four hours. Four credits. Required in the course in animal husbandry.

This is a continuation of General Anatomy I, but is taken up from a more practical standpoint, the parts dissected during the previous term being specifically studied, and considered with reference to the living animal. Special attention is given to variations, particularly as they concern unsoundnesses and relate to special purposes. Textbook, *Exterior of the Horse,* by Gabouix and Barrier.

Laboratory.—This comprises a careful examination of the Azoux model and of the living horse, with frequent visits to the dissection room for comparison.

COURSES IN HISTOLOGY

Lectures and recitations cover the work which is done in the laboratory. During the lectures the projectoscope is used to illustrate the tissues studied. It is essential that the student obtain a thorough knowledge of the manipulation of the microscope; of the microscopical structure of the normal animal tissues; and of the methods of fixing, embedding, sectioning, staining, and mounting tissues. This work gives the foundation for the study of pathological histology. Each student must prepare a full set of slides, from which he makes high- and low-power drawings, all of which will be of value for future use.

9. **Histology I.** Freshman year, winter term. Class work, three hours; laboratory, six hours. Six credits. Required in the course in veterinary medicine; elective in the course in general science.

The first part of the term is spent upon the care and manipulation of the microscope, in the use of which the student must become proficient. This is followed by a microscopical examination of cotton, woolen, silk, and linen fiber, bubbles of air, and drops of oil, to enable the student to recognize these when they are accidentally mounted with the tissue. The fundamental tissues are next studied: epithelial tissue with regard to form, structure, arrangement, and location; connective tissue with regard to structure and location, including bone development and teeth and their development; muscular tissue—voluntary, involuntary, and cardiac; nerve tissue, the structure and forms of its cells, of medullated and non-medullated nerve fibers; spinal cord; the blood vessels, heart, and lymphatic vessels. Blood and its corpuscles are studied with regard to size, shape, and structure of these, including each kind of the white corpuscles. There are taken up also the detection of blood by the examination for hæmin crystals, and finally blood-forming organs, as bone marrow, lymph glands, and spleen. The histology of the digestive tract is next studied, beginning with the mouth, the tongue, and the taste buds; and taking up the parotid, the submaxillary and sublingual, the thyroid and thymus glands, and the pharynx. In this term the student studies and mounts seventy-five slides, some of which are teased, and many of which are sectioned in paraffin and celloidin. Textbook, *Histology,* by Stohr. Prerequisite: Anatomy I.

10. **Histology II.** Freshman year, spring term. Class work, one hour; laboratory, two hours. Two credits. Required in the course in veterinary medicine; elective in the course in general science.

This is a continuation of Histology I, beginning with the esophagus, the stomachs of the dog, the horse, and the ox, the small intestines—duodenum, jejunum, and ileum; the large intestines—cæcum, colon, rectum, and anus. During this term the student stains, mounts, studies with the microscope, and makes drawings of the above-mentioned tissues, which comprise twenty-five slides, some of which are sectioned in paraffin, the remainder in celloidin. Some of the tissues studied are injected with gelatin mass to bring out the blood vessels. Textbook, *Histology,* by Stohr.

11. **Histology III.** Sophomore year, fall term. Class work, two hours; laboratory, four hours. Four credits. Required in the course in veterinary medicine; elective in the course in general science.

This is a continuation of Histology II, and includes the mi-

croscopic study of the liver; the pancreas; the respiratory tract—nasal mucous membrane, larynx, trachea, lungs, and bronchi; the urinary organs—kidney, ureter, bladder, urethra; the male and the female genital organs; the skin and its appendages; the suprarenal gland; the medulla; the cerebellum; the cerebrum; the eye; and the ear—a course which comprises the preparation of 30 slides. Textbook, *Histology,* by Stohr.

COURSES IN PHYSIOLOGY

The subject of physiology is divided into human physiology, comparative physiology, and animal physiology.

12. **Comparative Physiology I.** Sophomore year, fall term. Class work, two hours. Two credits. Required in the course in veterinary medicine; elective in the course in general science.

The course treats of the physiology of the domestic animals, beginning with the study of the blood, heart, blood vessels, ductless glands and internal secretions, respirations, and digestion. Textbook, *Veterinary Physiology,* by Fred Smith. Prerequisites: Anatomy I; Chemistry I, II, and III; Histology I and II.

13. **Comparative Physiology II.** Sophomore year, winter term. Class work, four hours; laboratory, four hours. Six credits. Required in the course in veterinary medicine; elective in the course in general science.

The work of this term is a continuation of Comparative Physiology I, and treats of the liver, pancreas, and absorption; the chemical constituents of the body; the skin; the urine, nutrition, animal heat, the muscular and nervous systems. Textbook, *Veterinary Physiology,* by Fred Smith.

Laboratory.—The laboratory work consists of a practical application of the knowledge derived in the lecture room. The saliva, gastric juice, bile, and pancreatic juice, and their digestive actions, are studied in detail. The composition and properties of blood, and the chemical, microscopic, and spectroscopic methods of studying blood are considered.

14. **Comparative Physiology III.** Sophomore year, spring term. Class work, two hours; laboratory, four hours. Four credits. Required in the course in veterinary medicine; elective in the course in general science.

The work of this term, which concludes the course in comparative physiology, embraces the study of the special senses, the locomotor apparatus, the foot; generation and development, growth and decay. Textbook, Smith's *Veterinary Physiology.*

Laboratory.—The laboratory work consists of the examination of normal urine. The tests for the detection of abnormal constituents, such as bile, blood, albumen, sugar, etc., are applied to normal and also to pathological urine. Microscopic

examinations are made for casts, blood, deposits, etc. The phenomena associated with the respiratory, muscular, and nervous systems are studied, and graphic records are made.

15. **Human Physiology.** Sophomore year, spring term, and junior year, fall or spring term. Class work, four hours. Four credits. Required in the courses in printing and home economics, and in options in the course in industrial journalism; elective in the course in general science.

The instruction consists of a study of the composition of the bones, blood, lymph, and all the secretions of the body, with their respective functions. The functions of the tissues and glands, the structure and functions of the digestive tract, of the respiratory tract, of the skin, of the nervous system, and of the organs of special sense are all considered. The lecture room is equipped with skeletons, papier-maché manikins, and models of the eye, ear, etc. Practical demonstrations relative to the subject under discussion are made as often as is practicable. Textbook, *Human Physiology*, by Thornton. Prerequisites: Chemistry I, II, and III.

16. **Animal Physiology.** Junior year, spring term. Class work, three hours; laboratory, two hours. Four credits. Required in the courses in animal husbandry and dairy husbandry.

This course embraces the study of the chemical constituents of the body. The composition and functions of the blood; the functions of the liver, the pancreas, and the other glands that assist in digestion, in absorption, in nutrition, and the production of animal heat; the locomotor apparatus, generation, and development are fully discussed. Textbook, *Veterinary Physiology*, by Fred Smith. Prerequisites: Chemistry I, II, and III, and General Anatomy I.

Laboratory.—In the laboratory the student obtains a practical knowledge of the subjects discussed in the class. The laboratory is well equipped with skeletons, models, microscopes, and other apparatus necessary for the work. The composition of saliva, gastric juice, pancreatic juice, and other digestive secretions, and their digestive actions, are studied. In order that the student may more fully understand the functions of the various organs, a study is further made of their microscopic structure.

COURSES IN PATHOLOGY

17. **Pathology I.** Sophomore year, spring term. Class work, four hours. Four credits. Required in the course in veterinary medicine; elective in the course in general science.

This course in general pathology treats of the history of pathology, predisposition, immunity, congenital and inherited disease; the causes, course, and termination of disease; of circulatory disturbances—cardiac difficulties, hyperæmia, hemorrhage, dropsy, œdema, thrombosis, embolism, and alteration

of the blood; of disturbances in metabolism—fever, necrosis, atrophy, cloudy swelling, fatty changes, calcification and concrement formation; and of the process of repair, of new formations, and of functional disturbances. Textbook, *Comparative General Pathology,* by Kitt. Prerequisites: Histology, Physiology, and Bacteriology I.

18. **Pathology II.** Junior year, fall term. Class work, two hours; laboratory, four hours. Four credits. Required in the course in veterinary medicine; elective in the course in general science.

This course is devoted to pathological technique; collecting, fixing, hardening, embedding in celloidin and paraffin; sectioning of fresh, frozen, and embedded tissues, and the methods of preserving gross specimens. Considerable time is devoted to stains and methods of staining. This is followed by special pathology, which includes the macroscopic and microscopic examination of the following tissues in all of the pathological conditions to which they are subject: cardiac muscle, skeletal muscle, the liver, the kidney, the bladder, and the pancreas. The students stain, mount, study, and make drawings of the above-mentioned tissues. Textbook, *Pathological Histology,* by Gaylord and Aschoff.

19. **Pathology III.** Junior year, winter term. Class work, two hours; laboratory, four hours. Four credits. Required in the course in veterinary medicine; elective in the course in general science.

This is a continuation of Pathology II, beginning with the study of the pathological conditions to which the following tissues are subject: the lungs, the mucous membranes, the serous membranes, the vascular system, lymph nodes, the spleen, and bone.

20. **Pathology IV.** Junior year, spring term. Class work, two hours; laboratory, four hours. Four credits. Required in the course in veterinary medicine; elective in the course in general science.

This is a continuation of Pathology III, taking up the study of the pathological conditions of the skin, the nervous system, the male and female genital organs, and the pathological histology of infectious diseases, tumors, and the blood. Textbook, *Pathology of Infectious Diseases,* by Moore.

COURSES IN MATERIA MEDICA AND PHARMACY.

21. **Pharmacy.** Sophomore year, spring term. Laboratory, two hours. One credit. Required in the course in veterinary medicine.

This is principally a laboratory course, in which the student is taught pharmaceutical processes, official preparations and how to prepare them, and the nonofficial preparations used in

veterinary practice. Chemical, physical and physiological incompatibilities are demonstrated in the laboratory and hospital. Thorough drill in the principles of prescription writing, and a study of tables of weights and measures and their relations, are given. Students are required to make tinctures, liquors, blisters, liniments, plasters, compounds, etc., which are used in the College practice. The United States Pharmacopœia is used as a guide.

22. **Materia Medica I.** Junior year, fall term. Class work, four hours. Four credits. Required in the course in veterinary medicine.

The student is taught the terms employed in the science, and the mode of action of drugs and their method of administration. The comparative action of drugs on different animals receives much attention. The inorganic drugs are studied during this term by means of lectures and demonstrations.

23. **Materia Medica II.** Junior year, winter term. Class work, four hours. Four credits. Required in the course in veterinary medicine.

A continuation of Materia Medica I, dealing principally with the organic drugs used in veterinary medicine. Much attention is paid to the source and the character of the drugs, and to the indications for them, and excellent facilities are afforded the student for noting the action of these drugs in the hospital, where ample opportunity occasions the use of practically all drugs studied. Textbook, *Veterinary Materia Medica and Therapeutics,* by Winslow.

COURSES IN SURGERY

The courses in surgery, which continue throughout the junior and senior years, are taught by lectures and recitations, together with an abundance of laboratory work furnished by the live stock on the College farm, the free clinic, and the outpractice. By performing operations on the cases presented, under the direction of the professor in charge, all senior students are given opportunity to put into practice the principles taught in the lecture room. A commodious modern operating amphitheater, equipped with every appliance and instrument for up-to-date aseptic surgery, is in use. The hospital is furnished with single and box stalls, a soak tank, stocks, and medicine room, and is ample to care for convalescent patients. Much attention is given to perfecting methods of technique which will insure asepsis during operations and facilitate recovery. The daily dressing of cases operated upon gives the student opportunity for studying the methods of repair and the growth of tissues after injury.

24. **Surgery I.** Junior year, fall term. Class work, one hour; laboratory, two hours. Two credits. Required in the course in veterinary medicine.

This course is an introduction to general surgery. Apparatus used in surgery, and methods of restraint, are studied, together with their practical application. The use of anesthetics and of antiseptics, and the general principles in closing wounds, controlling hemorrhage, bandaging, massage, etc., are here discussed. Textbook, Fleming's *Operative Veterinary Surgery,* part I.

25. **Surgery II.** Junior year, winter term. Class work, two hours; laboratory, four hours. Four credits. Required in the course in veterinary medicine.

During this term the causes, symptoms and treatment of the surgical diseases of the head and neck, the salivary glands, the guttural pouches, the larynx and the trachea are given especial attention. Textbook, *Regional Veterinary Surgery,* by Möller and Dollar.

26. **Surgery III.** Junior year, spring term. Class work, one hour; laboratory, two hours. Two credits. Required in the course in veterinary medicine.

This course is devoted principally to the structure of the teeth and their growth and replacement, their diseases and irregularities, and how to treat them. The clinic and outpractice furnish a large number of cases to illustrate floating, cutting, extraction, repulsion, and trephining. Textbook, Merillat's *Veterinary Surgery,* volume I.

27. **Surgery IV.** Senior year, fall term. Class work, four hours. Four credits. Required in the course in veterinary medicine.

A continuation of Surgery II and III, giving especial attention to the surgical diseases of the abdomen, limbs and feet, and their relief. The course is taught by lectures and laboratory practice.

28. **Surgery V.** Senior year, winter term. Class work, four hours. Four credits. Required in the course in veterinary medicine.

This course deals with the shoeing of horses, the relation of the foot to the limb, the functions of the foot, lameness, and the shoeing of normal and diseased feet. The subject is taught by lectures and laboratory work. Textbook, Dollar's *Handbook of Horseshoeing.*

29. **Surgery VI.** Senior year, spring term. Laboratory, eight hours. Four credits. Required in the course in veterinary medicine.

Here is given a general review of all of the above courses in surgery, conducted by having each student operate upon the living animal and upon the cadaver, performing all of the operations which are ever called for in the relief of disease. This is a very comprehensive course, with reviews, by quizzes and practice, of the subjects of anatomy, dissection, and sur-

gery. Each student should provide himself with a set of surgical instruments for this work. These may be further used in his practice after leaving College. Textbook, Williams' *Surgical and Obstetrical Operations.*

30. **Clinic.** Junior and senior years, one to six hours daily. This course is conducted as is other laboratory work. Free clinics are held daily, and the surrounding country, containing a vast amount of live stock of all species, furnishes ample material for the work. Each case presented at the hospital is recorded, its history taken, and the animal assigned to a senior student. Lectures and demonstrations are given on such cases to the entire class, and a quiz is held. Students are required to diagnose and prognose the case, as well as prescribe treatment, which latter is discussed, and corrected as needed by the professor in charge. Daily, and if necessary hourly, attention is given to the patient by the student to whom it has been assigned. The College has a large out-clinic, comprising calls into the surrounding country and towns, and students are always taken to see the cases and to become accustomed, in a practical way, to performing work outside the hospital, and to meeting clients in a professional capacity. Arrangements with the local practitioner for a student to accompany him on all calls, insures the students' becoming acquainted with absolutely all cases presented for treatment in this vicinity. Good train service gives the classes excellent opportunity to visit practitioners in neighboring towns when cases of especial interest are presented. Blanks for the recording of case history, diagnosis, treatment and results constitute the note-book for this laboratory.

COURSES IN MEDICINE

A study of internal medicine begins with the winter term of the junior year, after the student has acquired a thorough knowledge of the foundation studies—anatomy, physiology, histology, pathology, bacteriology, and materia medica—and extends throughout the remainder of the course. The subject is taught by lectures and recitations, supplemented by the study of special cases as they are found in the College practice. Here, and in the regular clinic, the student becomes thoroughly conversant with the causes, symptoms, diagnosis, treatment and prognosis of disease.

31. **Medicine I.** Junior year, winter term. Class work, four hours. Four credits. Required in the course in veterinary medicine.

The diseases of the respiratory and circulatory systems are thoroughly studied during this session.

32. **Medicine II.** Junior year, spring term. Class work, four hours. Four credits. Required in the course in veterinary medicine.

The work of this term is devoted to the study of the diseases of the organs of digestion. Especial stress is laid upon the different forms of indigestion and colics, their causes, differential diagnosis and treatment.

33. **Medicine III.** Senior year, fall term. Class work, four hours. Four credits. Required in the course in veterinary medicine.

A thorough discussion of the diseases of the urinary and generative organs, the skin, the eye, and the nervous systems occupies most of the student's time during this session.

34. **Infectious Diseases.** Senior year, winter term. Class work, four hours. Four credits. Required in the course in veterinary medicine.

This course includes the study of infectious diseases, of sanitary science, and of police. The methods of diagnosis, control and eradication of disease, and the laws governing general and special contagious diseases, are exhaustively discussed.

35. **Obstetrics.** Senior year, winter term. Class work, three hours; laboratory, as cases present themselves, an equivalent of two hours per week. Four credits. Required in the course in veterinary medicine.

This course considers fully obstetrical anatomy, physiology, and pathology. All of the physiological functions, as well as the diseases and accidents of gestation and parturition, are considered. The diseases of the young are thoroughly discussed. The lecture room is equipped with skeletons and models of the horse and other domestic animals, as well as charts and reference books bearing on the subject.

Laboratory.—The laboratory work is conducted in the hospital and at the locations of cases as they are presented throughout the surrounding country in the out-clinic. Textbook, *Veterinary Obstetrics,* by Fleming.

36. **Medicine IV.** Senior year, spring term. Class work, four hours. Four credits. Required in the course in veterinary medicine.

This session's work consists of a general review of the whole subject of internal medicine, with especial reference to differential diagnosis and therapeutics.

37. **Meat Inspection.** Senior year, spring term. Class work, three hours. Three credits. Required in the course in veterinary medicine.

The course in meat inspection is designed to prepare experts for national, state and local sanitary work, which is being more strongly urged and demanded every day. The kinds and classes of stock, the traffic and transportation of animals, their inspection before death, their slaughter, the normal conditions of healthful animals, the diseases discernible at the time of slaughter, the disposition of the condemned from hygienic and

sanitary standpoints, and different preparations and methods of preparation, adulterations, sanitary laws and regulations, and all other points bearing upon the question of healthful meat production, are considered. Several members of the Faculty have had practical experience in the federal inspection service, and one of these teaches the subject in a practical way. Visits are made to the local slaughtering establishments, and to the large packing plants in Topeka, Kansas City, or Wichita. Textbook, Edelman's *Meat Hygiene,* translated by Mohler and Eichorn.

38. **Diseases of Farm Animals, and Obstetrics.** Senior year, spring term. Class work, four hours. Four credits. Required in the courses in animal husbandry and dairy husbandry.

This course is devoted to the study of the common diseases of farm animals and to obstetrics. The subjects discussed include wounds and their treatment, examining farm animals for disease, the diagnosis and treatment of disease, the causes and treatment of contagious diseases. Sanitary and other measures necessary for their eradication and prevention are also studied. The instruction in obstetrics embraces a comparison of the soft and bony structures of the pelvis in the different animals, the comparison being made with reference to normal and difficult parturition. The causes of sterility are discussed, and the necessary remedies suggested. Attention is given to the accidents and diseases incidental to normal and difficult parturition. The diseases following parturition and the diseases affecting the offspring are also dealt with. Textbook, *The Farmer's Veterinarian,* by Burkett. Prerequisites: General Anatomy I and Animal Physiology.

Short Winter Courses in Agriculture and Dairying

The Agricultural College offers primarily four-year courses in agriculture, which give the student a fundamental training in the sciences relating to agriculture, and their application to the production of crops and stock and to farming in general. Such a course not only equips a man to become a successful farmer, but makes of him a better citizen, and a leader in the broader duties of life.

Not all young men who choose to farm have the time or the means to spend the necessary four years in getting a college training. For such who are eighteen years of age or older, the Agricultural College offers a short, practical course in agriculture and dairying, given in two terms. The entire time of the student is occupied in learning how to do the various things which are necessary for the production of good crops and good stock, and for the business management of the farm. The

subjects taught in such a course cover as much as can be given in the time, and are made intensely practical in presentation. The student is taught *why* and *how* to do the various farm operations.

DESCRIPTION OF SHORT COURSES

AGRICULTURE AND DAIRYING

The student may select either agriculture or dairying, or a combination of the two, as may best suit his individual needs. All students are required to take crop production, live-stock production, poultry, and woodwork the first year, and breeding and feeding of live stock, live-stock sanitation, agricultural botany, soil physics, and blacksmithing the second year. Other subjects offered are elective, enough being taken to make up a full course of fifteen hours of class work and twenty-eight hours of laboratory work a week.

The work in crop production and live-stock production gives a knowledge of these subjects in a very practical way. The student who has not taken scientific work is not able to study them from the standpoint of one trained in chemistry, physics, zoölogy, etc., but he can get from his study in class and laboratory the art of doing these things properly. The same is true of dairying and horticulture. The farmer needs to know how to select stock and crops that will be best adapted to his environment, and the short courses train him to do this. He needs to know how to prepare his soil for the reception of the seed; or so to manage his feed as to make the greatest gains in feeding his live stock. These things are taught successfully to short-course students.

Farm mechanics, as it relates to general farming or dairying and to practice in woodwork, is taught in such a way as to make the student capable of handling tools and machinery with proper skill.

The students who return for the second winter's work are given more advanced work along the same lines that were studied the first year.

The problems of breeding and feeding, diseases of live stock, soil and crop management, and the building up of pure-bred herds, are studied from the standpoint of the purchaser, breeder, or farmer.

Farmers' Short Course

The Arabic numeral following the name of a subject indicates the number of credit units, while the numerals in parentheses indicate the number of hours a week of recitation and of laboratory, respectively.

FIRST YEAR.	SECOND YEAR.	SECOND YEAR (CONT'D).
Crop Production 6 (4-4)	Animal Breeding 3 (3-0)	Dairying II 4 (4-0) *or*
Live Stock Market Classes 3 (1-4)	Breeds 3 (1-4)	Horticulture 3 (3-0)
Live Stock Feeding 3 (3-0)	Farm Management 2 (2-0)	Meats 1 (0-2)
Horticulture and Forestry 6 (4-4) *or*	Live Stock Sanitation 3 (3-0)	Farm Insects 2 (2-0)
Dairying I 6 (4-4)	Crop Improvement 5 (3-4)	Blacksmithing 2 (0-4)
Farm Mechanics 1 (0-2)	Agricultural Botany 2 (0-4)	Dairy Stock Judging 2 (0-4) *or*
Poultry 1 (0-2)	Soils 2 (0-4)	Horticulture Lab. 2 (0-4)
Woodwork 2 (0-4)		

CREAMERY COURSE

This course is offered for young men who wish to become butter- or cheese-makers or handlers of market milk and ice cream. It is a technical course, offered to those who have had experience in creamery or other dairy work, or to those who have taken the dairy farming course. Certificates are issued to students who have completed the course in a satisfactory manner and have a report of six months' successful work in a factory. The subjects taught are as follows:

Creamery Management 4 (4-0)	Dairy Mechanics and Refrigeration 4 (2-4)
Creamery Butter Making 6 (2-8)	Judging Dairy Products 4 (4-0)
Cheese and Ice-Cream Making 4 (1-6)	Dairying 6 (4-4)

SUBJECTS TAUGHT IN THE SHORT COURSES

AGRONOMY

1. **Crop Production.** Class work, four hours; laboratory, four hours. Six credits. Required in the first year of the farmers' short course. In this course such questions as time, depth, and manner of plowing; seed-bed preparation; time, rate, and method of seeding the various crops; crop rotation and cultivation, and farm soils are taken up in turn and discussed in a practical way.

Laboratory.—Special attention is given to the grain crops grown in this State. Various types of different varieties of corn, wheat, oats, etc., are available for comparative study. The student has the opportunity to handle and examine specimens of the common crops of this State—the best possible method for becoming familiar with the different plants.

2. **Farm Mechanics.** Laboratory, two hours. One credit. Required in the first year of the farmers' short course. This is a new, but very important line of work. There is probably a greater waste on farms from lack of knowledge of the kind of machinery to use, and of the way to care for it, than from any other cause. Mechanics in some form is required in practically every operation performed on the farm. The purpose of this course is to acquaint the student with the important improvements in farm machinery and to give him a general idea of the proper care, adjustment, and use of all farm equipments, as well as a general idea of the factors concerned in the construction of farm buildings, etc. This work is given in the form of illustrated lectures and laboratory demonstrations.

3. **Crop Improvement.** Class work, three hours; laboratory, four hours. Five credits. Required in the second year of the short course. The object of this course is to present practical, up-to-date, and approved methods of improving farm crops. Such questions as seed selection, crop adaptation, and crop rotation are presented and discussed in a practical manner.

4. **Soils.** Laboratory, four hours. Two credits. Required in the second year of the short course. This course consists of a study of methods of handling soils; it teaches how to prepare a suitable seed-bed, how to conserve moisture, and how to maintain fertility. A part of the period is used for lectures and demonstration.

5. **Farm Management.** Class work, two hours. Two credits. Required in the second year of the farmers' short course. The object of this course is to assist the student in applying to the management of a farm the information gained from his studies in the various agricultural courses. The work in animal husbandry, dairying, horticulture, agronomy, and other lines is correlated and placed on a practicable, workable basis, with all nonessential features eliminated. The farm layout is studied with especial reference to the character of the soil, its adaptation to certain kinds of crops and types of farming; the location of the buildings, their adaptation to types of farming; the proper distribution of capital among land, buildings, live stock, farm machinery, etc.; the division of the farm into fields of the proper size and shape for economical working; the planning and utilization of crops in rotation with one another; the relation of live stock to the maintenance of soil fertility; the proper adjustment of labor, teams, machinery, etc., to the farming area; and the growing of the right kind of crops in the proper proportion on farms of different types.

HORTICULTURE

1. **Horticulture and Forestry.** Class work, four hours; laboratory, four hours. Six credits. Optional with Dairying I in the first year of the short course. Lectures on the principles

upon which successful work in gardening and fruit growing depend. Here is given a discussion of the preparation of the soil, the use of fertilizers, the propagation and manipulation of plants, and the gathering and marketing of garden and orchard products. The twelve lectures on forestry here included cover in detail the formation of windbreaks and farm wood-lots, discuss the trees suitable for planting in the different parts of the State, and describe methods of planting and the care and cultivation required for securing successful growth.

Laboratory.—Two periods are used in investigating plant propagation, plant training, and plant protection. The other two periods are spent in inspecting the forest nursery and timber plantations.

2. **Horticulture.** Class work, three hours. Three credits. Optional with Dairying II in the second year of the short course. The work of this course is somewhat similar to the horticultural work described in the preceding course. A short discussion of the landscape principles and materials concerned in the improvement of farm properties is included.

3. **Horticulture Laboratory.** Four hours. Two credits. Optional with Dairy Stock Judging in the second year of the short course. A study of orchard sites, and of grades of nursery stock and its care; tests of orchard tools, of fuels and heaters for frost protection; of orchard sanitation, fruit picking, packing, judging, and storage.

ANIMAL HUSBANDRY

1. **Live Stock Market Classes.** Class work, one hour; laboratory, four hours. Three credits. Required in the first year of the short course. One lecture a week on the various market classes of live stock, taking up the study of the various market requirements for producing fat as well as for feeding cattle, the different types and classes of horses, sheep, and hogs. The aim of this work is to make the student familiar with the classifications found in the leading live-stock markets, and to enable him better to judge the various breeds of stock on the farm.

Laboratory.—The principal work is the judging of cattle, sheep, and hogs. The student is first taught the use of the score-card, and after becoming familiar with this is required to use comparison and group judging, the aim being to make him familiar with the best types of horses, to be able to detect an unsoundness, and to select such classes of stock as will give the best returns. During the last two weeks of the course the instruction in stock judging takes up dairy cattle. This is an elementary course in dairy stock judging, and consists of scoring and judging animals by the use of score-cards.

2. **Live Stock Feeding.** Class work, three hours. Three credits. Required in the first year of the short course. This is a study of all the common feedstuffs grown on the average farm, of the use of mill feeds and by-products, of the combinations of feeds that will give the best results, and of the feeds that can be most economically used under various conditions.

3. **Animal Breeding.** Class work, three hours. Three credits. Required in the second year of the short course. This subject is intended to give the student a knowledge of underlying principles and practices which are concerned in the improvement of our domestic animals. A careful study is made of the subject of variation in general. The subject of transmission of characters and the behavior of the various characters in transmission is taken up. The subject also includes correlation, type, and variability. Study is made of Mendel's law of hybrids. Prepotency of animals is studied as an influence in heredity. Practical problems involving the selection of animals and various systems of breeding, such as crossing, hybridizing, grading, line breeding, and inbreeding, are discussed. The student is shown how to maintain and to improve his own flocks and herds by the application of these various fundamental principles of breeding.

4. **Breeds.** Class work, one hour; laboratory, four hours. Three credits. Required in the second year of the short course. A study of the origin and history of the various breeds of domestic animals, of the characteristics of each breed and of their adaptability to various conditions.

Laboratory.—This work consists in the judging of pure-bred classes of stock. The characteristics of each breed, its weaknesses and its strong points, are emphasized, in order that the student may better be able to select his breeding herd. During the last two weeks of the course in breeds of live stock, the principal breeds of dairy cattle are studied, and types of each breed are judged and scored. For those students who elect dairying, or who desire to take more work in judging and studying dairy breeds, a special course is offered. In this course is given the history of breeds, their dairy characteristics, with the study of advanced registry systems and pedigree work with each breed.

5. **Live Stock Sanitation.** Class work, three hours. Three credits. Required in the second year of the short course. This subject deals with diseases that are communicable from animal to animal or from animal to man. The causes, symptoms, and methods that are employed to prevent and to combat the spread of diseases, and the drugs that are commonly used as disinfectants, for washes, dips, etc., are given full consideration. The use of serums, vaccines, etc., for the prevention of diseases is considered. The methods for the disposal of sick and

dead animals, as well as the means employed to clean and to disinfect the premises so as to prevent a recurrence of diseases, are considered.

6. **Meats.** Laboratory, two hours. One credit. Required in the second year of the short course. This is a study of the best methods of killing and curing meats on the farm, and of the proper methods for cutting up the carcass.

DAIRY HUSBANDRY

1. **Dairying I.** Four hours class work, four hours laboratory. Six credits. Required in the first year of the short course and in the creamery course. This is a general course in dairying, and consists of lectures on the secretion, composition, and properties of milk; the effect of the period of lactation; the Babcock test; the farm separator; farm butter making; and dairy sanitation. Lectures describe the handling of milk, feeding the dairy cow, and selecting and breeding the dairy herd.

Laboratory.—The laboratory work in this course consists in the operation of the Babcock test with milk, skimmed milk, cream, etc.; in practice with farm separators; and in farm butter making.

2. **Dairying II.** Four hours class work. Four credits. Optional with Horticulture in the second year of the short course. This course is planned for those students who elect dairying during the second year. Instruction is given in keeping records and accounts of dairy-farm business; in building up a dairy herd; concerning buildings on a dairy farm; silos and silage; on the fertility account of the dairy; on the feeding, care, and management of the dairy herd; on cow-testing associations, the coöperative ownership of dairy sires, and the making of detailed plans for the management of the dairy farm.

3. **Dairy Stock Judging.** Four hours laboratory. Two credits. Optional with Horticulture Laboratory in the second year of the short course. This course deals with judging dairy cattle from the standpoint of breed type. Practice is given in scoring animals with the breed score-cards, with comparative judging of the principal breeds.

4. **Creamery Management.** Four hours class work. Four credits. Required in the creamery course. A study of the location, construction, equipment, and general arrangement of the creamery; the organization of coöperative creameries, etc.; the question of supplies for the creamery markets; the keeping of accounts; the making up of pay rolls and systems of payment; the building up of cream routes; the relation of creamery and buyers to the patrons; the relation of patrons to the creamery.

5. **Creamery Butter Making.** Two hours class work, eight hours laboratory. Six credits. Required in the creamery course. Lectures on the sampling, weighing, and grading of cream and milk; on natural and commercial starters; on the pasteurization of milk and cream; on cream ripening, and the churning, washing, salting, packing, and marketing of butter; on conditions controlling the per cent of moisture in butter, etc.

Laboratory.—Practice in sampling, weighing, and grading milk and cream and in churning, packing, and marketing butter; the study of different makes of churns; the pasteurization of cream and practice with starters.

6. **Cheese and Ice-Cream Making.** One hour class work, six hours laboratory. Four credits. Required in the creamery course. This course deals with the making of cheese on the farm for home use and for sale. All of the common types of cheese are made. The last half of the term is devoted to the study of ice-cream making, including proportion of cream, flavoring, fillers, freezing, packing, and storing ice cream.

Laboratory.—Practice is given in the making of cheese, ice cream, and ices for home use and on a commercial scale. The student judges cheese and prepares cream; flavors, freezes, and packs ice cream.

7. **Dairy Mechanics and Refrigeration.** Two hours class work, four hours laboratory. Four credits. Required in the creamery course. This course deals with the machinery and equipment of creameries, cheese factories, milk stations and ice-cream factories, and with the buildings used for work of this character.

Laboratory.—Practice work in pipe fitting, belt lacing, the adjustment of pulleys, soldering, refrigeration, installation and management of machinery, etc.

8. **Judging Dairy Products.** Four hours laboratory. Two credits. Required in the creamery course. Scoring and judging butter, cheese, milk, and ice cream.

ADDITIONAL COURSES

1. **Poultry.** Two hours laboratory. One credit. Required in the first year of the short course. The first part of the course is devoted to a study of farm poultry. The subjects—breeding, feeding, fattening, and marketing poultry; hatching and rearing chicks; construction of poultry houses; and methods of combating disease—are taken up in detail. The remainder of the time is given to a study of the different breeds from the fancy and from the utility standpoint.

2. **Woodwork.** Four hours shop work. Two credits. Required in the first year of the short course. A graded set of

problems in joinery is given, with opportunity for practice in working to dimensions and in the proper use and care of bench tools. Tool required: a two-foot pocket folding rule.

3. **Blacksmithing.** Four hours shop work. Two credits. Required in the second year of the short course. A course in the forging of iron, designed to teach the operations of drawing, upsetting, welding, twisting, splitting, and punching. A study is made of the construction, care, and management of the forge, with a study of the smelting of iron ore and the manufacturing of iron and steel. Tools required: two-foot rule; one pair of five-inch outside calipers.

4. **Agricultural Botany.** Four hours laboratory. Two credits. Required in the second year of the short course. This is a study of the elements of botany from a practical standpoint. Germination, growth, the nutrition of plants, the absorption and use of water, etc., are demonstrated by means of elementary experiments. The groups of the lower plants are rapidly surveyed, especial attention being paid to the fungi causing plant diseases. Chief attention is given to the botany of the higher plants, notably those most important in agriculture. The economic relations of plants are emphasized throughout, and the practical bearings of plant physiology on agriculture are especially considered. Some time is given to the matter of seed testing, and to the study of elementary methods in plant breeding. Textbook, *Agricultural Botany*, by Perceval.

5. **Farm Insects.** Two hours class work. Two credits. Required in the second year of the short course. In this course the student is familiarized with the recognition marks, life history, and specific means of controlling the most injurious of the insects commonly found on the farm. He is required to prepare plans of actual farming operations on different types of farms whereby insect damage to the crops will be reduced to a minimum or completely eliminated.

COURSE IN TESTING DAIRY PRODUCTS

This course is offered to those who are buying milk or cream and who wish to gain, in a short time, skill and accuracy in the application of the various tests necessary in such work. The State law requires that all persons buying milk or cream by test must pass a satisfactory examination and secure a certificate from the State Dairy Commissioner. This course is designed to meet the needs of those who find they have not sufficient knowledge of the subject to pass such an examination.

In addition to a study of the Babcock test, the student receives lectures on ordinary sanitation, and learns the methods necessary to keep his place of business in a sanitary condition. Exercises are given in grading milk and cream, and in methods

of handling cream so as to keep it in condition until used or delivered at the railway station. This course is offered at different periods throughout the year, dates being announced a few days previous to the opening of each period.

REQUIREMENTS FOR ADMISSION

Students over seventeen years of age are admitted to these courses without examination. Students under seventeen years of age are admitted without examination, provided they present a certificate showing that they have completed the eighth grade in the common-school course, or its equivalent.

All students entering short courses are required to be present at the beginning of the term, and will not be admitted later.

Certificate.—A certificate is granted to students completing the work of the first and second years.

Cost.—The expenses for ten weeks need not exceed $50 to $75, exclusive of railroad fare. A fee of $3 is charged for the term, payable at enrollment. Reference books will cost from $5 to $10. For information write E. H. Webster, Dean of the Division of Agriculture, Kansas State Agricultural College, Manhattan, Kan.

Agriculture in the Summer School

At the present time the greatest hindrance to the general introduction of agriculture into the high schools and grade schools of the State is a lack of properly prepared teachers. In order to give the teachers of the State an opportunity to fit themselves to introduce this subject successfully into their schools, the College offers summer courses in agriculture, in which especial emphasis is laid upon the subject matter and methods adapted to secondary and primary schools.

The work offered consists in part of some of the regular subjects of the College courses, including a thorough study of farm crops, especially corn and small grains, in which growing as well as matured crops are available for laboratory work. Courses are also available in the study of market types and classes of beef cattle, dairy stock, sheep and swine, with extensive practice in stock judging. Instruction is also given in dairying, poultry husbandry, general horticulture, landscape gardening and orcharding. In addition to these subjects from the College courses, special classes are organized to meet the needs of teachers of agriculture in the rural schools, in the high schools and in the lower grades.

A special circular giving details of the summer school may be obtained by application to the President of the College. See, also, article in this catalogue on the Summer School.

Division of Mechanic Arts

The Division of Mechanic Arts includes courses in mechanical engineering, electrical engineering, civil engineering, architecture, and printing, each leading to the degree of bachelor of science in the profession selected.

The work of the freshman year is the same in all courses, except the course in printing; the work of the sophomore year is the same for students of mechanical engineering and electrical engineering, and, with the exception of surveying substituted for shop work, is the same for the course in civil engineering. For the course in architecture the plan of studies for the sophomore year is somewhat further modified.

The course in printing necessarily differs from the others throughout, because the nature of the work for which the young men are trained is far different.

While the courses offered are believed to be sufficient to cover the needs of the average young man, yet it is possible to combine portions of the work of two or more of these courses in such a way that one may be prepared to take up a special line of work for which he desires to fit himself. For example, by substituting certain subjects from the Departments of Chemistry and Geology for some of those in the course in mechanical engineering, a young man can fit himself for work in connection with the manufacture of cement. By substituting some of the subjects in chemistry for others in mechanical engineering, a special preparation can be secured for chemical engineering. By combining some of the subjects of the courses in civil and mechanical engineering and by taking additional work in chemistry and geology, a young man may fit himself for special work in connection with the development of the coal fields throughout the country. By combining work in the courses in architecture and civil engineering, specialization in architectural engineering may be secured. In special cases permission will be granted to combine the work on the lines here indicated.

However, it is believed that the courses as tabulated give the best preparation for students expecting to follow general work in the profession selected, and for those who are not absolutely certain what branch of their profession they will follow. The substitutions and combinations indicated, and others similar to them, will be permitted only when there is good evidence that the student desiring such work is practically certain to follow the branch selected.

In the case of any of these modifications, the degree granted

will be that of the course in which the major portion of the work is taken. In no case will the substitution of an additional amount of technical work for any of the general cultural work in the course be allowed.

COURSE IN MECHANICAL ENGINEERING

The course in mechanical engineering is designed to fit men for positions of authority and responsibility in this profession. It prepares for the successful management and superintendence of factories and power plants; for the design of power and machinery installations; for the design and construction of machine tools, steam and gas engines, compressors, hydraulic machinery, etc.; and for the design and erection of mill and engineering buildings.

The course of study has been laid out with the aim of securing a judicious mixture of theory and practice, such as will not only give the student the technical skill required for engineering operations, but will also give him a broad grasp of the fundamental principles of his profession.

It is not the intention in this course to give the young man training similar to that received in serving an apprenticeship, but rather to instruct him in the technical and theoretical principles upon which the art of mechanical engineering is based, without a thorough knowledge of which a man can not rise to a position of responsibility in this profession. The advantages of combining a practical application of principles with theoretical instruction, while these principles are being impressed upon the student by classroom work, are well known.

The course in shop work, being purely educational in its character, is designed to teach the various methods of doing shop work, the operations that may be performed upon the different machines, and upon what machines certain operations can be performed most economically, as well as to acquaint the student with what may be expected not only from the machines, but from the men operating them. In order to secure this knowledge it is necessary that the student should perform a large variety of operations. To accomplish this result, an appreciable proportion of the course consists of graded exercises. Wherever possible the student also is assigned to work on apparatus and machinery that is being built for use in the engineering or other departments of the College, a large amount of which is constantly under way in the shops.

Each student in the course in mechanical engineering is required to present before graduation a satisfactory thesis that shows the results of original research along engineering lines.

COURSE IN ELECTRICAL ENGINEERING

The essential elements underlying a sound engineering training are based upon a thorough study of mathematics and the physical sciences. The professional work of this course begins in the third year and continues throughout the rest of the course. General culture subjects are offered during the first three years of the course.

Emphasis is placed upon training to deal with forces and matter according to scientific principles, rather than upon the accumulation of facts. The department laboratories are well equipped with the various measuring instruments, standardizing apparatus, and the different types of dynamo machinery. The different subjects are presented in the classroom, and the classroom work is supplemented by laboratory practice. The course provides a liberal training in wood- and iron-working, mechanical drawing, and machine-shop practice. The laboratory experiments selected for the student are designed to give a clear conception of the theoretical work of the classroom.

Students are given extensive practice in connecting up the different types of machines for testing purposes and for standard commercial work. This practice work and testing extends throughout the junior and senior years, and is intended to give the student familiarity with the underlying principles of the different machines, and a knowledge of the care necessary to operate them successfully. Opportunity is also given to undertake the investigation of commercial problems as they are sent to the College from the different central stations of the State.

In connection with the regular work of the classroom and the laboratory, extensive references are given to leading books and to current literature on technical engineering. In connection with the laboratory work a certain amount of library work is required. In the year 1908 a College branch of the American Institute of Electrical Engineers was organized. The branch meets the first Tuesday of each month. At these meetings the instructors meet with the students for the discussion of technical subjects in engineering. Consulting engineers and central-station managers are invited to present papers at these meetings.

COURSE IN CIVIL ENGINEERING

The aim of the course in civil engineering, as outlined in the catalogue, is to give to the young men taking the course the best possible preparation for entering upon the active practice of the profession under present conditions. It will be noted that the first and second years of the course are devoted almost entirely to general culture studies and the sciences, including mathematics. This follows the arrangement generally found in the engineering courses of American colleges. It finds its

justification in the well-nigh universally accepted idea that any engineering education worthy of consideration must be grounded upon ample preliminary education in the allied sciences. In recognition of the mechanical trend of the age, liberal provision is made in the course for class and laboratory work in mechanical and electrical engineering.

Manhattan is located at the junction of the Kansas and Big Blue rivers, so that there are several bridges in the vicinity which serve as examples of practical construction for students of structural engineering. The proximity of the rivers also makes it possible for the students to work on problems of river hydraulics on a practical scale. The topography of the country surrounding the College is particularly favorable to field practice in the various branches of surveying, and as much time as possible is devoted to actual field operations with the common surveying instruments of the engineer.

In view of the growing importance of municipal problems, such as paving, sewerage and water-supply, the course in civil engineering includes a required course in municipal engineering, supplemented by courses in sanitary biology and chemistry.

The work in highway engineering, coming at the end of the senior year, affords time for an unusually thorough course in this subject, which is of such great importance at the present time.

A liberal course in drainage and irrigation engineering is introduced for those who may wish to take up this line of work, which is coming rapidly into prominence.

COURSE IN ARCHITECTURE

The course in architecture at the Kansas State Agricultural College was organized in 1904 to meet an urgent demand for designers and builders, a demand caused by the rapidly increasing wealth of the State, which showed itself in every county by the erection of modern residences, large business blocks, and substantial public buildings. It was manifest that there was a lack of properly trained architects and contractors, while there was not a technical institution within several hundred miles of Manhattan that had made provision for the study of architecture and its basic sciences. The first class of students graduated from the newly organized course in 1905, and since that year there have been a number of graduates every spring, while many more have taken partial courses.

The freshman year of the course in architecture is identical with that of the other courses of the division of mechanic arts. The other three years are devoted to the study of pure and applied mathematics, mechanics, physics, history of architecture, municipal improvements, modern steel and cement construction, landscape architecture, and especially to the study of

drawing and drafting. The course aims to develop the creative powers of the student in the fields of original composition. From ten to sixteen hours per week, for the last three years of the course, are given to work of this kind over the drawing table. During the summer months the student is expected to work at one of the building trades in order to study the "anatomy" of building structures.

The College is well equipped for the maintenance of a course in architecture. Its mechanical workshops are the most extensive west of the Missouri river; its science laboratories are provided with an abundance of modern scientific apparatus; it owns a rapidly growing collection of several hundred plaster casts, tile and terra cotta samples, marble specimens, etc. It has a fine collection of models of the classic orders; a collection of blue-prints of over fifty residences, schoolhouses and churches, and of nearly all the Kansas state buildings; a large number of modern books on architecture and engineering; a complete set of the international edition of the *American Architect;* a complete set of the *Inland Architect,* and sets of several European architectural magazines; a well-equipped blue-print room, etc. The substantial stone buildings of the institution, their complete system of water-supply, drainage, heating and lighting, and one of the largest and handsomest campuses in America, furnish excellent illustrative material.

Students taking the course in architecture are expected to devote their summer vacations to practical work in actual building operations.

COURSE IN PRINTING

For some time it has been apparent that a broader education of those desiring to become expert in the printing craft is needed. The people are awakening to an appreciation of what is truly artistic and beautiful, and there is a growing demand for a higher class of printing. Notwithstanding this demand, the opportunity for the apprentice is less to-day than ever before.

The average printing-office does not provide a thorough training for the apprentice; nor does it give the young man an education such as a printer needs. Unless he is given an opportunity to supplement his composing-room instruction with practice he will remain a mere mechanical tool. His instruction in the pressroom should be supplemented by work in the machine shops and by the handling of gasoline engines and electric motors. The day when the "learning of the trade" was all that was necessary is past. The successful printer of to-day must have a broader knowledge than is obtained through a routine of every-day work.

The all-around printer is becoming a relic of the past. Men who are capable of "running" a country newspaper are grow-

ing scarcer every day. The country newspaper man should be a compositor, a job printer, a good "stone" man, a pressman—in fact, should be an all-around man—not so much to do the work himself as to know when it is properly done and to be able to direct intelligently and profitably those in his employ.

Students in this course receive instruction in the every-day work of the office, and this is supplemented by classroom work in scientific and cultural studies, intended to broaden the intellect and to sharpen the appetite for that higher knowledge which always brings its reward financially as well as intellectually. It is not expected that at graduation a student will be an expert in any line, but he will have a broad foundation upon which to build, and will be far better able to cope with the problems of life than would be possible otherwise.

Those wishing to specialize in any branch of the technical work of the course may enter the graduate courses.

Course in Mechanical Engineering

The Arabic numeral immediately following the name of a subject indicates the number of credit units, while the numerals in parentheses indicate the number of hours a week of recitation and of laboratory, respectively.

All young men in this course below the junior year are required to take military drill; except, that sophomores who have had one year of drill may take physical training instead of military drill, and that physical training taken in the preparatory course may be substituted for a like amount of physical training in this course. All men excused from military drill on account of physical disability are provided by their dean with an equivalent or stronger substitute from the regular work required in the course, and their normal work later in the course is increased by that much.

FRESHMAN

FALL TERM	WINTER TERM	SPRING TERM
Narrative Writing 4 (4-0)	Theme Writing 4 (4-0)	Hist. of Eng. Literature 4 (4-0)
Chemistry I 4 (2-4)	Chemistry II 4 (2-4)	Chemistry III 4 (2-4)
Algebra IV 4 (4-0)	Plane Trigonometry 4 (4-0)	College Algebra 4 (4-0)
Woodwork I 2 (0-4)	Woodwork II 2 (0-4)	Blacksmithing I 2 (0-4)
Free-hand Drawing 1 (0-2)	Object Drawing I 2 (0-4)	Surveying I 2 (0-4)
Geometrical Drawing 2 (0-4)	Descriptive Geometry I 2 (0-4)	Descriptive Geometry II 2 (0-4)
Methods of Study 1 (1-0)		

SOPHOMORE

Analytical Geometry 4 (4-0)	Differential Calculus 4 (4-0)	Integral Calculus 4 (4-0)
Industrial History 4 (4-0)	Kinematics I 4 (4-0)	Extempore Speech 2 (2-0)
Engineering Physics I 5 (3-4)	Engineering Physics II 5 (3-4)	Engineering Physics III 5 (3-4)
Mechanical Drawing I 3 (1-4)	Mechanical Drawing II 2 (0-4)	Mechanical Drawing III 2 (0-4)
Blacksmithing II 3 (1-4)	Foundry 3 (1-4)	Wood Turning and Pattern Making 3 (1-4)
		American Government 2 (2-0)

JUNIOR

College Rhetoric 4 (4-0)	Business Organization 2 (2-0)	Graphic Statics 2 (0-4)
Economics 4 (4-0)	Business Law 2 (2-0)	Hydraulics 3 (3-0)
Applied Mechanics I 5 (4-2)	Applied Mechanics II 5 (4-2)	Applied Mechanics III 4 (3-2)
Steam Engineering I (Valve Gears) 2 (2-0)	Steam Engineering II (Thermodynamics) 4 (3-2)	Steam Engineering III (Thermodynamics) 4 (3-2)
Kinematics II 3 (2-2)	Machine Design I 3 (1-4)	Machine Design II 3 (1-4)
	Machine Shop I 2 (0-4)	Machine Shop II 2 (0-4)

SENIOR

Applied Mechanics IV 4 (3-2)	Gas Engineering 3 (2-2)	Heating and Ventilation 5 (3-4)
Steam Engineering IV 4 (3-2)	Mill Engineering 5 (2-6)	Power Plant Engineering 5 (2-6)
Electrical Engineering M-I 4 (3-2)	Electrical Engine'ring M-II 4 (3-2)	Refrigeration 2 (2-0)
Machine Shop III 3 (1-4)	Machine Shop IV 3 (0-6)	Machine Shop V 2 (0-4)
Hydraulic Motors 3 (2-2)	Thesis 3 (-)	Thesis 4 (-)

Course in Electrical Engineering

The Arabic numeral immediately following the name of a subject indicates the number of credit units, while the numerals in parentheses indicate the number of hours a week of recitation and of laboratory, respectively.

All young men in this course below the junior year are required to take military drill; except, that sophomores who have had one year of drill may take physical training instead of military drill, and that physical training taken in the preparatory course may be substituted for a like amount of physical training in this course. All men excused from military drill on account of physical disability are provided by their dean with an equivalent or stronger substitute from the regular work required in the course, and their normal work later in the course is increased by that much.

FRESHMAN

FALL TERM	WINTER TERM	SPRING TERM
Narrative Writing 4 (4-0)	Theme Writing 4 (4-0)	Hist. of Eng. Literature 4 (4-0)
Chemistry I 4 (2-4)	Chemistry II 4 (2-4)	Chemistry III 4 (2-4)
Algebra IV 4 (4-0)	Plane Trigonometry 4 (4-0)	College Algebra 4 (4-0)
Woodwork I 2 (0-4)	Woodwork II 2 (0-4)	Blacksmithing I 2 (0-4)
Freehand Drawing 1 (0-2)	Object Drawing I 2 (0-4)	Surveying I 2 (0-4)
Geometrical Drawing 2 (0-4)	Descriptive Geometry I 2 (0-4)	Descriptive Geometry II 2 (0-4)
Methods of Study 1 (1-0)		

SOPHOMORE

Analytical Geometry 4 (4-0)	Differential Calculus 4 (4-0)	Integral Calculus 4 (4-0)
Industrial History 4 (4-0)	Kinematics I 4 (4-0)	Extempore Speech 2 (2-0)
Engineering Physics I 5 (3-4)	Engineering Physics II 5 (3-4)	Engineering Physics III 5 (3-4)
Mechanical Drawing I 3 (1-4)	Mechanical Drawing II 2 (0-4)	Mechanical Drawing III 2 (0-4)
Blacksmithing II 3 (1-4)	Foundry 3 (1-4)	Wood Turning and Pattern Making 3 (1-4)
		American Government 2 (2-0)

JUNIOR

College Rhetoric 4 (4-0)	Business Organization 2 (2-0)	Electrical Instruments and Calibration 3 (2-2)
Economics 4 (4-0)	Business Law 2 (2-0)	Hydraulics 3 (3-0)
Applied Mechanics I 5 (4-2)	Applied Mechanics II 5 (4-2)	Chemistry E 3 (0-6)
Mechanical Drawing IV 2 (0-4)	D-C Machines I, ½ term 3½ (5-4)	Direct Current Machines II 7 (5-4)
Theory of Electricity I 3 (2-2)	Theory of Elect. II, ½ term 3½ (5-4)	Machine Shop II 2 (0-4)
	Machine Shop I 2 (0-4)	

SENIOR

Alternating-C. Machines I 6 (4-4)	Alternating-C. Machines II 6 (4-4)	A.-C. Machine Design 2 (2-0)
Steam and Gas Eng. E-I 5 (4-2)	Steam and Gas Eng. E-II 5 (4-2)	Power Plant Specifications 3 (3-0)
Direct-C. Machine Design 2 (1-2)	Illuminating Eng. *or* Telephone Eng. *or* Electric Traction Practice 5 (4-2)	Generation and Distribution of Electrical Energy 5 (5-0)
Machine Shop III 2 (0-4)	Thesis 2 (-)	Inspection Trips 2 (-)
Hydraulic Measurements 2 (1-2)		Thesis 6 (-)

Course in Civil Engineering

The Arabic numeral immediately following the name of a subject indicates the number of credit units, while the numerals in parentheses indicate the number of hours a week of recitation and of laboratory, respectively.

All young men in this course below the junior year are required to take military drill; except, that sophomores who have had one year of drill may take physical training instead of military drill, and that physical training taken in the preparatory course may be substituted for a like amount of physical training in this course. All men excused from military drill on account of physical disability are provided by their dean with an equivalent or stronger substitute from the regular work required in the course, and their normal work later in the course is increased by that much.

FRESHMAN

FALL TERM	WINTER TERM	SPRING TERM
Narrative Writing 4 (4-0)	Theme Writing 4 (4-0)	Hist. of English Literature 4 (4-0)
Chemistry I 4 (2-4)	Chemistry II 4 (2-4)	Chemistry III 4 (2-4)
Algebra IV 4 (4-0)	Plane Trigonometry 4 (4-0)	College Algebra 4 (4-0)
Woodwork I 2 (0-4)	Woodwork II 2 (0-4)	Blacksmithing I 2 (0-4)
Free-hand Drawing 1 (0-2)	Object Drawing I 2 (0-4)	Surveying I 2 (0-4)
Geometrical Drawing 2 (0-4)	Descriptive Geometry I 2 (0-4)	Descriptive Geometry II 2 (0-4)
Methods of Study 1 (1-0)		

SOPHOMORE

Analytical Geometry 4 (4-0)	Differential Calculus 4 (4-0)	Integral Calculus 4 (4-0)
Industrial History 4 (4-0)	Kinematics I 4 (4-0)	Extempore Speech 2 (2-0)
Engineering Physics I 5 (3-4)	Engineering Physics II 5 (3-4)	Engineering Physics III 5 (3-4)
Mechanical Drawing I 3 (1-4)	Mechanical Drawing II 2 (0-4)	Mechanical Drawing III 2 (0-4)
Surveying II 3 (1-4)	Surveying III 3 (1-4)	Surveying IV 3 (1-4)
		American Government 2 (2-0)

JUNIOR

College Rhetoric 4 (4-0)	Business Organization 2 (2-0)	Graphic Statics 2 (0-4)
Economics 4 (4-0)	Business Law 2 (2-0)	Hydraulics 3 (3-0)
Applied Mechanics I 5 (4-2)	Applied Mechanics II 5 (4-2)	Applied Mechanics III 4 (3-2)
Sanitary Biology I 3 (1-4)	Sanitary Biology II 3 (1-4)	Engineering Geology 6 (4-4)
Civil Eng. Drawing I 2 (0-4)	Chemistry C-I 3 (1-4)	Chemistry C-II 3 (0-6)
	Municipal Engineering 3 (3-0)	

SENIOR

Bridge Stresses 4 (4-0)	Structural Design 6 (3-6)	Electrical Engineering C 4 (3-2)
Steam and Gas Eng. C 4 (3-2)	Railway Engineering I 3 (3-0)	Railway Engineering II 4 (0-8)
Drainage & Irrigation Eng. 4 (4-0)	Masonry and Concrete 4 (3-2)	Geodesy 4 (2-4)
Civil Eng. Drawing II 3 (0-6)	Spherical Trigonometry and Astronomy 3 (3-0)	Highway Engineering 2 (2-0)
Hydraulic Motors 3 (2-2)	Surveying V 2 (2-0)	Thesis 4 (-)

Course in Architecture

The Arabic numeral immediately following the name of a subject indicates the number of credit units, while the numerals in parentheses indicate the number of hours a week of recitation and of laboratory, respectively.

All young men in this course below the junior year are required to take military drill; except, that sophomores who have had one year of drill may take physical training instead of military drill, and that physical training taken in the preparatory course may be substituted for a like amount of physical training in this course. All men excused from military drill on account of physical disability are provided by their dean with an equivalent or stronger substitute from the regular work required in the course, and their normal work later in the course is increased by that much.

FRESHMAN

FALL TERM	WINTER TERM	SPRING TERM
Narrative Writing 4 (4-0)	Theme Writing 4 (4-0)	Hist. of Eng. Literature 4 (4-0)
Chemistry I 4 (2-4)	Chemistry II 4 (2-4)	Chemistry III 4 (2-4)
Algebra IV 4 (4-0)	Plane Trigonometry 4 (4-0)	College Algebra 4 (4-0)
Woodwork I 2 (0-4)	Woodwork II 2 (0-4)	Blacksmithing I 2 (0-4)
Free-hand Drawing 1 (0-2)	Object Drawing I 2 (0-4)	Surveying I 2 (0-4)
Geometrical Drawing 2 (0-4)	Descriptive Geometry I 2 (0-4)	Descriptive Geometry II 2 (0-4)
Methods of Study 1 (1-0)		

SOPHOMORE

Analytical Geometry 4 (4-0)	Differential Calculus 4 (4-0)	Integral Calculus 4 (4-0)
Industrial History 4 (4-0)	Residences 4 (4-0)	Extempore Speech 2 (2-0)
Engineering Physics I 5 (3-4)	Engineering Physics II 5 (3-4)	Engineering Physics III 5 (3-4)
Architectural Drawing I 3 (0-6)	Architectural Drawing II 3 (0-6)	Architectural Drawing III 3 (0-6)
Clay Modeling 3 (1-4)	Shades and Shadows 2 (0-4)	Linear Perspective 2 (0-4)
		American Government 2 (2-0)

JUNIOR

Ink Rendering 2 (0-4)	Business Organization 2 (2-0)	Graphic Statics 2 (0-4)
Economics 4 (4-0)	Business Law 2 (2-0)	Hydraulics 3 (3-0)
Applied Mechanics I 5 (4-2)	Applied Mechanics II 5 (4-2)	College Rhetoric 4 (4-0)
History of Architecture I 4 (4-0)	History of Architecture II 4 (4-0)	History of Architecture III 4 (4-0)
Architectural Drawing IV 3 (0-6)	Water Color Rendering 2 (0-4)	Cast and Life 2 (0-4)
	Architectural Composition I 3 (0-6)	Architectural Composition II 3 (0-6)

SENIOR

Materials of Construction 5 (2-6)	Electrical Engineering A 4 (3-2)	Electrical Wiring and Lighting 2 (2-0)
Heating and Plumbing 5 (5-0)	Trusses 5 (2-6)	Landscape Architecture 5 (2-6)
Mural Decoration 2 (0-4)	Specifications 4 (4-0)	Seminar 4 (4-0)
Architectural Composition III 3 (0-6)	Architectural Composition IV 5 (0-10)	Thesis 7 (-)
Municipal Improvements 3 (3-0)		

Course in Printing

The Arabic numeral immediately following the name of a subject indicates the number of credit units, while the numerals in parentheses indicate the number of hours a week of recitation and of laboratory, respectively.

All young men in this course below the junior year are required to take military drill; except, that sophomores who have had one year of drill may take physical training instead of military drill, and that physical training taken in the preparatory course may be substituted for a like amount of physical training in this course. All men excused from military drill on account of physical disability are provided by their dean with an equivalent or stronger substitute from the regular work required in the course, and their normal work later in the course is increased by that much.

FRESHMAN

FALL TERM	WINTER TERM	SPRING TERM
Narrative Writing 4 (4-0)	Theme Writing 4 (4-0)	Hist. of English Literature 4 (4-0)
Chemistry I 4 (2-4)	Chemistry II 4 (2-4)	Chemistry III 4 (2-4)
Free-hand Drawing 1 (0-2)	Geometrical Drawing 2 (0-4)	Object Drawing I 2 (0-4)
Composition I 3 (0-6)	Composition II 5 (0-10)	Composition III 6 (0-12)
Woodwork I 2 (0-4)	Blacksmithing I 2 (0-4)	Machine Shop I 2 (0-4)
Algebra IV 4 (4-0)	Methods of Study 1 (1-0)	

SOPHOMORE

College Rhetoric 4 (4-0)	English Literature I 4 (4-0)	English Literature II 4 (4-0)
General Physics I 4 (3-2)	General Physics II 4 (3-2)	Economics 4 (4-0)
Ad. Composition & Dist. 4 (0-8)	Job Composition & Dist. 4 (0-8)	Tabular Composition 4 (0-8)
General Bacteriology 4 (2-4)	Correcting Proofs 2 (0-4)	Make-up and Imposition 2 (0-4)
Distribution 2 (0-4)	Modern Europe 4 (4-0)	Public Speaking 4 (4-0)

JUNIOR

Elementary Journalism 2 (2-0)	Farm Writing 2 (2-0)	Gathering News 2 (2-0)
Journalism Practice I 2 (0-4)	Journalism Practice II 2 (0-4)	Journalism Practice III 2 (0-4)
Job Presswork I 4 (0-8)	Job Presswork II 3 (0-6)	Job Presswork III 3 (0-6)
Steam Engineering P 2 (1-2)	Gas Engineering P 2 (1-2)	Electric Motors P 2 (1-2)
Psychology 4 (4-0)	American History I 4 (4-0)	American History II 4 (4-0)
Civics 4 (4-0)	International Law 2 (2-0)	Human Physiology 4 (4-0)
	Cutting Stock 1 (0-2)	Trimming and Tabbing 1 (0-2)
	Business Law 2 (2-0)	

SENIOR

Copy Reading 2 (2-0)	Newspaper Law 2 (2-0)	Editorial Practice 2 (2-0)
Journalism Practice IV 2 (0-4)	Journalism Practice V 2 (0-4)	Journalism Practice VI 2 (0-4)
Sociology 4 (4-0)	Philosophy 4 (4-0)	English History 4 (4-0)
Cylinder Presswork I 3 (0-6)	Cylinder Presswork II 2 (0-4)	Cylinder Presswork III 4 (0-8)
Estimating Jobs 1 (0-2)	Business Organization 2 (2-0)	Public Finance 2 (2-0)
Editing Copy 2 (0-4)	Labor Problems 2 (2-0)	Money and Banking 2 (2-0)
Plant Morphology 4 (2-4)	Plant Physiology I 4 (2-4)	Color Comp. and Presswork 2 (0-4)

Department of Applied Mechanics and Hydraulics

Professor SEATON.

The courses in applied mechanics are designed primarily to teach the graphical and analytical methods of the determination of stresses in the parts of structures and machines, and the fundamental principles of the design of these parts to meet specified conditions. The course is intended to be of a highly practical character. For the purpose of better fixing in the mind of the student the principles taught, the solution of a large number of problems involving these principles is required in both the applied mechanics and hydraulics. The principles are further illustrated by means of the laboratory and drafting-room work, which parallels the classroom instruction.

COURSES IN APPLIED MECHANICS AND HYDRAULICS

1. **Applied Mechanics I.** Junior year, fall term. Class work, four hours; laboratory, two hours. Five credits. Required in the courses in engineering and architecture.

This course includes analytical mechanics treating of composition, resolution, and conditions of equilibrium of concurrent and nonconcurrent forces; center of gravity; laws of rectilinear and curvilinear motion of material points; moments of inertia; relations between forces acting on rigid bodies and the resulting motions; work, energy, and power; graphical solutions of problems in statics. Textbook to be selected. Prerequisites: Differential Calculus, Integral Calculus, and Engineering Physics III.

Laboratory.—See "Power and Experimental Engineering," 3.

2. **Applied Mechanics II.** Junior year, winter term. Class work, four hours; laboratory, two hours. Five credits. Required in all courses in engineering and in the course in architecture.

This course treats of: behavior of materials subjected to tension, compression, and shear; riveted joints; torsion; shafts and the transmission of power; strength and stiffness of beams and cantilevers; bending moments and shear forces in beams; design of beams of wood, cast and wrought iron, steel, and reinforced concrete; design of built-up beams and box girders; resilience of beams; stresses in columns and hooks; design of columns of wood, cast iron, and steel; and the analytical treatment of linear arches. Textbook, to be selected. Prerequisite: Applied Mechanics I.

Laboratory.—See "Power and Experimental Engineering," 5.

3. **Applied Mechanics III.** Junior year, spring term. Class work, three hours; laboratory, two hours. Four credits. Required in the courses in mechanical and civil engineering.

This course emphasizes: stresses in continuous and built-in beams; masonry arches and arch ribs; properties of materials for reinforced concrete; mechanical bond; rectangular and T beams; double reinforced beams; web reinforcing; columns reinforced with bars and hoops; reinforced concrete in building construction; design of slabs, beams, girders, and columns. Textbook, to be selected. Prerequisite: Applied Mechanics II.

Laboratory.—See "Power and Experimental Engineering," 6.

4. **Graphic Statics.** Junior year, spring term. Drafting-room practice, supplemented by lectures, four hours. Two credits. This work is required in the courses in mechanical and civil engineering and in the course in architecture.

The graphical solution of the stresses existing in a number of typical bridge and roof trusses, with a detail design of one of the simpler forms of roof trusses. Prerequisite: Applied Mechanics II, or these two courses may be taken together.

5. **Hydraulics.** Junior year, spring term. Class work, three hours. Three credits. Required in all the courses in engineering and in the course in architecture.

This course includes a study of fluid pressure, stress in containing vessels and pipes, center of pressure, stability of walls and dams; retaining walls for earth; immersion and flotation; Bernoulli's theorem, with applications; flow through orifices, weirs, short and long pipes; loss of head due to various causes; flow of water in open channels, and measurement of same; Kutter's formula; impulse and reaction of a jet; power of jets; plates moving in fluids. Textbook, to be selected. Prerequisite: Applied Mechanics I.

6. **Applied Mechanics IV.** Senior year, fall term. Class work, three hours; laboratory, two hours. Four credits. Required in the course in mechanical engineering.

Dynamics of machinery, friction, lubrication and lubricants are studied in this course. Textbook, to be selected. Prerequisite: Applied Mechanics III.

Laboratory.—See "Power and Experimental Engineering," 9.

7. **Hydraulic Motors.** Senior year, fall term. Class work, two hours; laboratory, two hours. Three credits. Required in the courses in mechanical and civil engineering.

This course treats of elements of water power; design, construction, and operation of gravity motors, impulse wheels and turbines; regulation of water motors; testing of impulse wheels and turbines; centrifugal, turbine, and reciprocating pumps; pressure engines, accumulators, and hydraulic rams. Textbook, Church's *Hydraulic Motors.* Prerequisite: Hydraulics.

Laboratory. — See "Power and Experimental Engineering," 10.

8. **Hydraulic Measurements.** Senior year, fall term. Class work, one hour; laboratory, two hours. Two credits. Required in the course in electrical engineering.

Conditions affecting quantity of discharge from streams, instruments and methods to determine this, data and calculations, suitability of streams for hydraulic power purposes, are the topics treated in this course. Textbook, to be selected. Prerequisite: Hydraulics.

Laboratory. — See "Power and Experimental Engineering," 13.

Department of Architecture and Drawing

Professor WALTERS
Instructor WEEKS
Instructor HARRIS
Assistant MORTON
Assistant PRATT

Drawing is the language of form and the key to every artistic and to nearly every industrial pursuit. The educational and practical value of a systematic course in drawing can hardly be overestimated. The general aims of the several courses in industrial art are the same: (*a*) the cultivation of observation and analysis of form; (*b*) the development of correct taste; (*c*) the teaching of the different methods of graphic representation; (*d*) the acquiring of skill in handling drawing tools.

The instruction offered in architecture is intended to supply the preliminary training required for the practice of architecture and to prepare the student to pass the examinations required of architects by many cities and states. It recognizes the fact that this instruction must have a three-fold object: first, the teaching of sound modern building construction; second, the teaching of the different methods of graphic representation; and third, the development of correct taste.

The first is attained, in connection with the work in other departments, by lectures, and by extended laboratory work in heating, plumbing, concrete construction, steel construction, and electric lighting; also by preparing building specifications and by making investigations of the legal and ethical relations of architect, owner, and contractor. The second end involves the teaching of correct perception and analysis of form. Not less than four hours per week throughout the first three years are given to projection drawing, descriptive geometry, isometric drawing, linear perspective, shades and shadows, sketching from casts and from life, etc. The development of correct taste is probably the most difficult to accomplish. Even with the talented student its acquisition requires extended and persistent efforts of a greatly varied character. This is sought by offering much work in sketching and rendering, in mural decoration, landscape architecture, architectural criticism, and

architectural composition. A year's work is devoted to the study of the fundamental principles of design and the styles of the past.

COURSES IN ARCHITECTURE AND DRAWING

1. **Free-hand Drawing.** Subfreshman, second year, or freshman, fall term. Two hours, one credit, or four hours, two credits. Required of all students in the subfreshman course, and in the engineering, architectural, general science, industrial journalism, printing, and home economics courses if not taken previously.

This course includes: exercises in drawing simple figures illustrating the effects of geometric arrangement, radiation, repetition, symmetry, proportion, harmony, and contrast; exercises in drawing conventional plant ornaments; and free-hand lettering.

2. **Geometrical Drawing.** Subfreshman, second year, winter term, or freshman, fall or winter term. Four hours, two credits. Required of all students in the subfreshman course, and in the courses in engineering, architecture, general science, home economics, printing, and industrial journalism, if not taken previously.

Construction of perpendiculars, parallels, angles, polygons, tangent connections, etc.; construction of the ovoid, oval, conic section curves, and the spiral; and the use of T-square, triangles, drawing board, and India ink, are emphasized in this course.

3. **Object Drawing I.** Subfreshman, second year, winter or spring term; freshman year, winter or spring term; sophomore year, winter term. Four hours, two credits. Required of all students in the subfreshman course, and in the freshman year in the engineering, architectural, general science, home economics, printing, and industrial journalism courses, if not taken previously.

Drawing from models and simple objects, and exercises in shading from the object and from imagination, comprise the work of this course. Prerequisite: Geometrical Drawing.

4. **Projection Drawing.** Elective, fall term. Four hours, two credits.

The principles of orthographic projection, the section plane, rotation in space, development of surfaces, interpenetration of geometric solids, are the matters emphasized in the course.

5. **Object Drawing II.** Elective, winter term. Four hours, two credits.

Drawing from models and casts, shading with the pencil and with crayon, and free-hand perspective, are taught in this course. Prerequisite: Object Drawing I.

6. **Object Drawing III.** Elective, spring term. Four hours, two credits.

This course includes drawing from natural objects and various methods of shading with the pen and the brush. Prerequisite: Object Drawing II.

7. **Descriptive Geometry I.** Freshman year, winter term. Four hours, two credits. Required of all engineering and architectural students and of students in the mechanic arts option of the course in industrial journalism.

This course emphasizes projection, rotation, and measurement of the straight line and the angle in space; change of ground line; oblique projection; the plane and its traces; and various problems pertaining to the straight line and the plane. Prerequisite: Geometrical Drawing.

8. **Descriptive Geometry II.** Freshman year, spring term. Four hours, two credits. Required of all engineering and architectural students and of students in the mechanic arts option of the course in industrial journalism.

The single and double curved surfaces of revolution; their tangents and tangent planes; development of surfaces of revolution; sections, interpenetrations of the cylinder, cone, and sphere; and construction and sections of the hyperboloid of revolution are treated in this course. Prerequisite: Descriptive Geometry I.

9. **Clay Modeling.** Sophomore year, fall term. One hour lecture and four hours laboratory work. Three credits. Required in the architectural course and elective in the course in general science.

This course includes clay and plaster modeling of architectural details, historic ornaments, and decorative statuary; also methods of making plaster casts.

10. **Working Drawings I and II.** Sophomore year, fall and winter terms. Two hours per week, one credit each term. Required of students in the course in home economics, and elective in the course in general science.

Designing and drawing residence plans to scale and detail drawings of furniture and various modern conveniences, comprise this course.

11. **Architectural Drawing I, II, III, and IV.** This work begins in the fall term of the sophomore year and covers six hours per week for four consecutive terms. Three credits each term. Required of students in the course in architecture.

The first term is given to the study of Gothic and Romanesque ornaments, tracery windows, and other details, from plaster models and blue-prints. The second term takes up the analysis and study of standard forms of the five orders. The third term is devoted to the study of the modern cottage and

residence, and the fourth to a study of public buildings, such as schoolhouses, churches, and post-office buildings. No textbook required. Prerequisite: Descriptive Geometry I.

12. **Color and Design I and II.** Sophomore year, fall and winter terms, four hours, two credits each term. Required of students in the course in home economics, and in the home economics option in the course in industrial journalism.

This course includes discussion of the nature and influence of color, its use and abuse, and of the principles that underlie good design and consistent, harmonious color combinations. Original designs in construction and decoration as applied to fabrics, dress, and articles of common use in the home are also considered, in order that young women may recognize and appreciate what is beautiful and appropriate, and may become more discriminating purchasers.

13. **Shades and Shadows.** Sophomore year, winter term. Four hours, two credits. Required of architectural students.

Shadows upon the planes of projection; shadows upon oblique planes and curved surfaces; shades; exercises in brush shading, are emphasized here. Prerequisite: Descriptive Geometry II.

14. **Residences.** Sophomore or senior year, winter term. Four hours, four credits. Required of architectural students, optional in the mechanic arts option in the course in industrial journalism.

Lectures on location, arrangement, construction, decoration, and sanitation of residences; a study of modern residence styles; drawing to scale plans, elevations, sections, and details of characteristic residences, involving construction in lumber, brick, stone, and concrete, comprise this course.

15. **Home Decoration.** Sophomore year, spring term, or junior year, winter term. Four hours, two credits. Required in the course in home economics, and in the home economics option in the course in industrial journalism.

In general, this course includes a study of design in its application to the home, its plan, furniture, and decorations. Emphasis is placed upon the refining and educating influence of well-chosen and appropriate decoration, the importance of simplicity being urged. Lectures on fine arts and the handicrafts teach that the home should demonstrate the fact that fine art and industrial art are not to be considered separately. Problems in planning and decorating houses are included.

16. **Linear Perspective.** Sophomore year, spring term. Four hours, two credits. Required of architectural students, elective for others.

Vanishing points; vanishing traces; measuring points; cylindric perspective and perspective corrections, are emphasized,

and various exercises in representing geometric solids are given. Prerequisite: Geometrical Drawing.

17. **Ink Rendering.** Junior year, fall term. Four hours, two credits. Required of architectural students, elective for others.

Shades and shadows in perspective; perspectives of buildings and ornamental details; rendering in ink; studio methods, are considered in this course. Prerequisite: Linear Perspective.

18. **History of Architecture I.** Junior year, fall term. Four hours, four credits. Required of architectural students.

This study is taught by lectures illustrated by photographs, plaster models, and stereopticon views. It comprises the study of the development of the styles of architecture of the ancient Egyptians, Chaldeans, Greeks, and Romans. Textbook, *International Instruction Pamphlets* Nos. 1085-A and 1085-B.

19. **History of Architecture II.** Junior year, winter term. Four hours, four credits. Required of architectural students.

This is a study of the styles of architecture of the medieval and Renaissance periods; the Romanesque, the Byzantine, the Gothic, the Moorish, the Renaissance, and the Neo-Greek. Textbook, *International Instruction Pamphlets* Nos. 1085-C and 1085-D. Prerequisite: History of Architecture I.

20. **Water-Color Rendering.** Junior year, winter term. Four hours, two credits. Required of architectural students; elective for others.

Representations of buildings and their landscape environments in ink and in water-color washes, are emphasized in this course. Prerequisite: Ink Rendering.

21. **Architectural Composition I, II, III, and IV.** This work begins with the winter term of the junior year and extends through four consecutive terms. Six hours per week, three credits per term. Required of architectural students.

The first term is given to the planning of a residence and involves the preparation of a complete set of plans, elevations, sections, and detail drawings. The second term takes up the planning and drawing of a Gothic church. The third is devoted to the planning and drawing of a small public building in the Romanesque style. The fourth is given to the preparation of drawings for a modern public building in the Renaissance style. Sets of blue-prints of all composition drawings must be left with the department, if required by the professor in charge of this work. No textbook required. Prerequisites: Descriptive Geometry II, and Architectural Drawing IV.

22. **Cast and Life.** Junior year, spring term. Four hours, two credits. Required of architectural students.

This course includes pencil and crayon studies of the human

form, from plaster casts, lithographs, and life. Prerequisites: Object Drawing I, and Linear Perspective.

23. **History of Architecture III.** Junior year, spring term. Four hours, four credits. Required of architectural students.

This course is given by means of lectures and includes a study of American architecture—the Colonial, the American classic, the American Romanesque, the American Gothic, and the mission style. Prerequisite: History of Architecture II.

24. **Mural Decoration.** Senior year, fall term. Four hours, two credits. Required of architectural students.

Each student is required to make a series of large water-color studies of interior wall-decoration schemes, including original designs for borders, centerpieces, etc.

25. **Heating and Plumbing.** Senior year, fall term. Five hours, five credits. Required of architectural students.

Discussions of the phenomena and laws of heat generation and propagation; systems of heating by means of air, water, and steam; modern methods of ventilation; dry closets; water-supply; plumbing; sewer construction; sewage disposition, are included in the work of this course. The course is given by means of lectures. Prerequisites: Graphic Statics, and Hydraulics.

26. **Materials of Construction.** Senior year, fall term. Class work, two hours; laboratory, six hours. Five credits. Required of architectural students.

Stone and brick walls, terra cotta work, foundations, reenforced concrete construction, cast iron and steel columns, wood and steel beams, are studied under this head. Prerequisite: Graphic Statics.

27. **Municipal Improvements.** Senior year, fall term. Three hours, three credits. Required of architectural students.

The construction of culverts, gutters, sewers, curbing, sidewalks, street pavements, parkways, and other public improvements, is studied in this course. No textbook is required. Prerequisite: Materials of Construction is to be taken with this subject if not before.

28. **Trusses.** Senior year, winter term. Class work, two hours; laboratory, six hours. Five credits. Required of architectural students.

This course emphasizes methods of construction and the graphic analysis of standard wood and steel trusses. Textbook, Kidder's *Handbook for Architects.* Prerequisite: Materials of Construction.

29. **Specifications.** Senior year, winter term. Four hours, four credits. Required of students in the course in architecture.

This course includes: the discussion and preparation of standard specifications for some of the residences and public buildings planned by the student in the classes in composition; estimates of the materials and labor required in erecting and completing these buildings; methods of making lump estimates; a discussion of the principles and form of building contracts; a study of the legal relations of the architect, the owner, and the contractor; and discussion of State laws concerning the erection of public buildings—labor laws, lien laws, city ordinances, building permits, building insurance, contracts and bonds. No textbook required.

30. **Landscape Architecture.** Senior year, spring term. Class work, two hours; laboratory, six hours. Five credits. Required of architectural students.

A discussion and study of the principles of landscape design; the location and construction of roads and walks; and the disposition of trees, shrubs, lawns, and water as landscape features, comprise the work of this course.

Laboratory.—Each student is required to draw and finish in water-color a set of plates representing his original designs for a home lot, a public square, a campus, and a small park. No textbook is required.

31. **Seminar.** Senior year, spring term. Four hours, four credits. Required of architectural students.

A critical study of public buildings, such as the Manhattan library, the Riley county courthouse, the buildings of the College, etc.; the study and discussion of the work of American architects, such as Smithmeyer, Upjohn, and Richardson; a critical study of the competitive designs for the Cathedral of St. John in New York, the University of California, etc., form the work of the course. No textbook is required.

32. **Thesis.** Senior year, spring term. Fourteen hours, seven credits. Required of architectural students before graduation.

In the winter and spring of the senior year, the student prepares a thesis, consisting of a set of original drawings, complete with details and specifications, for a public building. This work must be done in the drafting room of the department and under the supervision of the professor of architecture, who decides on the cost limit and style of the building and the size and number of plates required.

33. **Home Architecture I.** Elective, fall term. Eight hours, four credits. Elective in the course in home economics.

The work of this term consists in studying and drawing a number of floor plans and architectural details of modern cottages and residences. Prerequisite: Working Drawings.

34. **Home Architecture II.** Elective, winter term. Class work, four hours. Four credits. Elective in the course in home economics.

A course of lectures on residence building is given, identical with the course of lectures to the sophomores in the architectural course. Prerequisite: Home Architecture I.

35. **Home Architecture III.** Elective, spring term. Eight hours, four credits. Elective in the course in home economics.

The work of this term consists in drawing to scale a complete set of plans, elevations, sections, and details for a modern residence. Prerequisite: Home Architecture II.

Department of Civil Engineering

Professor CONRAD
Assistant FRAZIER

The instruction in civil engineering is given by means of lectures and recitations, and by practice in the field, in the drawing room, and in the laboratory. The professional work begins in the spring term of the freshman year, in which the work in surveying is started, and is continued through four succeeding terms. The heaviest professional work of the course falls in the junior and senior years, during which, in addition to studies in other departments, courses are given in civil engineering drawing and in the analysis of stresses in framed structures, structural design, drainage, and irrigation engineering, construction and design in masonry and concrete, railway and highway engineering, spherical trigonometry, astronomy, and geodesy. During the spring term of the senior year considerable time is devoted to thesis work.

In addition to the laboratory equipment found in the mechanical and electrical engineering laboratories, which is available to civil engineering students as well, the Department of Civil Engineering possesses a good assortment of transits, levels, plane tables, tapes, chains, etc.

COURSES IN CIVIL ENGINEERING

1. **Surveying I.** Freshman or junior year, spring term. Four hours field work per week. Two credits. Required of young men in courses in engineering and architecture, and in the mechanic arts option of the course in industrial journalism.

This is a short elementary course in the use of surveying instruments. Practice is given in the use of surveyor's and engineer's chains and tapes, and in the use of the compass, engineer's level, and transit. The time is devoted mainly to field practice, though some time must of necessity be given to classroom instruction and to the working of problems. Textbook, Pence and Ketchum's *Surveying Manual.* Plane Trigonometry must accompany or precede this course.

2. **Surveying II.** Sophomore year, fall term. One hour recitation and four hours practice per week. Three credits. Required in the course in civil engineering.

Practice with the engineer's level and with the transit. Care, adjustment, and use of engineer's surveying instruments. Textbook, J. B. Johnson's *Theory and Practice of Surveying*. Prerequisite: Surveying I.

3. **Surveying III.** Sophomore year, winter term. One hour recitation and four hours in drafting room per week. Three credits. Required in the course in civil engineering.

This is a course in land surveying and plotting. Textbook, J. B. Johnson's *Theory and Practice of Surveying*. Prerequisites: Surveying I and II.

4. **Surveying IV.** Sophomore year, spring term. One hour recitation and four hours field work per week. Three credits. Required in the course in civil engineering.

Practice is here given in the use of the stadia and plane table in topographic surveying. Textbook, J. B. Johnson's *Theory and Practice of Surveying*. Prerequisites: Surveying I, II, and III.

5. **Civil Engineering Drawing I.** Junior or senior year, fall term. Four hours drafting-room exercises per week. Two credits. Required in the course in civil engineering and in the mechanic arts option in the course in industrial journalism.

The time is devoted to the application of the elementary principles of stereotomy, shades and shadows, isometric drawing, and perspective. These principles are explained to the student by such short lectures as seem necessary for that purpose. No textbook is used. Prerequisites: Mechanical Drawing I and II.

6. **Municipal Engineering.** Junior year, winter term. Recitations, three hours per week. Three credits. Required in the course in civil engineering.

This course takes up water-supply, sewerage, and paving. Considerable work is assigned supplementary to the text. Textbook, McCullough's *Engineering Works in Towns and Cities*. Sanitary Biology II must accompany or precede this course.

7. **Civil Engineering Drawing II.** Senior year, fall term. Six hours per week of work in the drafting room. Three credits. Required in the course in civil engineering.

This is a continuation of the course in graphic statics. Considerable time is spent during the latter part of the term in working up the design of a simple roof truss. No textbook is used. Prerequisite: Graphic Statics.

8. **Bridge Stresses.** Senior year, fall term. Recitations, four hours per week. Four credits. Required in the course in civil engineering.

This course involves a study of the algebraic method of computing stresses in roofs and bridges, leading up to the subject

of structural design in the following term. Textbook, Merriman and Jacoby's *Roofs and Bridges*, Part I.

9. **Drainage and Irrigation Engineering.** Senior year, fall term. Recitations, four hours per week. Four credits. Required in the course in civil engineering.

A study is made of the application of engineering principles to the design and construction of drainage and irrigation works. Considerable attention is paid to the development of ground water supplies for irrigation. Any senior engineering student may enter the course. Textbook, Wilson's *Irrigation Engineering*. Prerequisite: Hydraulics.

10. **Surveying V.** Senior year, winter term. Two hours per week, recitations and lectures. Two credits. Required in the course in civil engineering.

This is a course in hydrographic and mine surveying, and computation of volumes. Textbook, J. B. Johnson's *Theory and Practice of Surveying*. Prerequisites: Surveying I, II, III, and IV.

11. **Structural Design.** Senior year, winter term. Three hours class exercises per week, and six hours drafting-room exercises per week. Six credits. Required in the course in civil engineering.

This is a study of the design of timber and of metal structures. Textbook, Merriman and Jacoby's *Roofs and Bridges*, Part III. Prerequisites: Bridge Stresses, Applied Mechanics II, and Civil Engineering Drawing II.

Laboratory.—In the drafting room the time is chiefly devoted to working out the details of a plate girder and of a railroad or highway bridge.

12. **Masonry and Concrete.** Senior year, winter term. Recitations, three hours; laboratory, two hours per week. Four credits. Required in the course in civil engineering.

In this course it is intended to acquaint the student with the fundamental principles of masonry and concrete construction as at present practiced. The course in masonry and concrete proper is introduced by a short lecture and library course in foundations. This course may be taken by any senior engineering student. Textbook, to be selected. Prerequisite: Applied Mechanics II.

13. **Spherical Trigonometry and Astronomy.** Senior year, winter term. Recitations, three hours per week. Three credits. Required in the course in civil engineering and in the mechanic arts option in the course in industrial journalism.

This course is given to civil engineering students as a preparation for geodesy the following term. The course, as given, is a practical one, designed to familiarize the student with methods of determining latitude, longitude, and azimuth, with

the ordinary instruments of the engineer. Textbook, Wentworth's *Plane and Spherical Trigonometry,* and Johnson's *Theory and Practice of Surveying.* Prerequisites: Plane Trigonometry and Surveying IV.

14. **Railway Engineering I.** Senior year, winter term. Recitations, three hours per week. Three credits. Required in the course in civil engineering.

This is a short course in the theory of railroad engineering. Textbooks, William G. Raymond's *Elements of Railroad Engineering,* and Nagle's *Field Manual for Railroad Engineers.* Prerequisites: Surveying V and Civil Engineering Drawing II.

15. **Railway Engineering II.** Senior year, spring term. Eight hours of drafting-room or field exercises per week. Four credits. Required in the courses in civil engineering.

This is a continuation of the preceding course. The time is devoted principally to the field and office work of railway engineering. In the field a reconnoissance and survey of a short line is made, and the office work consists in working up the maps, profiles and estimates from the survey. Textbooks, William G. Raymond's *Elements of Railroad Engineering,* and Nagle's *Field Manual for Railroad Engineers.* Prerequisite: Railroad Engineering I.

16. **Geodesy.** Senior year, spring term. Recitations, two hours; field work, four hours per week. Four credits. Required in the course in civil engineering.

Here the precise methods of surveying and leveling are studied. In the field the time is devoted to practice with the plane table, base-line measurement, triangulation, and precise leveling. Textbook, J. B. Johnson's *Theory and Practice of Surveying.* Prerequisites: Surveying V, and Spherical Trigonometry and Astronomy.

17. **Highway Engineering.** Senior year, spring term. Two hours per week. Two credits. Required in the course in civil engineering.

The time is devoted to recitation, library, and lecture work dealing with the principles underlying the economical location and construction of highways. Attention is given to the design and construction of bridges and culverts, as well as to methods of constructing and of maintaining earth, gravel, and stone roads. Other forms of improved road surfaces are also considered, such as sand clay and burnt clay roads, oiled roads, etc. Textbook, to be selected. Prerequisite: Railway Engineering I.

18. **Thesis.** Senior year, spring term. Four credits.

Each student in the course in civil engineering is required to present, before graduation, a thesis on some subject which shall be connected with his profession and shall constitute a report upon an original investigation conducted by him.

galvanic current, magnetism, and electromagnetism. Emphasis is laid upon the ultimate importance to the student of a thorough understanding of these subjects. Textbook, Pender's *Principles of Electrical Engineering*. Prerequisites: Engineering Physics III and Integral Calculus.

Laboratory.—The laboratory course continues the work of the class room in giving the application of the fundamental principles, the experiments being so arranged as to follow the theoretical development of the subject.

2. **Theory of Electricity II.** Junior year, winter term, first half. Five hours recitations and lectures, and four hours laboratory. Three and one-half credits. For electrical engineering students.

This course is a continuation of the work begun in the fall term. It deals primarily with the general principles of electromagnetic induction, and gives an elementary treatment of alternating currents, including the effect of inductance and capacity. Textbook, Pender's *Principles of Electrical Engineering*. Prerequisite: Theory of Electricity I.

Laboratory.—This laboratory course consists of a series of experiments involving special and commercial tests of alternators, synchronous motors, transformers, and the different types of alternating-current machinery and apparatus.

3. **Direct-Current Machines I.** Junior year, winter term, second half. Five hours recitations or lectures and four hours laboratory per week. Three and one-half credits. For electrical engineering students.

The work consists of a detailed study of the fundamental principles of magnetic and electric circuits and their application to the various types of direct-current machines. Numerous problems involving the application of the principles are given as a part of the course. The class work is planned to coördinate with the electrical engineering laboratory. Textbook, Franklin and Estey, *Elements of Electrical Engineering*, volume I. Prerequisites: Integral Calculus and Theory of Electricity II.

Laboratory.—A series of experiments is outlined which is designed to necessitate careful, accurate measurement. The student is obliged to make all electrical connections with the necessary instruments in the circuit and to record the required data. From the laboratory records a written report upon each experiment or test must be submitted. The laboratory exercises include tests for armature and field resistance, potential curves, machine characteristics, motor and generator efficiencies.

4. **Direct-Current Machines II.** Junior year, spring term. Five hours lectures or recitations and four hours electrical engineering laboratory per week. Seven credits. For electrical engineering students.

galvanic current, magnetism, and electromagnetism. Emphasis is laid upon the ultimate importance to the student of a thorough understanding of these subjects. Textbook, Pender's *Principles of Electrical Engineering*. Prerequisites: Engineering Physics III and Integral Calculus.

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Laboratory.—A series of experiments is outlined which is designed to necessitate careful, accurate measurement. The student is obliged to make all electrical connections with the necessary instruments in the circuit and to record the required data. From the laboratory records a written report upon each experiment or test must be submitted. The laboratory exercises include tests for armature and field resistance, potential curves, machine characteristics, motor and generator efficiencies.

4. **Direct-Current Machines II.** Junior year, spring term. Five hours lectures or recitations and four hours electrical engineering laboratory per week. Seven credits. For electrical engineering students.

This course is a continuation of Direct-Current Machines I. It involves a detailed study of the various types of direct-current machinery with respect to theory and operation. The latter part of the course is devoted to a special examination of the different methods of testing generators and motors, and to the special application of the different classes of machines to commercial uses. Textbook, Franklin and Estey, *Elements of Electrical Engineering,* volume I. Prerequisite: Direct-Current Machines I.

Laboratory.—Special attention is given in this course to the different methods of determining generator and motor efficiencies and to the proper tabulation and interpretation of results.

5. **Electric Motors P.** Junior or senior year, spring term. Two hours class work during the first half term; the work is divided between class and laboratory periods during the second half term. Two credits. For students in printing and in the mechanic arts option in the course in industrial journalism. Textbook, Sheldon's *Direct-Current Machines.*

6. **Electrical Instruments and Calibration.** Junior year, spring term. Two hours per week lectures and recitations, and two hours per week calibration laboratory. Three credits. For electrical engineering students.

This course includes a study of the different types of electrical measuring instruments and their application to electrical engineering testing. Textbook, *Electric and Magnetic Measurements,* by Roller, supplemented by lectures. Prerequisites: Theory of Electricity I and II.

Laboratory.—The laboratory work in this subject includes the calibration of both direct- and alternating-current measuring instruments and their uses in measuring current, potential power, resistance, inductance, and capacity.

7. **Direct-Current Machine Design.** Senior year, fall term. One hour per week lectures and two hours computation per week. Two credits. For electrical engineering students.

The purpose of the course is to acquaint the student with the principles of commercial design of direct-current machinery. Each student is required to make the necessary calculations and drawings for a direct-current generator. Prerequisite: Direct-Current Machines II.

8. **Alternating-Current Machines I.** Senior year, fall term. Four hours recitations or lectures and four hours laboratory per week. Six credits. For electrical engineering students.

The work consists of a mathematical treatment of alternating-current phenomena. A study is made of the vector method of treating alternating-current problems. The solution of problems involving single and polyphase circuits forms an

important part of the course. Textbooks, Franklin and Estey, *Elements of Electrical Engineering,* volume II; Swenson and Frankenfield, *Testing of Electro-Magnetic Machinery.* Prerequisites: Integral Calculus and Theory of Electricity II.

Laboratory.—It is the aim of this course to provide a series of experiments illustrating the theoretical work of the lecture room. Practice is given in the accurate measurement of capacity and inductance, and the effect of each upon the circuit. The latter part of the course is devoted to a study of polyphase circuits.

9. **Electrical Engineering M-I.** Senior year, fall term. Three hours lectures or recitations, two hours laboratory. Four credits. For mechanical engineering students.

This course covers the subject of direct-current machines with reference to the fundamental laws of the electric circuit; the principles of direct-current machinery, and the more important commercial tests. Textbook, Sheldon's *Direct-Current Machines.*

Laboratory.—Practice is given in the proper use of electrical measuring instruments. The experiments include a variety of tests requiring accurate observation, and a knowledge of the theory of dynamo machines. The various standard characteristic and efficiency tests are given. A written report on each test is required.

10. **Electrical Engineering M-II.** Senior year, winter term. Three hours lectures and recitations and two hours laboratory per week. Four credits. For mechanical engineering students.

The work covers briefly the important principles of alternating-current phenomena. The leading types of alternating-current machinery and apparatus are discussed with reference to their operation, and their adaptability to different classes of service. Textbook, Sheldon's *Alternating-Current Machines.* Prerequisites: Engineering Physics III and Integral Calculus.

Laboratory.—The experimental work in this course includes practice in the use of alternating-current instruments; standard tests of alternators, motors, and transformers, and methods of operating the different types of alternating-current machinery.

11. **Alternating-Current Machines II.** Senior year, winter term. Four hours recitations or lectures and four hours laboratory per week. Six credits. For electrical engineering students.

This is a continuation of Alternating-Current Machines I. The course consists of a study of the theory of alternating-current machinery, alternators, synchronous motors, induction motors, transformers, and the various devices used in connection with alternating-current work. A study is also made of

the application of the different types of machinery to industrial uses. Textbooks, Franklin and Estey, *Elements of Electrical Engineering,* volume II; Swenson and Frankenfield, *Testing of Electro-Magnetic Machinery.* Prerequisite: Alternating-Current Machines I.

12. **Illuminating Engineering.** Senior year, winter term. Four hours lectures or recitations and two hours laboratory per week. Five credits. For electrical engineering students. Optional with Telephone Engineering, and Electric Traction Practice.

The course is devoted to a study of photometry and light standards and the principles of illumination. The different types of incandescent and arc lamps are discussed with reference to their efficiency and adaptability to different classes of lighting. Systems of street illumination are also studied.

13. **Telephone Engineering.** Senior year, winter term. Class work, four hours; laboratory, two hours. Five credits. For electrical engineering students. Optional with Illuminating Engineering, and Electric Traction Practice.

This course consists of a consideration of the principles of acoustics and alternating phenomena involved in telephone practice. A detailed investigation is made of telephone apparatus and circuits, with reference to their adaptation to various kinds of telephone service. This is followed by a study of the design and maintenance of telephone lines and central-office apparatus, and also of central-office methods, the selection of apparatus, and of methods of handling telephone traffic. Textbook, Abbot's *Telephony.*

14. **Electric Traction Practice.** Senior year, winter term. Class work, four hours; laboratory, two hours. Five credits. For electrical engineering students. Optional with Illuminating Engineering, and Telephone Engineering.

The instruction in this subject is by lectures and recitations and covers briefly the design of direct-current and alternating-current systems of railway operation, and the adaptation of each to different classes of service. Practical tests are made on the Manhattan City and Interurban Railway during the course.

15. **Electrical Engineering A and C.** Senior year, winter and spring terms, respectively. Three hours recitations or lectures, and two hours laboratory practice. Four credits. For students in the courses in architecture and civil engineering.

This work is designed to cover briefly the fundamental principles of direct-current and alternating-current machinery. Emphasis is laid upon the proper installation and operation of the different classes of machines.

Laboratory.—The laboratory practice is designed to give the student a knowledge of the most important commercial tests.

The proper use of electrical instruments is emphasized. A written report of each laboratory test is required. Prerequisites: Engineering Physics III and Integral Calculus.

16. **Alternating-Current Machine Design.** Senior year, spring term. Two hours per week lectures and computing. Two credits. For electrical engineering students.

This course embraces the elementary principles underlying the design of alternating-current apparatus. Students are required to make calculations and drawings for an alternating-current machine. Prerequisite: Alternating-Current Machines II.

17. **Generation and Distribution of Electrical Energy.** Senior year, spring term. Five hours per week recitations or lectures. Five credits. For electrical engineering students.

This course is designed to cover station operation and management, methods of power transmission, and systems of distribution. Each student is assigned an important electrical power station, upon which a detailed written report is required. Textbook, Ferguson's *Elements of Electrical Transmission.*

18. **Power Plant Specifications.** Senior year, spring term. Three hours per week recitations and reports. Three credits. For electrical engineering students.

This work relates to the design and equipment of a modern power plant. Complete specifications for the necessary machinery and apparatus, with drawings showing plan of building and location of machinery and apparatus, are required.

19. **Electric Wiring and Lighting.** Senior year, spring term. Two hours class work per week. Two credits. For architectural students and students in the mechanic arts option in the course in industrial journalism.

This work is planned to cover briefly the principles of illumination, the proper distribution of lighting units, photometric measurements, and inspection work, as based on the "National Electrical Code."

20. **Inspection Trips.** Senior year, spring term. Two credits. For electrical engineering students.

Visits are made to the different power stations in the vicinity of Manhattan, and in Kansas City, where special problems in central-station work are studied. A written report of each inspection trip is required.

21. **Thesis.** Senior year, spring term. Six credits. Required of electrical engineering students before graduation.

The selection of a subject for thesis work, in consultation with the head of the department, is made at the beginning of the winter term. The work is continued during the winter and spring terms. Every opportunity is given the student to work out original ideas as to design or operation.

Department of Mechanical Drawing and Machine Design

Professor SEATON
Assistant JABLOW

The instruction given in this department begins in the sophomore year and extends throughout the remaining years of the course in mechanical engineering, and into the junior year in the courses in electrical and civil engineering. Work given to students in the course in general science, who are specializing in manual training is additional to that outlined above. The object of the course is to ground the students thoroughly in the rudiments of drafting, and allied subjects, rather than to give them speed in execution. The course includes lettering, titling, arrangement of views in machine drawing, the making of detailed working drawings for a complete machine, drawings for factories and power plants, and instruction and practice in blue-printing and other copying processes.

COURSES IN MECHANICAL DRAWING AND MACHINE DESIGN

1. **Mechanical Drawing I.** Sophomore year, fall term. One hour lectures and recitations and four hours drafting-room practice per week. Three credits. For students in courses in mechanical, electrical, and civil engineering and in the mechanic arts option in the course in industrial journalism.

This course includes: a consideration of the fundamental principles of lettering, with a detailed study of the proportions and construction of the inclined Gothic system of letters and figures; the use and care of drawing instruments; simple exercises in making working drawings from given plates; special attention is given to the arrangement of views to secure balance and to the subject matter and layout of titles and notes. Supplies required: triangles, T square, scale, pencils, pens, ink, erasers, thumb tacks, drawing paper, and a set of drawing instruments. Students are advised not to purchase these supplies until after consulting with the instructor. Textbook, Adams's *Mechanical Drawing*. Prerequisite: Descriptive Geometry.

2. **Kinematics I.** Sophomore year, winter term. Four hours lectures and recitations per week. Four credits. For students in the courses in mechanical, electrical, and civil engineering and in the mechanic arts option in the course in industrial journalism.

An analysis of the motions and forms of the parts of machines is considered in this course. Among the subjects discussed are: bearings, screws, worm and wheel; rolling cyl-

inders, cones, and other surfaces; belts, cords and chains, levers, cams, and linkwork, with their velocity diagrams; quick returns, straight-line motions, and other special forms of linkages; conjugate curves for gear teeth, cycloidal and involute systems of gearing, spur, annular and bevel gears, and special forms of gearing. The solution of a large number of graphical and mathematical problems is required in this course. Textbook, Schwamb and Merrill's *Elements of Mechanism.* Prerequisite: Plane Trigonometry.

3. **Mechanical Drawing II.** Sophomore year, winter term. Drafting-room practice, supplemented by occasional lectures, four hours per week. Two credits. For students in the courses in mechanical, electrical, and civil engineering and in the mechanic arts option in the course in industrial journalism.

Free-hand sketches are made from simple machine parts, followed by complete working drawings from these sketches without further reference to the objects. Special emphasis is laid upon the proper selection of views to present the necessary information in convenient form, and to give the proper dimensioning of the drawings. Textbook, Adams's *Mechanical Drawing.* Prerequisite: Mechanical Drawing I.

4. **Mechanical Drawing III.** Sophomore year, spring term. Four hours drafting-room practice per week. Two credits. For students in the courses in mechanical, electrical, and civil engineering and in the mechanic arts option in the course in industrial journalism.

This course includes the designing of cams, gears, and quick returns to fulfill specified conditions. Center-line drawings are first made, embodying the solution of the problem, and upon these are built working drawings of the machine parts. An effort is made to follow standard practice in the design of those details usually determined by empirical methods. Velocity diagrams are drawn for the cams and quick returns. Gear teeth are accurately rolled and drawn from templates prepared by the student. Prerequisites: Kinematics I and Mechanical Drawing II.

5. **Kinematics II.** Junior year, fall term. Two hours lectures and recitations and two hours drafting-room practice per week. Three credits. For students in the course in mechanical engineering.

This course is a continuation of Kinematics I, consisting of a consideration of the following subjects: Mechanisms for producing intermittent motion, such as clicks, ratchets, and escapements; wheels in trains, and combinations of mechanisms. Textbook, Schwamb and Merrill's *Elements of Mechanism.* Prerequisite: Kinematics I.

6. **Mechanical Drawing IV.** Junior year, fall term. Four hours drafting-room practice per week. Two credits. For students in the course in electrical engineering.

This is a continuation of the work in Mechanical Drawing III, together with the design of other machine elements where a knowledge of mechanics of materials is not required. Prerequisite: Mechanical Drawing III.

7. **Machine Design I.** Junior year, winter term. One hour recitations and lectures and four hours drafting-room practice per week. Three credits. For students in course in mechanical engineering.

The course includes the solution of a problem on the slide valve by the Zeuner diagram, followed by the design of the cylinder, piston, steam chest, and valve of a steam engine. Textbooks: Machine design text to be selected; for reference, Kent's *Mechanical Engineer's Pocketbook.*

8. **Machine Design II.** Junior year, spring term. One hour recitations and lectures and four hours drafting-room practice per week. Three credits. For students in the course in mechanical engineering.

This course requires the designing of the crosshead, guides, connecting-rod crank shaft, fly-wheel governing mechanism and frame for the engine whose design is begun in Machine Design I. In both of these courses full working drawings are made of the parts designed.

9. **Manual Training Drawing I.** Elective, fall term. Two hours per week. One credit. For students in the manual training option in course in general science.

Perspective sketches of simple details of construction and projection drawings with tracings and blue-prints of exercises, models, and projects made in Woodwork III G, are required in this course.

10. **Manual Training Drawing II.** Elective, winter term. Eight hours drawing per week. Four credits. For students in manual training option in course in general science.

Cabinet and projection drawings of articles made in Woodwork IV G, Wood Turning, and Pattern Making, are required here.

11. **Manual Training Drawing III.** Elective, spring term. Four hours drawing per week. Two credits. For students in manual training option in course in general science.

Isometric and projection drawings of articles made in blacksmithing and in machine-shop practice, are required under this head.

Department of Power and Experimental Engineering

Professor McCORMICK
Assistant ORR
Assistant JOHNSON
Assistant WILSON

The work given in this department is intended to supplement the courses in applied mechanics, hydraulics, machine design, and steam and gas engineering. The instructor undertakes to show the application of theoretical principles to actual problems, to teach the methods of conducting commercial tests, and to encourage original experimental investigation. The student is required to present a complete report for each experiment performed, which includes such charts, tables, and conclusions as would be embodied in a report given by a consulting engineer in commercial work.

In addition to the equipment installed especially for experimental purposes, all of the heat, power, ventilating, and pumping equipment of the College subserves the further purpose of experimental work.

There are available for boiler tests three 125-horsepower high-pressure boilers identical in construction and setting, but equipped with different mechanical stokers, one having an underfeed stoker, another a chain grate, and a third a rocking grate. Besides the three high-pressure boilers there are eight low-pressure boilers equipped with underfeed stokers and so arranged that they can be run independently or in batteries. These boilers have full equipment of auxiliaries and, in connection with the engines and dynamos, make possible a wide range of experimental work.

The laboratories contain five steam engines, ranging from six horsepower to one hundred horsepower, and a 300-horsepower DeLaval steam turbine. One of these engines and the turbine are direct-connected to generators. Another of the engines is belted to a generator, while the remainder are run in connection with absorption brakes.

The department owns two modern traction engines which are occasionally used for testing purposes. Several types of gas engines are in the laboratories, ranging from three to ten horsepower, and in addition a four-cycle gasoline tractor which will develop thirty-five horsepower. A small compressed-air plant is installed in the laboratories, and consists of an eight-by-eight Ingersoll-Sargent air compressor, driven by an electric motor, driving in turn a small motor the power of which is absorbed by a brake. For experimental work with fans and draft, the College has eight fans, of which two are belt driven, four are direct-connected to motors, and two are driven by a steam engine.

The thermodynamic and hydraulic laboratories are thoroughly equipped with auxiliary apparatus, such as gauges, thermometers, brakes, calorimeters, etc.

There is a 100-horsepower producer-gas plant which is used for experimental purposes.

In the strength-of-materials laboratory there is a 100,000-pound Riehle tension and compression machine, upon which transverse specimens six feet in length can be tested; a beam-testing apparatus, built at the College, which will test reënforced concrete culvert and bridge sections up to two feet in width and fourteen feet in span, and will test beams of timber or reënforced concrete up to ten inches by fourteen inches in cross-section and fourteen feet in length. There is a full equipment of cement and concrete testing machinery and apparatus, and a rumbler and other appliances for testing paving brick and other road materials.

The transmission laboratory contains a transmission and traction dynamometer, an oil-and-bearing-testing machine, a belt-testing apparatus, etc.

COURSES IN POWER AND EXPERIMENTAL ENGINEERING

1. **Steam Engineering P Laboratory.** Junior year, fall term. Two hours per week. One credit. For students in printing.

This course offers practice in the operation and care of small steam engines and boilers, with particular attention paid to methods of adjustment and emergency repairs. Prerequisite: Machine Shop I.

2. **Gas Engineering P Laboratory.** Junior year, winter term. Two hours laboratory practice per week. One credit. Required in the course in printing.

This course offers practice in the operation, adjustment and repair of small gasoline engines and exercises in aligning shafting, babbitting bearings, lacing belts, etc. Prerequisite: Machine Shop I.

3. **Applied Mechanics I Laboratory.** Junior year, fall term. Two hours per week. One credit. For students in the courses in mechanical, electrical, and civil engineering, and in architecture. Taken in connection with Applied Mechanics I.

This course covers laboratory instruction in subjects as follows: The use and determination of accuracy of micrometers, planimeters, slide rules, and calculating machines; calibration of gauges, thermometers, planimeters, indicator springs, dynamometers, platform scales, and tachometers; efficiency tests on hoists and jacks. Reference book recommended, Carpenter and Diederich's *Experimental Engineering*.

4. **Steam Engineering II Laboratory.** Junior year, winter term. Two hours per week. One credit. For students in the course in mechanical engineering. Taken in connection with Steam Engineering II.

This course begins with the study of the construction and care of steam engines, steam turbines, and internal-combustion engines. This is followed by valve-setting and by indicator practice on steam and gas engines. Prerequisites: Applied Mechanics I Laboratory and Steam Engineering I.

5. **Applied Mechanics II Laboratory.** Junior year, winter term. Two hours per week. One credit. For students in the courses in mechanical, electrical and civil engineering, and in architecture. Taken in connection with Applied Mechanics II.

This course covers the following experiments: compression tests of various woods and metals; tensile tests with cast iron, wrought iron, and steel; transverse tests of various woods and metals under concentrated and eccentric loads; tests of welds, hooks, and chains; preparation of standard tensile and compression cement specimens; the use of cement-testing machines. Prerequisite: Applied Mechanics I Laboratory.

6. **Applied Mechanics III Laboratory.** Junior year, spring term. Two hours per week. One credit. For students in mechanical and civil engineering. Taken in connection with Applied Mechanics III.

This course includes tests of cements, sands, and concretes, such as the determination of fineness, soundness, time of set, tensile, transverse and compressive strengths, proper proportioning and mixing of concretes; the use of cement mixers and cement-block machines and the efficiency of the various reenforcing materials; abrasion, freezing, absorption, compression, and transverse tests of brick and stone; torsion tests on metals; and tests of road materials. Prerequisite: Applied Mechanics II.

7. **Steam Engineering III Laboratory.** Junior year, spring term. Two hours per week. One credit. For students in mechanical engineering. Taken in connection with Steam Engineering III.

This is a continuation of the work given in Steam Engineering II Laboratory, and includes testing of steam engines, steam turbines, and gas engines; the use of several different kinds of steam calorimeters and injectors; tests of air compressors and air motors. Prerequisite: Steam Engineering II.

8. **Steam Engineering IV Laboratory.** Senior year, fall term. Two hours per week. One credit. For students in mechanical engineering. Taken in connection with Steam Engineering IV.

This term's work includes the handling and care of boilers, stokers, and pumps; boiler testing; condenser testing; pump

and fan testing; analysis of solid fuels and of flue gases. Prerequisite: Steam Engineering III.

9. **Applied Mechanics IV Laboratory.** Senior year, fall term. Two hours per week. One credit. For students in mechanical engineering. Taken in connection with Applied Mechanics IV.

This course includes tests of bearings and lubricants; impact tests; foundations for machines; road tests with traction dynamometer; measurements of power in transmission, and of slippage of belts. Prerequisite: Applied Mechanics III.

10. **Hydraulic Motors Laboratory.** Senior year, fall term. Two hours per week. One credit. For students in mechanical and civil engineering. Taken in connection with Hydraulic Motors.

This course includes tests to determine the coefficients of weirs, orifices, tubes, and pipes; use and calibration of water meters; tests on water wheels; water motors, rams, and pumps. Prerequisites: Hydraulics and Applied Mechanics I Laboratory.

11. **Steam and Gas Engineering E-I Laboratory.** Senior year, fall term. Two hours per week. One credit. For students in electrical engineering. Taken in connection with Steam and Gas Engineering E-I.

Construction and care of steam engines, steam turbines, internal-combustion engines; indicator practice and valve setting; analysis of liquid and gaseous fuels by means of the Junkers calorimeter; and the use of different kinds of steam calorimeters, are included in this course. Prerequisite: Applied Mechanics I Laboratory.

12. **Steam and Gas Engineering C Laboratory.** Senior year, fall term. Two hours per week. One credit. For students in civil engineering. Taken in connection with Steam and Gas Engineering C.

This course includes construction and care of steam and internal-combustion engines; indicator practice and valve setting; use of steam calorimeters; use of the Junkers gas calorimeter; tests of steam and gas engines; air compressor and compressed-air motor tests. Prerequisite: Applied Mechanics I Laboratory.

13. **Hydraulic Measurements Laboratory.** Senior year, fall term. Two hours per week. One credit. For students in electrical engineering. Taken in connection with Hydraulic Measurements.

Measurement of the flow of water by means of weirs, orifices, tubes, pipes, and water meters; and stream measurements for water and water-supply are treated experimentally in this course. Prerequisite: Hydraulics.

14. **Gas Engineering Laboratory.** Senior year, winter term. Two hours per week. One credit. For students in mechanical engineering. Taken in connection with Gas Engineering.

This course includes the handling and care of gas producers; proximate and ultimate analyses of liquid and gaseous fuels; determination of the boiling point of kerosene, gasoline, and alcohol, and the variation of same with the specific gravity of the fuel; proportions for explosive mixtures; pressure due to explosion; experimental determinations of conditions affecting the mean effective pressure of internal-combustion engines; comparative values of gasoline, kerosene, and alcohol, in the same internal-combustion engine; effect of jacket temperature on thermal efficiency; complete producer and gas-engine tests. Prerequisite: Steam Engineering IV.

15. **Steam and Gas Engineering E-II Laboratory.** Senior year, winter term. Two hours per week. One credit. For students in electrical engineering. Taken in connection with Steam and Gas Engineering E-II.

This course includes: the testing of engines, steam turbines, and internal-combustion engines; use and calibration of injectors; tests of condensers, pumps, and fans; and tests of air compressors and air motors. Prerequisites: Steam and Gas Engineering E-I.

16. **Refrigeration D Laboratory.** Senior year, winter term. Four hours per week. Two credits. For students in the course in dairy husbandry. Taken in connection with Refrigeration D.

Operation and testing of engines and refrigerating machinery; practice in pipe fitting; setting and repairing dairy machinery, are treated experimentally in this course. The time is divided between the engineering laboratory and the dairy building.

17. **Mill Engineering.** Senior year, winter term. Two hours lectures and recitations; six hours drafting-room work. Five credits. For students in mechanical engineering.

This course considers the selection of a locality and site for shops and manufacturing establishments; the grouping and design of the buildings, including the study of slow-burning and fire-proof construction; systems of illumination; equipment for the different departments; the methods of handling the raw material, from the point of its receipt through the several departments to the completion of the finished product, with the least amount of doubling back; methods of manufacturing. Each student makes a complete design of a factory or shop, outlining the method of organization, system of cost accounting, marketing, etc. Textbooks, Kent's *Mechanical Engineer's Pocketbook,* and Arnold's *Factory Manager.* Prerequisites: Applied Mechanics IV and Business Organization.

18. **Heating and Ventilation.** Senior year, spring term. Three hours lectures and recitations; four hours laboratory and drafting-room work. Five credits. For students in mechanical engineering.

This course is planned to acquaint the student with the fundamental principles of the subject, and the following topics are considered: direct and indirect systems; hot water, hot air, live steam and exhaust steam systems of heating; points to be considered in the design of heating systems for shops, factories, power plants, schools, churches, and dwellings; sizes of air ducts, radiators, and heating surface required for the various systems; fan computation and testing; vacuum system; reducing valves, air valves, water expansion tanks, thermostats; efficiencies of various heating systems, and analysis of the systems in use at the College; the design of a system of heating for a special case, with specifications and bill of material. Textbook, to be selected. Prerequisites: Steam Engineering II, III, and IV.

19. **Power Plant Engineering.** Senior year, spring term. Two hours lectures and recitations; six hours laboratory and drafting-room work. Five credits. For students in mechanical engineering.

This course consists of drafting-room work, power-plant tests, and such lectures, recitations, and inspection trips as may be needed to make the course practical and effective. The work includes the laying out of a complete plant for assigned units, and the making of such drawings as are necessary to show the location of boilers, stokers, engines, auxiliaries, piping, chimneys, fans, coal-handling machinery, etc. The student makes a careful study of load conditions, location of plant, and other details. No attempt is made to design apparatus, but standard makes are selected and the student shows in detail the methods of assembling and installing all the machinery and equipment used. The same problem is assigned to the entire class, but during any one term there will be designs of several plants under way. The usual features of each design are taken up before the entire class, so that each student derives benefit from his neighbor's work as well as from his own. Textbook, to be selected. Prerequisites: Steam Engineering IV, Applied Mechanics IV, Hydraulic Motors and Gas Engineering, taken simultaneously.

Department of Printing

Superintendent RICKMAN
Instructor RODELL
Assistant ALLEN

The Department of Printing has been installed permanently in a press building. This structure is 70 x 84 feet, has two stories and a basement, and contains twelve work rooms, six offices, and three lavatories. The department at present uses thirteen of these various rooms, and more will be occupied as needed. The shop is a model one. Work on one current publication, with the varied "jobs" for the several departments of the College, gives practical experience on a wide range of work.

The department operates a well-equipped printing office. The equipment consists of a Babcock Optimus, a Babcock Drum Cylinder, and three Chandler & Price Gordon printing presses, a perforator, two stitchers, and other modern machines, all run by electric power; a large assortment of job faces, all in series and in cabinets, and enough body type to keep one regular publication going, besides the numerous pamphlets, bulletins, etc., constantly on hand.

COURSES IN PRINTING

1. **Composition I.** Freshman year, fall term. Laboratory, six hours. Three credits. Required in the course in printing.

The student is taken to the case, shown the "lay," and explanation is made why it is so arranged. As soon as he is familiar with the boxes most commonly used, he is given a list of short sentences, each of which contains all the letters of the alphabet, and he begins typesetting. The importance of accuracy and of clean proofs is impressed upon him, and the work of each day is graded with this point in view, rather than from the standpoint of the amount of type set. Within a short time copy for the regular publication is given him, beginning with newspaper width (13 ems), and later he is assigned book work (26 ems).

2. **Composition I J.** Freshman, junior, or senior year, winter term. Laboratory, four hours. Two credits. Required in the course in industrial journalism.

This course includes practical work in the composing-room. The value of punctuation, capitalization and English construction are emphasized and authorities consulted. An occasional short lecture on the cardinal virtues of the printer—promptness and accuracy—is given.

3. **Composition II.** Freshman year, winter term. Laboratory, ten hours. Five credits. Required in the course in printing.

This is a continuation of Composition I. Careful justification and even spacing are emphasized as the student progresses. Prerequisite: Composition I.

4. **Composition II J.** Freshman, junior or senior year, spring term. Laboratory, four hours. Two credits. Required in the course in industrial journalism.

The typesetting and other subjects in Composition I are continued. Proper distribution of white space in headings and displays are taken up and demonstrated.

5. **Composition III.** Freshman year, spring term. Laboratory, twelve hours. Six credits. Required in the course in printing.

This course is a continuation of Composition I and II. Prerequisites: Composition I and II.

6. **Distribution.** Sophomore year, fall term. Laboratory, four hours. Two credits. Required in the course in printing.

Distribution of straight matter is the subject of instruction in this course. Prerequisites: Composition I, II, and III.

7. **Advertisement Composition and Distribution.** Sophomore year, fall term. Laboratory, eight hours. Four credits. Required in the course in printing.

At first the student receives copy accompanied by a "draft" or style. Proper selection of type, distribution of white space, relative length and position of lines, etc., are explained. His proofs are critically examined and the defects pointed out. After corrections are made, he takes a "revise" and notes by comparison the effect of the changes that have been made. As soon as his ability justifies it, he is set to making his own "draft." After sufficient practice at this work he sets his advertisements without "draft." During this term he acquires considerable drill in the point system. Prerequisites: Composition I, II, and III.

8. **Job Composition and Distribution.** Sophomore year, winter term. Laboratory, eight hours. Four credits. Required in the course in printing.

Many of the important features of a well-balanced job having been learned while working on advertisements, the student soon becomes proficient. At first he is given reprint copy for reproduction, taking up manuscript copy later. Careful distribution of the job faces is insisted upon, with the result that the job man always finds a "clean" case. The student keeps a record of the time occupied on the various jobs, thus fitting himself to take up later the estimating of jobs. Prerequisites: Composition I, II, and III, and Advertisement Composition and Distribution.

9. **Correcting Proofs.** Sophomore year, winter term. Laboratory, four hours. Two credits. Required in the course in printing.

This is a course in correcting galleys of straight matter. Prerequisites: Composition I, II, and III.

10. **Make-up and Imposition.** Sophomore year, spring term. Laboratory, four hours. Two credits. Required in the course in printing.

This is taught at first by explaining the systems of "work and turn," "work and back," etc., cardboard pages being used for demonstration when type pages are not at hand. Then the student learns to "cut out" pages and lay an eight-page or sixteen-page form. He also "lines up" on the stone for a perfect register, and is taught to figure margins, before and after trimming. Prerequisites: Composition III, Distribution, and Correcting Proofs.

11. **Tabular Composition.** Sophomore year, spring term. Laboratory, eight hours. Four credits. Required in the course in printing.

The student is taught to "cast up" his tables and reduce them to any desired size. Everything is reduced to the point system. Prerequisites: Composition III, Distribution, Correcting Proofs, and Advertisement and Job Composition.

12. **Job Presswork I, II, and III.** Junior year, fall term, laboratory eight hours, four credits; winter term, laboratory six hours, three credits; spring term, laboratory six hours, three credits. Required in the course in printing.

Actual work is taken up from the beginning. The student is given the easy "feeds" at slow speed, the speed being increased as he becomes familiar with his work. Running at a moderate speed and "hitting the gauges every time" is considered to be the best type of work. The instruction impresses upon the student the importance of overlays and underlays, the quantity and quality of the ink, the rigidity and evenness of the impression, etc. With the job presswork, instruction is given in the grades, weights and sizes of paper, especially linens, flats, ledgers, etc., and also in the care of rollers. Cutting stock, trimming and tabbing, stapling, folding, inserting, etc., are all taken up while the student is working on the presses.

13. **Cutting Stock.** Junior year, winter term. Laboratory, two hours. One credit. Required in the course in printing.

This includes getting out stock and cutting it ready for the press, allowing margins before and after trimming.

14. **Trimming and Tabbing.** Junior year, spring term. Laboratory, two hours. One credit. Required in the course in printing.

In Cutting Stock the student gets instruction in margins, but in Trimming and Tabbing the proper proportion of mar-

gins and the neatest and most effective tabbing are emphasized. Prerequisite: Cutting Stock.

15. **Editing Copy**. Senior year, fall term. Laboratory, four hours. Two credits. Required in the course in printing.

While setting type the student is instructed to watch the editing of his copy, in which the marks on his proofs are also of assistance. Construction and punctuation are some of the main features that are considered. The upper classmen often do the editing of the copy of the lower classmen, and the work is practical throughout. Prerequisites: Composition III, and the English work in the course.

16. **Estimating Jobs**. Senior year, fall term. Laboratory, two hours. One credit. Required in the course in printing.

Having had most of his experience in all the work of a printing-office, and having learned the value of keeping his own time tickets, the student then receives practical instruction in estimating on the actual jobs put through the department, which, after completion, are compared with the student's estimates. Prerequisites: Sufficient composing-room and pressroom work to give the student an idea of how much time it would require a compositor or pressman, according to wages paid, to handle the job.

17. **Cylinder Presswork I, II, and III.** Senior year, fall term, laboratory six hours, three credits; winter term, laboratory four hours, two credits; spring term, laboratory eight hours, four credits. Required in the course in printing.

A Babcock No. 5 Optimus is used in the Department of Printing, and the student gets experience in printing book forms, half-tones, rule work, posters—in fact, all the work done on a cylinder press. Here he also learns more about papers, rollers, and inks, care of machines, motors, etc.

18. **Color Composition and Presswork.** Senior year, spring term. Laboratory, four hours. Two credits. Required in the course in printing.

Having had composing-room and pressroom instruction, this work consists largely of dividing forms for color work and selecting pleasing and attractive colors. Mixing inks and matching tints or shades are also considered. Prerequisites: All composing-room and pressroom work.

Department of Shop Methods and Practice

Assistant Professor BRAY
Instructor HOUSE
Instructor CARLSON
Instructor HOLLAR
Instructor DAVIS
Assistant PARKER
Assistant HAYES
Assistant YOST

The work in the shops is planned to meet the needs of three classes of students: (1) those in the courses in agriculture who expect to use the skill gained in the shops in their after work on the farm; (2) those in the manual-training option of the course in general science who need to secure a sufficient knowledge of the principles underlying shop work, and sufficient skill in the performance of various operations, to be able to instruct others; (3) those in the courses in engineering whose need is to secure a thorough knowledge of the methods of performing various kinds of shop work; of the machines best suited for the different purposes; of the amount of work that may be expected of the different machines and from the workmen under different conditions. With these students it is a secondary consideration to secure skill in the performance of the various operations. In order to secure these different results, it is considered desirable to separate these students, especially after the first few terms of elementary work.

The equipment of the department is set forth to a certain extent below.

Wood Shop.—This room is 40 x 90 feet; it contains two hundred and twenty separate sets of tools, and benches for forty-four students in each class.

Pattern Shop.—This room is 45 x 81 feet; it contains twenty ten-inch by four-and-one-half-inch wood-turning lathes and one eighteen-inch by twelve-foot J. A. Fay & Co. pattern makers' lathe, fully equipped with tools and chucks; eight pattern makers' double benches, equipped with rapid acting vises and a complete set of tools.

Woodworking Machinery Room.—This room is 35 x 42 feet, and contains one Dietzwell wood planer, one Coodesman Meyer friezer, one thirty-four-inch band saw, one Beach jig saw, one Fay combination circular saw, one Fay & Egan power mortiser, one Fay & Egan sandpapering machine, besides the necessary grindstones and work benches.

Machine Shop.—This room is 40 x 116 feet, and contains thirteen engine lathes, as follows: One fourteen-inch Hendey-Norton lathe, two fourteen-inch Flather lathes, one thirteen-inch Lodge & Davis lathe, one sixteen-inch Lodge & Shipley combination engine and turret lathe, two fourteen-inch Reed lathes, five fourteen-inch K. S. A. C. lathes, and one twenty-

eight-inch by twenty-foot American lathe equipped with block to raise it to sixty-inch swing, one K. S. A. C. speed lathe, one Brown & Sharp No. 2 universal milling machine, one K. S. A. C. (Hendey-Norton patterns) shaper, one K. S. A. C. (Pratt & Whitney patterns) shaper, one Gray twenty-six-inch by six-foot planer, one Niles fifty-one-inch vertical turning and boring mill, one Baker Bros. key seater, one Barns thirty-four-inch self-feed drill press, one Rogers twelve-inch sensitive drill press, two K. S. A. C. twelve-inch sensitive drill presses, one K. S. A. C. (Bemis Miller's patterns) twenty-inch double traverse quick return shaper, two Morse & Dexter valve reseating machines, one Walker universal grinder, one K. S. A. C. special drill grinder, one Emerson direct-connected motor polishing machine, one bolt machine, one pipe machine, benches and tools for fifty students, and a tool room completely stocked with the finest modern tools.

Blacksmith Shop.—This room is 50 x 100 feet, and is equipped with thirty-three Buffalo down-draft forges for students' use and two large special Buffalo forges for general use. Each forge has anvil and complete set of forging tools, and is supplied with forced draft and power exhaust. In addition to the general tools for a fully equipped blacksmith shop, there is also installed a drill press, punch and shear, emery grinder, power cold saw, and a number of pieces of special apparatus built by the department.

Iron Foundry.—This room is 27 x 100 feet. It is equipped with a two-ton Collan cupola, one-and-one-half-ton K. S. A. C. steel crane, core oven five by six by seven feet (arranged so that it can be heated with either coke or gas), one car, track and turntable, one two-by-three-foot K. S. A. C. rumbler, one K. S. A. C. emery grinder, an exceptionally large number of flasks, both wood and iron, ladles, etc.

Brass Foundry.—This room is 24 x 34 feet. It is equipped with one twenty-one by thirty-six-inch brass furnace, crucibles, flasks, molding tubs, benches, cases, racks, and all necessary tools for bench and floor molding.

Amphitheater.—This room is 54 x 54½ feet. It is adjacent to the blacksmith shop and iron and brass foundries, and is equipped with forge, anvil and forge tools, bench, molding trough and molding tools, blackboard, etc., for lectures and demonstration work.

Locker Room.—This room is 36 x 40 feet. It is conveniently located, and is equipped with 344 special metal lockers for the use of students taking work in the machine shop, blacksmith shop, foundry and engineering laboratory.

COURSES IN SHOP METHODS AND PRACTICE

1. **Woodwork I.** Subfreshman, first year, fall term, and freshman year, fall or winter term. Shop work, supplemented by frequent lectures, four hours per week. Two credits. Required of all male students in the subfreshman course, and of students in the courses in engineering, architecture, printing, and industrial journalism in the freshman year.

A graded set of problems in joinery is given, with practice in working to dimensions and in the proper use and care of bench tools. Tool required: a two-foot pocket folding rule. No prerequisite.

2. **Woodwork II.** Subfreshman, first year, winter term. Shop work, supplemented by frequent lectures, four hours per week. Two credits. Required of all male students in the subfreshman course, and of students in the courses in engineering, architecture, and options in industrial journalism in the freshman year.

This work is a continuation of Woodwork I, with the application of joinery to cabinet construction. A study is made of the various woods used, methods of holding parts together, and the methods of staining, rubbing and polishing both hard and soft woods. Prerequisite: Woodwork I.

3. **Blacksmithing I.** Subfreshman, first year, spring term. Shop work, supplemented by lectures and demonstrations, four hours per week. Two credits. Required of all male students in the subfreshman course, and of students in the courses in engineering, architecture, printing, and mechanic arts option of the course in industrial journalism in the freshman year.

This is a course in the forging of iron, and is designed to teach the operations of drawing, upsetting, welding, twisting, splitting and punching. A study is made of the construction, care and management of the forge, together with a study of the smelting of iron ore and the manufacturing of iron and steel. Tools required: two-foot rule and one pair of five-inch outside calipers. Prerequisite: Woodwork II.

4. **Blacksmithing II.** Subfreshman, second year, winter term, and sophomore year, fall term. Four hours shop, two credits; or one hour lecture and four hours shop, three credits. Required in the subfreshman course, and in the courses in mechanical engineering and electrical engineering; elective in the course in general science.

Advanced work is given in the forging of iron and in the manufacture of steel tools. Instruction is given in tempering, case-hardening, and annealing. Tools required: two-foot rule, one pair of five-inch outside calipers. Prerequisite: Blacksmithing I.

5. **Blacksmithing III Ag.** Freshman year, winter term. Four hours shop work per week. Two credits. For agricultural students.

The shop work given in this course is primarily the work in wagon and implement smithing, and instruction in the shaping and fitting of horseshoes. The latter part of the course is intended to supplement the work given in the Department of Veterinary Medicine, on the structure of the horse's hoof and the methods of shoeing to overcome certain faults or to bring out desired results. This course is based on the supposition that the students have had either the work in the shop given in the subfreshman years, its equivalent in work pursued in other schools, or experience gained in a shop or on the farm. Those who show that they have not the necessary training to carry on this work successfully will be required to substitute the elementary shop work. Prerequisite: Blacksmithing I.

6. **Foundry.** Sophomore year, fall or winter term. One hour lecture and four hours shop work per week. Three credits. Required in the courses in mechanical engineering and electrical engineering and in the mechanic arts option of the course in industrial journalism.

Practice is given in both floor and bench molding, in core making, and in casting in iron, brass, and special alloys. Castings are made for complete machines and machine parts which are built in the machine shop. A study is also made of modern foundry construction, equipment, materials, and methods.

7. **Wood Turning and Pattern Making.** Sophomore or junior year, spring term. One hour lecture and four hours shop work per week. Three credits. Required of students in the courses in mechanical and electrical engineering and in the mechanic arts option of the course in industrial journalism.

Sufficient work is given in wood turning to enable the student to become familiar with turning-lathes and tools, so that he can use the lathes when necessary in pattern construction. The course in pattern making comprises a series of exercises embodying the principles governing pattern construction in making plain and split patterns, including core prints and core boxes, after which practical patterns are made of machines and machine parts. Prerequisite: Foundry.

8. **Woodwork III G.** Junior year, fall term. Lectures and recitations two hours, shop work eight hours per week. Six credits. Elective in the course in general science.

A course is given in woodworking suitable for use in the upper grammar and high-school grades. Each student completes a set of exercises suitable for those grades. Models showing progressive steps are made for the purpose of illustrating the proper methods of procedure in working out the different exercises. A study is made of the selection and cost of the equipment and materials used in this work. Prerequisite: Woodwork II.

9. **Woodwork IV G.** Junior year, winter term. Lectures and recitations one hour, shop work four hours per week. Three credits. Elective in the course in general science.

This is a continuation of Woodwork III G, with a study of cabinet construction best adapted to high-school grades. The work of this term includes a course in wood carving designed to develop skill in using carving tools, in sinking backgrounds, and in modeling curved surfaces. The course includes a study of the proper application of carving in ornamenting articles of use. Prerequisite: Woodwork III G.

10. **Wood Turning G.** Junior year, winter term. Lectures and recitations one hour, shop work four hours per week. Elective in the course in general science.

Exercises are first given in turning cylinders, cones, beads, convex and concave curves, which involve the use of different wood-turning tools. The course involves turning between centers, on faceplates, and by means of hollow chucks. Some of the articles made are tool handles, dumb-bells, napkin rings, towel rings, bowls, typical vase forms, cups, goblets, etc. Tools required: one two-foot rule, one pair of three-inch dividers, one pair of five-inch outside calipers, one pair of five-inch inside calipers. Prerequisite: Woodwork III G.

11. **Machine Shop I.** Junior year, winter term. Shop work, four hours per week. Two credits. Required in the courses in mechanical engineering, electrical engineering, printing, and in the mechanic arts option in the course in industrial journalism and elective in the course in general science.

Practice is given in chipping, filing, scraping, and laying out work from drawings. Tool required: One nine-inch combination square. Prerequisite: Foundry.

12. **Machine Shop II.** Junior year, spring term. Shop work supplemented by lectures, four hours. Two credits. For students in courses in mechanical engineering and electrical engineering and in the mechanic arts option of the course in industrial journalism; elective in the course in general science.

This is a course in metal working, involving the use of the lathe, shaper, and drill press. A study of cutting edges and tool adjustment best suited for different metals, together with a study of cutting speeds and feeds. Tools required: One nine-inch combination square, one pair three-inch dividers, one pair five-inch outside calipers, one pair five-inch inside calipers, one center gauge, one center drill. Prerequisite: Machine Shop I.

13. **Machine Shop III.** Senior year, fall or spring term. One hour lectures, four hours shop work. Three credits. For students in the courses in mechanical and electrical engineering and in the mechanic arts option in the course in industrial journalism.

This course takes up advanced work on lathes, planers, and milling machines. Exercises in turning tapers, cutting threads and gears, in making reamers, drills, taps, and special tools are included. Prerequisite: Machine Shop II.

14. **Blacksmithing III G.** Senior year, winter term. Lectures and recitations, one hour per week; shop work, four hours per week. Three credits. Elective in the course in general science.

Special drill in forge work is given, in order to impart skill in the different operations. Progressive steps of difficult exercises are worked out in order to illustrate the method of their construction. Tools required: a two-foot rule, and a pair of five-inch outside calipers. Prerequisite: Blacksmithing II.

15. **Machine Shop IV.** Senior year, winter term. Shop work, supplemented by lectures, six hours per week. Three credits. For mechanical engineering students.

The time of this course is devoted to the construction of complete machines and machine parts, from drawings and blueprints. Prerequisite: Machine Shop III.

16. **Blacksmithing IV G.** Senior year, spring term. Lectures and recitations, one hour per week; shop work, two hours per week. Two credits. Elective in the course in general science.

A study of ornamental forge work in designing and making articles such as jardiniere stands, andirons, hinges, escutcheons, etc. A portion of the time is devoted to hammered metal work. Problems are worked out in copper and brass, which bring into use typical tools and operations in the handling of sheet metal. Prerequisite: Blacksmithing III G.

17. **Machine Shop III G.** Senior year, spring term. Lectures and recitations, one hour per week; shop work, four hours per week. Three credits. Elective in the course in general science.

The completion of a course in machine shop metal working adapted to the conditions frequently found in high schools. A study is made of the selection of machines, tools, and general supplies; the proper arrangement of the shop, the location of shafting, and other shop problems. Prerequisite: Machine Shop II.

18. **Machine Shop V.** Senior year, spring term. Shop work, supplemented by lectures, four hours per week. Two credits. Required in the course in mechanical engineering.

A continuation of Machine Shop IV, with the construction of jigs and forms for the rapid duplication of parts. Supplementary instruction is given in shop arrangement and management, a study of special machines, also a study of sources, properties and prices of materials used. Prerequisite: Machine Shop IV.

Department of Steam and Gas Engineering

Professor POTTER

The object of the instruction offered in this department is to give to the student the fundamental principles underlying the design, construction, selection, operation and testing of steam boilers, engines, and turbines; gas producers; gas and petroleum engines; compressed-air and refrigerating machinery. These subjects are developed by thorough courses in thermodynamics and steam and gas engineering, and are supplemented in the fourth year by courses in power-plant engineering, refrigeration, and heating and ventilation. The classroom instruction of every course is paralleled by work in the drafting room and in the experimental laboratory.

COURSES IN STEAM AND GAS ENGINEERING

1. **Steam Engineering P.** Junior year, fall term. Lectures and recitations, one hour; laboratory, two hours. Two credits. Required in the course in printing and in the mechanic arts option in the course in industrial journalism.

This course includes a study of small steam engines and boilers; their classification, details of construction, design, operation, and management; and fundamental formulas and calculations.

Laboratory.—See "Power and Experimental Engineering," 1.

2. **Steam Engineering I.** Junior year, fall term. Lectures and recitations, two hours. Two credits. Required in the course in mechanical engineering.

Valve gears are the subject of study here. This course takes up the study of the steam engine mechanism and includes plain slide valves, double valves, radial valves, and drop cutoff valves, with special reference to that of the Corliss engine; link motions as applied to locomotives; the methods of governing steam engines; various valve diagrams, including the Zeuner and Bilgram, with applications to the various types of valves; the methods of setting the various valve gears. Textbooks: Peabody's *Valve Gears,* Heck's *Steam Engine and Turbine.* Prerequisite: Kinematics I.

3. **Gas Engineering P.** Junior or senior year, winter term. Lectures and recitations, one hour; laboratory, two hours. Two credits. Required in the courses in printing and industrial journalism.

This course includes a study of small gas and petroleum engines, transmission machinery, and hydraulic motors. It takes up two- and four-cycle gas engines, their important details when using gas, gasoline, or crude petroleum; care and

management of gas engines; power transmission by gears, belts, chains, and ropes; calculation of sizes of pulleys; classification, construction, care and principles of operation of water motors; selection and adaptability of the various engines and motors for the driving of printing machinery. Prerequisite: Steam Engineering P.

Laboratory.—See "Power and Experimental Engineering," 2.

4. **Steam Engineering II.** Junior year, winter term. Lectures and recitations, three hours; laboratory, two hours. Four credits. Required in the course in mechanical engineering.

This is a course in thermodynamics. A detailed mathematical study of the laws governing the transformation of heat into work; the thermodynamics of gases, saturated and superheated vapors; thermal lines on pressure-volume and entropy-temperature coördinates; the heat engine cycle and the application of the properties of gases to the study of the thermodynamic cycles of internal-combustion engines, hot-air engines, compressed air and air-refrigerating machines, comprise the matter of this course. Textbooks: Peabody's *Thermodynamics,* Peabody's *Tables of Steam and Other Vapors.* Prerequisites: Steam Engineering I, Differential Calculus and Integral Calculus.

Laboratory.—See "Power and Experimental Engineering," 4.

5. **Steam Engineering III.** Junior year, spring term. Lectures and recitations, three hours; laboratory, two hours. Four credits. Required in the course in mechanical engineering.

This course is a continuation of the work as given in Steam Engineering II. The course includes a study of gas and oil engines; properties of explosive mixtures for internal-combustion engines; carburetors and vaporizers for liquid fuels; the application of the laws of vapors to the study of the vapor cycles, including steam engines and vapor-refrigerating machines; the flow of vapors and the design of steam nozzles; the thermodynamic design of the reciprocating steam engine and of the impulse and reaction steam turbine; influence of cylinder condensation, reëvaporation, steam jackets, superheating and compounding on economy. Textbooks: same as for Steam Engineering II. Prerequisite: Steam Engineering II.

Laboratory.—See "Power and Experimental Engineering," 7.

6. **Steam Engineering IV.** Senior year, fall term. Lectures and recitations, three hours; laboratory, two hours. Four credits. Required in the course in mechanical engineering.

This course includes a study of the functions, forms, and principles of operation of boilers, reciprocating steam engines,

and steam turbines; fire-tube, water-tube, marine and locomotive boilers; boiler settings and foundations; methods of staying boilers; boiler accessories; the care of boilers; water purification; smoke prevention; effect of scale and corrosion on economy; boiler inspection; fuels for boilers and analysis of same; theory of combustion; air for combustion; power of boilers; materials for boilers; boiler explosions; strength tests of boilers; evaporative tests of boilers (A. S. M. E. standard methods); boiler design; steam-engine details and calculations for simple, compound, condensing, and noncondensing engines; the jet, surface, and barometric condenser; circulating pumps, dry- and wet-air pumps; regulations of engines; steam-turbine details; tests of reciprocating steam engines and steam-turbines and a study of data based on commercial tests. Textbooks: Peabody and Miller's *Steam Boilers,* Heck's *Steam Engine and Turbine.* Prerequisite: Steam Engineering III.

Laboratory.—See "Power and Experimental Engineering," 8.

7. **Steam and Gas Engineering E-I.** Senior year, fall term. Lectures and recitations, four hours; laboratory, two hours. Five credits. Required in the course in electrical engineering.

This course considers the general laws of thermodynamics as applied to gases, saturated and superheated steam, thermal lines with gases and vapors; heat-engine cycles, including those of internal-combustion engines, hot-air engines, compressed air, steam engines, and refrigerating machines; the steam engine—simple, compound, condensing, and noncondensing—from the thermodynamic standpoint; the functional study of the steam turbine and of the gas engine; the use of steam and entropy tables and charts, and the solution of problems in throttling, nozzle design, flow of steam, and injectors. Textbooks: Kinealy's *Steam Engines and Boilers,* Mehrten's *Gas Engine Theory and Practice.* Prerequisites: Kinematics, Differential Calculus and Integral Calculus.

Laboratory. — See "Power and Experimental Engineering," 11.

8. **Steam and Gas Engineering C.** Senior year, fall term. Lectures and recitations, three hours; laboratory, two hours. Four credits. Required in the course in civil engineering.

This course includes the study of steam boilers, engines, and turbines; fundamental thermodynamic laws underlying the operation of heat engines; classification of steam engines; valve gears; compound steam engines and condensers; fuel and combustion; construction of fire-tube and water-tube boilers; boiler accessories. The impulse and reaction steam turbine; construction of two- and four-stroke gas engines, using liquid and gaseous fuels; the indicator card as a measure of work and basis for the analysis of operation of engines; methods of testing boilers; steam engines, steam turbines, and internal-

combustion engines. Textbooks: Allen and Bursley's *Heat Engines*. Prerequisites: Kinematics, Differential and Integral Calculus.

Laboratory. — See "Power and Experimental Engineering," 12.

9. **Gas Engineering.** Senior year, winter term. Lectures and recitations, two hours; laboratory, two hours. Three credits. Required in the course in mechanical engineering.

This course involves a detailed study of solid, liquid, and gaseous fuels; crude petroleum and its distillates; methods of refining as used in America and in Europe; physical tests for petroleum; petroleum as fuel for internal-combustion engines; gaseous fuels; natural gas; gas manufacturing processes as applied to coal gas, carbureted coal gas, oil gas, water gas, carbureted water gas, wood gas, acetylene gas, blast-furnace gas, and producer gas; the thermal and physical properties of commercial gases; a careful study of the apparatus required in the manufacture of the various commercial gases, including scrubbers, purifiers, and other auxiliaries; gaseous fuels for internal-combustion engines and for heating and lighting purposes; economy of gas, alcohol, crude petroleum, kerosene, and gasoline engines, and comparisons with steam prime-movers. Textbook, to be selected. Prerequisites: Steam Engineering III and Chemistry III.

Laboratory. — See "Power and Experimental Engineering," 14.

10. **Steam and Gas Engineering E-II.** Senior year, winter term. Lectures and recitations, four hours; laboratory, two hours. Five credits. Required in the course in electrical engineering.

This is a continuation of the work as given in Steam and Gas Engineering E-I. This course treats of the different forms of prime-movers, with special reference to the requirements of the modern electric power plant; steam-engine types and the variations in the construction of their most important parts; valve gears and valve diagrams; fuels and combustion; simple, compound, condensing, and noncondensing engines; condensers and condenser auxiliaries; boiler types, and the study of the construction and management of fire-tube and water-tube boilers; feed-water heaters and economizers; stokers; feed-water purification; boiler explosions; steam-turbine types and their adaptability for electrical power generation; details of construction of the leading types; methods of testing engines, turbines, and boilers; internal-combustion engines with liquid and gaseous fuels, and the functional and structural details of same; carburetors and vaporizers for liquid fuels and the gasification of solid fuels by means of gas producers; methods of testing internal-combustion engines; selection of prime-movers for central stations; relative cost, efficiency and durability of

the different types. Textbooks: Kinealy's *Steam Engines and Boilers,* Mehrten's *Gas Engine Theory and Practice.* Prerequisite: Steam and Gas Engineering E-I.

Laboratory. — See "Power and Experimental Engineering," 15.

11. **Refrigeration D.** Senior year, winter term. Lectures and recitations, one hour; laboratory, four hours. Three credits. Required in the course in dairy husbandry.

This course deals with steam and gas engines, systems of refrigeration, and the construction, ventilation, and care of cold-storage rooms and refrigerating plants.

Laboratory.— See "Power and Experimental Engineering," 16.

12. **Refrigeration.** Senior year, spring term. Lectures and recitations, two hours. Two credits. Required in the course in mechanical engineering.

In this course are considered the analysis of the compression and absorption systems; the relative equipment, space economy, fuel and water per ton of refrigeration; details of construction and care of compressors, brine pumps, condensers, tanks, coils, expansion valves, and pipe fittings; cam and plate systems of ice making; refrigerating rooms; cold storage; insulation; carbonic acid and anhydrous systems; cylinder horsepower per ton of refrigeration; commercial refrigerating plants. Textbook, to be selected. Prerequisite: Steam Engineering III.

Trade Courses

In addition to the professional engineering courses, as scheduled, trade courses are offered as follows: (1) foundry and pattern making, (2) blacksmithing, (3) machine-shop and drafting-room practice, (4) boiler and engine operation. These courses are not designed to be in any way substitutes for the four-year courses. They are open to such young men only as are graduates of accredited high schools, or who are twenty-one years of age at the time of entering upon the course. The school years in these courses consist of eleven months, and students are required to be in attendance regularly during that time. The month of August is the vacation period. Students may enter this course at practically any time during the year after having made arrangements for doing so with the dean of the division of mechanic arts. After a student has once enrolled, continuous attendance is expected.

In each course three half-days per week are devoted to academic work and drawing. The academic work consists of trade lectures, written reports on shop and factory methods and practice, and work on the theory and computations pertaining

to the special trade sought by the student. The drawing work consists of preliminary projection drawing and lettering, and as soon as the student becomes proficient, work in making shop drawings and machine details is given.

The practice work naturally varies with the course pursued, and in any one course will vary somewhat from year to year, but in general the following outline will be followed:

1. **Foundry and Pattern Making.** Eight half-days per week throughout two years. This work consists of practice in the iron and brass foundries, setting up molds, core making, cupola operations, and in all classes of work usually found in a high-grade foundry. The pattern work of this course is not taken up until the student has had several months of practice in molding. The first work in the pattern shop consists of such exercises as will familiarize the student with the use and care of the pattern maker's tools. This is followed by the construction of patterns, ranging from simple to intricate designs, to be used afterwards in the foundry and oftentimes by the student who has made them.

2. **Blacksmithing.** Eight half-days per week throughout two years. The greater proportion of the student's time is employed in the blacksmith shop, with considerable practice in the foundry to give him a better knowledge of the processes of producing forge iron and steel, and a slight amount of work in the machine shop to show him the uses to which steel and iron forgings are put after passing from the blacksmith's hands. The work in the blacksmith shop consists of forging and welding common iron, mild steel, and high-carbon steel. The work ranges from simple exercises, designed to teach methods, up through wagon work, tool making and dressing, chisel, tap, reamer, drill, ax and knife tempering, to exercises in ornamental iron forging and design.

3. **Machine Shop.** Eight half-days per week throughout three years. The student taking the course in machine shop devotes considerable time to work in the foundry and blacksmith shop, in order to learn thoroughly the nature of the materials with which he works in the machine shop, and also that he may be able when he gets into practical operations to do such work if an emergency arises. At least two of the three years are devoted to work in the machine shop, and the variety of work done in the College shops is such that an opportunity is offered a young man who is earnest in his desire and who is industrious to become an all-around machinist.

4. **Boiler and Engine Operation.** Nine half-days per week throughout three years. The students in this course are given a slight amount of experience in the machine and blacksmith shops, but at least four-fifths of the time is devoted to engine and boiler operations, dynamo tending, and pipe fitting. With the variety of machinery owned and operated by the College, a

young man can secure experience in practically all branches of power-plant operation, and, if he faithfully attends to his work while taking the course, he should be competent, upon its completion, to take charge of a small plant or to act as assistant in a large one.

Owing to the fact that the College plant is operated for long hours and that oftentimes boilers are run twenty-four hours per day for several months continuously, the student's hours will be arranged in accordance with what seems to be the best method so far as both the needs of the plant and the needs of the student are concerned.

Because of the fact that the number of students that can be taken in these courses is limited, those who are in attendance will be expected to attend strictly to business and to make the most of their opportunities. In case a student fails to do this, he will be requested to withdraw and to make room for some one else.

Mechanic Arts in the Summer School

The College has been unable to supply from its regular graduates all of the teachers in manual training required by the high schools of the State, and in order to encourage the introduction of manual training and industrial drawing in all grades the College offers summer courses for teachers in manual training, agriculture, and domestic science.

The work in drawing is an elementary course in freehand and object drawing especially designed to assist teachers in the use of the state text in drawing.

In manual training and shop practice several courses are offered, embracing different grades of work and different materials. One of these is for pupils in the primary grades and includes weaving, cord work, raffia, reed work and cardboard construction. Other courses deal with woodworking for the grammar grades and for high schools. These include not only a careful study of tools and processes, and practice in important exercises in joinery, but practical cabinet construction, wood turning, wood carving and inlaying, polishing and finishing.

In metal work a course in forging includes practical exercises for high-school work, involving the operations of drawing, upsetting, welding, twisting, splitting and shaping. Sufficient instruction is given in the forging of tool steel to enable one to make and temper many of the tools needed in high-school work. Another course includes bench work and machine-tool work, and familiarizes the student with some of the fundamental operations of a modern machine shop.

A special circular giving further details of this work may be had upon application to the President of the College. See, also, article in this catalogue on the Summer School.

Engineering Fellowships

The Board of Regents has recently established two fellowships in engineering. Each fellowship is two years in duration. The holder is expected to devote eleven months of the year to the work laid out, and receives from the College $450, annually.

To be eligible for appointment, the applicant must be a graduate of a technical course of a school or college of recognized standing. Preference will be given to those who have had some commercial experience along the lines of research to be followed.

The time will be divided approximately as follows: One half the time will be devoted to the solution of some research problem; twenty to thirty per cent will be devoted to some problem in design, such problem being selected with a view to producing results of actual value in the near future; the remaining portion of the time will be devoted to assisting in laboratory, drafting room, or shops, as may seem desirable.

Applications for fellowships should be made to the dean of the division of mechanic arts, and should state the lines of work that the applicant particularly desires to follow.

Division of Home Economics

The philosophy which long ruled our educational policy has been so modified by research in the sciences and by development of the industries, arts, and professions, that it is now recognized that any perfected educational system must include technical training. It must encourage the student's natural desire for productive work—work in which there is a living connection between theory and practice. These broader views have been accepted by college and university men, and the result is noted in the success attained by combining industrial, technical, and scientific work with the general studies. The result is evidenced in the new courses of study for our young men and women. It is safe to assume that there are now but few educators who are so conservative as not to be in sympathy with the collegiate education in home training which is furnished by courses in home economics.

The courses are designed to fit young women to be home makers and capable women in whatever sphere their life work may be. The training is both specific and general. While it emphasizes primarily the practical and material side of life, it does not stop here. The young women are constantly reminded that life is not all drudgery; that technical knowledge and scientific skill, even, fail to include the full meaning of education in its highest sense. They are taught that any training that fails to develop harmoniously body, mind, and spirit is inadequate and incomplete. They are brought face to face with ideals as well as with actualities, and are made to see that, while skilful labor is the crowning dignity of life, grace, refinement, and self-poise are the highest ingredients of true service.

The training given is as varied as it is broad. It includes a knowledge of the laws of health, an understanding of the sanitary requirements of the home; the study of values, both absolute and relative, of the various articles (including food) that are used in the home; the wise expenditure of money, time, and energy; the scientific principles underlying the selection and preparation of food; the right care of children; and the ability to secure efficient service from others. Instruction is methodical and thorough, and is suited to the circumstances of the students. Experience shows that such training teaches contentment, industry, order, and cleanliness, and fosters a woman's independence and feeling of responsibility.

Two courses are offered in home economics:

A four-year course, leading to degree of bachelor of science.

A six-month housekeepers' course, for which a certificate of proficiency is granted.

COURSE IN HOME ECONOMICS

The popularity of the four-year home economics course is evidenced by the fact that fully eighty-five per cent. of the girls who graduate from the College graduate from this course. The training is both general and specific. Since scientific training is fundamental in the intelligent and successful administration of the home, strong courses in the sciences are given as a foundation for the special training in home economics. To the end that well-rounded culture may be attained, courses in English, art, history, economics, and psychology receive due prominence. The time of the student is about equally divided among the purely technical subjects, the fundamental sciences, and the cultural studies. The courses in the related subjects are given in the different departments of the College, while the technical courses are given by the home economics departments. In the senior year opportunity is given for choice of electives, which makes it possible for the student to specialize in some chosen line. To this end electives are to be chosen in groups combined logically in courses approved by the Faculty or by the student's dean.

The four-year course is recommended for all who desire to teach domestic science or domestic art. It is with difficulty that the home economics training schools meet the demand for well-prepared teachers, a demand which is increasing more rapidly each year. The College does not assume the responsibility of insuring employment to graduates, but the latter rarely experience difficulty in obtaining remunerative positions as instructors in domestic science or in domestic art, as dietitians, or as professional housekeepers.

Course in Home Economics

The Arabic numeral immediately following the name of a subject indicates the number of credit units, while the numerals in parentheses indicate the hours a week of recitation and of laboratory, respectively.

All young women in this course below the junior year, unless excused by the dean of women, take physical training; except, that in the sophomore year music may be taken instead; provided the student has at least one year of physical training credited; and provided further, that physical training taken in the preparatory course may be substituted for a like amount of physical training in this course. Women excused from physical training on account of physical disability are provided by their dean with an equivalent or stronger substitute from the regular course, and their normal work later in the course is increased by that amount.

FRESHMAN

FALL TERM	WINTER TERM	SPRING TERM
Narrative Writing 4 (4-0)	Theme Writing 4 (4-0)	Hist. of English Literature 4 (4-0)
Chemistry I 4 (2-4)	Chemistry II 4 (2-4)	Chemistry III 4 (2-4)
Algebra IV 4 (4-0)	Food Preparation I 3 (1-4)	Household Physics 4 (4-0)
Methods of Study 1 (1-0)	Making Undergarments 2 (0-4)	Food Preparation II 3 (1-4)
Hand Sewing 3 (1-4)	Object Drawing I 2 (0-4)	Making Shirt-Waist Suit 3 (1-4)
Free-Hand Drawing 2 (0-4)	Geometrical Drawing 2 (0-4)	

SOPHOMORE

FALL TERM	WINTER TERM	SPRING TERM
College Rhetoric 4 (4-0)	English Literature 4 (4-0)	Public Speaking 4 (4-0)
General Zoology I-W 4 (2-4)	General Zoology II-W 4 (2-4)	Embryology 4 (2-4)
Qualitative Analysis 4 (2-4)	El. Organic Chemistry 4 (4-0)	Human Physiology 4 (4-0)
Color and Design I 2 (0-4)	Color and Design II 2 (0-4)	Home Decoration 2 (0-4)
Drafting and Designing 3 (1-4)	Dressmaking 3 (0-6)	Advanced Dressmaking 2 (0-4)
Working Drawings I 1 (0-2)	Working Drawings II 1 (0-2)	Food Production 2 (2-0)

JUNIOR

Elementary German I 4 (4-0)	Elementary German II 4 (4-0)	German Readings 4 (4-0)
General Bacteriology 4 (2-4)	Household Bacteriology Lab. 2 (0-4)	Civics 4 (4-0)
Household Chemistry 4 (1-6)	Food and Nutrition I 8 (4-8)	Food and Nutrition II 8 (3-10)
Human Nutrition 4 (4-0)	Psychology 4 (4-0)	Kitchen Gardening 2 (2-0)
Textiles 2 (2-0)		

SENIOR

American History I 4 (4-0)	American History II 4 (4-0)	Economics 4 (4-0)
Dietetics 4 (2-4)	Household Sanitation 4 (4-0)	Home Nursing 3 (3-0)
Landscape Gardening I 2 (2-0)	Household Entomology 2 (2-0)	Therapeutic Cookery 3 (1-4)
Electives 8 (-)	Electives 8 (-)	Electives 8 (-)

ELECTIVES

Home Management 4 (4-0)	Presentation of Domestic Science 4 (3-2)	Bread Making 4 (2-4)
Tailoring 4 (1-6)	Millinery 4 (1-6)	Art Needlework 4 (1-6)
Physiological Chemistry I 4 (4-0)	Physiological Chemistry II 4 (4-0)	Hygienic Bacteriology 4 (2-4)
German Comedies 4 (4-0)	German Prose I 4 (4-0)	German Prose II 4 (4-0) *or* Teachers' German 4 (4-0)
Rhetoric of Oratory 4 (4-0)	The English Drama 4 (4-0)	American Literature 4 (4-0) *or*
Argumentation and Debate 4 (4-0)	English Practice 4 (4-0)	19th Century Literature 4 (4-0) Applied English 4 (4-0)
Music 4 (4-0)	Music 4 (4-0)	Music 4 (4-0)
French History 4 (4-0)	Modern Europe (44-0)	English History 4 (4-0)

History of Education, Philosophy of Education, Methods of Teaching, School Management, and School Law are required by Kansas State law of all who are candidates for a State teacher's certificate. These courses are offered by the College and may be taken as electives. See elective groups, course in general science.

Department of Domestic Art

Professor BECKER
Instructor COWLES
Assistant HUMFELD
Assistant MUTCHLER
Assistant BAYHA
Assistant HOBBS
Assistant SMILEY

Since the design and making of clothing is no longer taught in the home, it should have a place in the training of girls in our schools and colleges. Under a system carefully planned, and properly carried out, sewing may become as educational a process as is any other of the industrial arts. It develops thrift and encourages neatness, cleanliness, order, a sense of management, and industry.

The object of the instruction in domestic art is to give young women a practical knowledge of the selection of materials, their growth and the process of their manufacture, the characteristics of the textile fabrics, the quantity of material needed, its cost and suitability. The work also gives a practical knowledge of all the varieties of hand and machine sewing, and of the principles of dressmaking, tailoring, and millinery, with as much practice in their application as time will allow.

Materials for the models in Sewing I are furnished to the student, but she must furnish her own thread, thimble, needles, and tape measure. In courses 2, 3, 4, and 5, the student furnishes her own materials and makes her own garments. Printed notes are supplied by the department for a small sum. A written examination is held at the close of each term.

COURSES IN DOMESTIC ART

1. **Sewing I.** Subfreshman, first year, fall term. Class work, one hour; laboratory, four hours. Three credits. Required of all subfreshman young women.

This course deals with the history and manufacture of needles, pins, machines, scissors, and tape measures.

Laboratory.—The student makes a number of models, covering a full course in hand sewing, different kinds of stitches, seams, hems, tucks, gathering, overhanding, darning, patching, and making buttonholes; also, each student makes a fancy sewing apron and a work bag.

2. **Sewing II.** Subfreshman, first year, winter term. Class work, one hour; laboratory, four hours. Three credits. Required of all subfreshman young women.

Discussion of appropriate materials and trimmings for undergarments. Lecture on cotton, its growth and manufacture. Care and use of machine and attachments. Prerequisite: Sewing I.

Laboratory.—Making a cooking apron, a corset cover, and a nightdress.

3. **Sewing III.** Subfreshman, first year, spring term. Class work, one hour; laboratory, four hours. Three credits. Required of all young women in the subfreshman course.

Lectures on estimated cost and amount of material suitable for undergarments; embroideries, laces, and other trimmings. Prerequisite: Sewing II.

Laboratory.—Drafting, cutting and making of underskirt and drawers. Material used: muslin, longcloth, cambric, or nainsook.

4. **Hand Sewing.** Freshman year, fall term. Class work, one hour; laboratory, four hours. Three credits. Required in the course in home economics and in the home economics option in the course in industrial journalism; elective in the course in general science.

The history and manufacture of cotton, and of pins, needles, scissors, tape measures, and sewing machines are here treated.

Laboratory.—The students in this subject are required to prepare a full series of models covering a course in hand sewing.

5. **Making Undergarments.** Freshman year, winter term. Laboratory, four hours. Two credits. Required in the course in home economics and in the home economics option in the course in industrial journalism; elective in the course in general science.

This is a course in drafting, cutting, and making underskirt and drawers, utilizing various kinds of cloth.

6. **Making Shirt-Waist Suit.** Freshman year, spring term. Class work, one hour; laboratory, four hours. Three credits. Required in the course in home economics and in the home economics option in the course in industrial journalism; elective for young women in the course in general science.

A study of the growth and manufacture of flax, wool, and silk. Prerequisite: Making Undergarments.

Laboratory.—Drafting and making of an unlined dress, the materials used being madras, gingham, linen, lawn, or percale.

7. **Drafting and Designing.** Sophomore year, fall term. Class work, one hour; laboratory, four hours. Three credits. Required in the course in home economics and in the home economics option in the course in industrial journalism; elective for young women in the course in general science.

The study of color and design as applied to dress and the selection of materials. Instruction in the use of bought patterns. Directions for the removal of spots by liquid and dry cleaning. Prerequisite: Making Shirt-Waist Suit.

Laboratory.—The laboratory work consists in taking measures, drafting, designing, and making paper patterns and crinoline models in copied and original designs.

8. **Dressmaking.** Sophomore year, winter term. Laboratory, six hours. Three credits. Required in the course in home economics and in the home economics option in the course in industrial journalism; elective for young women in the course in general science.

This is a laboratory course devoted to the fundamental principles of dressmaking. Each student is required to take measures, and to draft and make a cloth dress. Prerequisites: Hand Sewing, Making Shirt-Waist Suit, and Drafting and Designing.

9. **Advanced Dressmaking.** Sophomore year, spring term. Four hours. Two credits. Required in the course in home economics and in the home economics option in the course in industrial journalism; elective for young women in the course in general science.

A laboratory course in designing, drafting, and making an elaborate street, house or evening dress; emphasizing the artistic side of line and decoration in dress. Prerequisite: Dressmaking.

10. **Textiles.** Junior year, fall term. Class work, two hours. Two credits. Required in the course in home economics and in the home economics option in the course in industrial journalism.

The study of textiles and their beginning in the art of primitive peoples; the making of a simple loom; weaving and designing. Prerequisite: Advanced Dressmaking.

11. **Tailoring.** Senior year, fall term. Class work, one hour; laboratory, six hours. Four credits. Elective in the course in home economics.

This is principally a laboratory course in the making of jackets and coats. Instruction is given also in tailoring as applied to dress. Prerequisite: Advanced Dressmaking.

12. **Millinery.** Senior year, winter term. Laboratory, eight hours. Four credits. Elective in the course in home economics.

This is chiefly a laboratory course, in which the student receives elementary instruction in the making of buckram and wire frames, and in covering them with velvet, silk, or straw. Instruction is also given in the making of fitted and shirred facings, puffed edges, folds, bows, and rosettes.

13. **Art Needlework.** Senior year, spring term. Class work, one hour; laboratory, six hours. Four credits. Elective in the course in home economics.

This is for the most part a laboratory course, which undertakes to give the student the necessary stitches used in decorative art, and at the same time endeavors to cultivate artistic feeling and judgment in the choice of design and color, and in the decoration of fancy dress waists, collars, undergarments, and household articles.

Department of Domestic Science

Professor VAN ZILE
Assistant Professor DOW
Instructor LINDSEY
Instructor HUSE
Assistant MILES
Assistant HUMPHREY
Assistant STORMS
Assistant CATON
Assistant FORD
Assistant HAMMOND

Technically, domestic science is an application of the science of bacteriology to the study of home sanitation and hygiene; of physiology and chemistry to the composition of foods and their effect upon the human body; of physics as applied to heating and lighting. Since the home is dependent upon the sciences of chemistry, physiology, and bacteriology, and the application of these to hygiene, direct use of the principles of these sciences is made in the lessons in cookery, dietetics, home nursing, and household management. In the kitchen laboratory a standard system of measurement is taught, and constant emphasis is laid upon neatness, accuracy, and economy in the handling of materials and utensils. Science, applied science, and practice are presented in their proper relations, so that the student who completes these courses gains not only a theoretical knowledge of the principles underlying the profession of home making, but experience in applying them.

COURSES IN DOMESTIC SCIENCE

1. **Cookery I.** Subfreshman, second year, fall term. Laboratory, four hours. Two credits. Required of all young women in the subfreshman course.

2. **Cookery II.** Subfreshman, second year, winter term. Laboratory, four hours. Two credits. Required of all young women in the subfreshman course.

3. **Cookery III.** Subfreshman, second year, spring term. Laboratory, four hours. Two credits. Required of all young women in the subfreshman course.

The purpose of Cookery I, II, and III is to familiarize the student with laboratory methods, and to give fundamental knowledge of foods and their preparation. The purpose is to develop skill and efficiency in the handling of materials, utensils, stoves, and fuels.

4. **Food Preparation I.** Freshman year, winter term. Lecture, one hour; laboratory, four hours. Three credits. Required in the course in home economics, and in the home economics option of the course in industrial journalism; elective for young women in the course in general science.

5. **Food Preparation II.** Freshman year, spring term. Class work, one hour; laboratory, four hours. Three credits. Required in the course in home economics and in the home economics option of the course in industrial journalism; elective for young women in the course in general science.

In Food Preparation I and II foods are classified according to similarities in their composition which cause them to be divided into groups representative of the five food types—carbohydrates, fats, proteids, mineral matter, and water; their sources, composition, and digestive value are also considered.

Laboratory.—Principles underlying the cooking of food are illustrated in the preparation of representative foods. Students with subfreshman assignments are not admitted to Food Preparation I and II.

6. **Food Production.** Sophomore year, spring term. Class work, two hours. Two credits. Required in the course in home economics.

This course is a study of food materials, their growth, the conditions under which they are matured and marketed, and the problems which relate to their storage and transportation. Lectures are given and reference work is required.

7. **Food and Nutrition I.** Junior year, winter and spring terms. Class work, four hours; laboratory, eight hours. Eight credits. Required in the course in home economics and in the home economics option of the course in industrial journalism; elective for young women in the course in general science.

A study of food and its relation to the body, to the composition of the body, and to the daily income of nutrients required and the output of waste. Carbohydrates are considered as to their classification, composition, occurrence, and general properties, which matters are followed by a study of typical carbohydrate foods. Fats and proteids are studied in the same manner. Food values and costs are emphasized throughout the course. Lectures are given and reference work is required. Prerequisites: General Bacteriology, and Human Nutrition.

Laboratory.—Experimental cookery. This is an experimental study of carbohydrates, fats, and proteids, the knowledge thus gained being then applied to the preparation of foods of known composition.

8. **Food and Nutrition II.** Junior year, spring term, or senior year, fall term. Class work, three hours; laboratory, ten hours. Eight credits. Required in the course in home

economics and in the home economics option of the course in industrial journalism; elective for young women in the course in general science.

A review of the chemistry and physiology of digesting; a study of fermentation in its relation to preservation of fruits and vegetables. Lectures are given and reference work is required. Prerequisite: Food and Nutrition I.

Laboratory.—Marketing and serving, and fruit preservation. This course gives an opportunity for practice in home cookery, and includes the planning, preparation, and serving of meals, with practice in the canning of fruits and vegetables, and in fancy cookery.

9. Dietetics. Senior year, fall term. Class work, two hours; laboratory, four hours. Four credits. Required in the course in home economics.

A study of the fundamental principles of human nutrition, as applied to the feeding of individuals under varying physiological, economic, and social conditions; a study of the metabolism of carbohydrates, fats, and proteids, and a discussion of dietary standards. Lectures are given and reference work is required. Prerequisites: Food and Nutrition I and II.

Laboratory.—A practical comparison is made of the nutritive values of the common foods by computing, preparing, and serving dietaries of specific costs in which specified nutrients are furnished.

10. **Household Sanitation.** Senior year, winter term. Class work, four hours. Four credits. Required in the course in home economics, and in the home economics option of the course in industrial journalism.

This course includes a study of the conditions which determine the healthfulness of the house, and the application of principles of sanitation to its care. Sanitary construction, ventilation, heating, lighting, and plumbing of the house, are considered. Lectures are given and reference work is required. Prerequisite: Working Drawings.

11. **Home Nursing.** Senior year, spring term. Class work, three hours. Three credits. Required in the course in home economics, and in the home economics option of the course in industrial journalism.

This course covers the furnishing and care of the sick room, the giving of baths, administration of medicines, recording of symptoms, the giving of first aid to the injured, and the intelligent use of antiseptics and disinfectants. Prerequisite: Dietetics.

12. **Therapeutic Cookery.** Senior year, spring term. Class work, one hour; laboratory, four hours. Three credits. Required in the course in home economics.

Abnormal conditions of digestion, assimilation, and metabolism, alterations of secretions, and destruction of tissue due to germ diseases are studied, together with those diets adapted to the conditions and needs of the system under special conditions. Prerequisite: Dietetics.

Laboratory.—This comprises a study of diet in relation to disease, together with the preparation of food suitable for the sick, including the arrangement of attractive trays for the invalid.

13. **Home Management.** Senior year, fall term. Class work, four hours. Four credits. Elective in the course in home economics.

The purpose is to secure an intelligent judgment regarding the general management of the home. The place of the home and the homemaker in the economic world, the value and cost of house furnishings and their care, the apportionment and judicious expenditure of the income, the method of keeping accounts, and the general cost of living, are the subjects studied. Lectures are given and reference work is required.

14. **Presentation of Domestic Science.** Senior year, winter term. Class work, three hours; laboratory, two hours. Four credits. Elective in the course in home economics.

This is a study of methods of preparation on the part of the teacher for the class exercises, the mode of conducting it, the making of lesson and course outlines, and the arrangement and equipment of laboratories, together with the cost of equipment and supplies.

15. **Bread Making.** Senior year, spring term. Class work, two hours; laboratory, four hours. Four credits. Elective in the course in home economics.

This course includes a microscopic study of yeasts, a careful consideration of milling methods, visits to mills, and an investigation of all the conditions that may affect the quality of bread. Many methods are followed in the preparation of bread and comparisons are made of the various methods.

Short Courses in Home Economics

HOUSEKEEPERS' COURSE

There are large numbers of young women who, from lack of time, are unable to take an extended course, but who recognize the need for special training in home making. The twentieth century demands of home managers an understanding of the sanitary requirements of the home, a knowledge of values, absolute and relative, of the articles used in the house, quick attention to details, good judgment in buying, and a ready adaptation of means to the end in view. The purpose of the housekeepers' course is to furnish this training. The teaching in this course is no less accurate than in the regular course, but is necessarily different. Given to students without scientific training, the instruction must be more largely a presentation of facts, without an elaboration of the underlying principles. The work is intensely practical, and the hundreds of girls who take this course go back to their homes with a broader view of life, and a knowledge and training that will enable them to meet their responsibilities.

REQUIREMENTS FOR ADMISSION

Girls between the ages of eighteen and twenty-one are admitted upon presentation of common-school diploma, grammar-school certificate, or high-school diploma, or upon passing an examination in the following subjects: reading, writing, spelling, arithmetic, grammar, geography, physiology, and United States history. Young women over twenty-one are admitted without examination.

HOUSEKEEPERS' COURSE

The Arabic numeral immediately following the name of a subject indicates the number of credit units, while the numerals in parentheses indicate the number of hours a week of recitation and of laboratory, respectively.

FALL TERM.		WINTER TERM.	
Cookery I	5 (0-10)	Cookery II	6 (0-12)
Sewing	6 (0-12)	Home Nursing	2 (2-0)
Color and Design	3 (0-6)	Dressmaking	4 (0-8)
		Floriculture	2½ (2-1)

SUBJECTS TAUGHT IN HOUSEKEEPERS' COURSE

1. **Cookery I.** Fall term, ten hours.

A laboratory course. Stoves, stove construction, stove management, and fuels are the first topics considered, and are followed by experiments illustrating the effect of heat upon starch and proteids. The necessary elementary principles involved are then applied to the cooking of cereals, vegetables, beverages, breads, meats, soups, and simple cake mixtures and puddings.

2. **Sewing.** Fall term, twelve hours.

A laboratory course. The student makes a model-book covering the full course in hand sewing, comprising basting,

gathering, darning, patching, etc. Machine practice; drafting, cutting, and making underskirt and drawers; drafting, fitting and making dress without lining. Materials for the model work are provided by the College. Each pupil furnishes her own material for the garments.

3. **Color and Design.** Fall term, six hours.

A laboratory course in simple designing and in studying color relations, with special reference to problems in the home.

4. **Cookery II.** Winter term, twelve hours.

A laboratory course. The work of the term is divided into three parts. Four weeks are given to the planning and serving of meals; four weeks to the study of diet in relation to disease, with the preparation of suitable food; and four weeks to canning, preserving, and the making of salads, cakes, pastries, and desserts.

5. **Home Nursing.** Winter term, two hours.

This course includes the study of the sick room and its care and furnishing, and the duties of the home nurse in giving intelligent assistance to the physician, and in contributing to the comfort of the sick. This involves also the ability to recognize and report symptoms correctly; to relieve pain; to give baths; to change bedding; to disinfect; and to treat wounds, burns, and sprains, as well as to meet successfully other emergencies that may arise in the home.

6. **Dressmaking.** Winter term, eight hours.

A laboratory course. The student is taught the use of a dress-cutting system, and the cutting, fitting, and making of a woolen dress. She must furnish her own material, and must cut and make a dress for herself.

7. **Floriculture.** Winter term. Class work, two hours; laboratory, one hour.

Lectures in the class room are supplemented by practical exercises in the greenhouse, dealing with the propagation and culture of flowers. Soil requirements, the planting of seeds, transplanting, cultivation, the making of cuttings, the selection of varieties adapted to the purposes of window gardening, lawn planting and cutting, are discussed in the lectures. An opportunity to become acquainted with the species recommended, and with the operations necessary for their successful culture, is afforded in the laboratory practice.

HOME ECONOMICS IN THE SUMMER SCHOOL

In addition to instruction in various branches of home economics available to many teachers in the spring term, the College offers several courses in this subject during the summer session. Instruction in these courses is intended to represent correctly that which may be introduced successfully into

graded schools and high schools. Students will be enrolled upon presentation of a teacher's certificate, or of a certified statement showing that two years' high-school work or its equivalent has been completed.

The general subject of the presentation of home economics is one of the courses offered. Here attention is given to the application of the general principles of teaching to the teaching of domestic science and domestic art, to the planning of lesson and course outlines, and to the equipment of laboratories for grade schools and high schools.

In the courses in domestic science the preparation of food is discussed in its different phases, and the principles studied in the classroom are amply illustrated in the laboratory demonstrations.

In the courses in domestic art, the theory of hand and machine sewing, making shirt-waist suits, and drafting and designing is taught and given ample laboratory demonstration.

A special circular giving in detail the courses offered in the Summer School may be had by applying to the President of the College. See, also, the article on Summer School in this catalogue.

Division of General Science

In the class of colleges to which this institution belongs, the classical studies of the older type of college are replaced by work in the sciences and in vocational subjects. A sound basis for technical training includes thorough training in mathematics, physical science, and biological science. It is believed also that education should include some preparation for the discharge of one's duties to the state and to the community in which he lives. It should afford him that discipline and culture which alone can give him a grasp of the relations among things, a breadth of view, a tolerant attitude, and hence an influence over his associates and fellow citizens of every station in life.

It is the province of the departments grouped in this division of the College to give this basal scientific, cultural, and disciplinary training. Their work is not only foundational, but it penetrates through all the characteristic vocational courses of the institution, as the structural steel of the modern skyscraper penetrates the entire building and forms a secure framework and support for the parts more readily visible. These departments thus give unity to all of the four-year courses of study, although presenting but two courses that are distinctive of their own work. These, however, by means of electives and options, are susceptible of manifold modification and application.

THE COURSE IN GENERAL SCIENCE

The course in general science is the lineal descendant of the single course formerly offered here. It includes fundamental training in English, mathematics, science, history, economics, and physical culture required in the several specialized vocational courses now offered by the College and chosen by the great body of our students. Its required subjects constitute the central educational basis of the institution. By means of a number of groups of electives, it gives an opportunity to students to advance themselves still further in these fundamental lines and to give special attention to some instead of taking the vocational subjects characterizing other courses. This opportunity meets the need of several types of young people, among whom are: (1) Those who have not yet fully decided as to their vocation, but who wish an education that is strong and well balanced in respect to modern science and cultural subjects, as a foundation for further education or as a preparation for sound citizenship and intellectual satisfaction in life.

(2) Those who are looking forward to teaching in the high schools of the State. The electives offered allow one to give special attention to mathematics, physical science, biological science, elementary agriculture, elementary domestic science and art, history, economics, English, and professional educational subjects. (3) Those who are fitting themselves for research work in the sciences, especially as applied to agriculture, engineering, and other industries.

The elective groups offered in this course are to a considerable extent made up of studies required in one or more of the specialized courses. They provide also, however, advanced work not included in other courses. The scientific work in connection with the Agricultural and Engineering Experiment Stations, and several fields of State investigation and service, calls for the operation of unusually well-equipped departments in the sciences, and excellent facilities for practical training in this work are thus afforded.

While the course in general science offers a wide choice of electives, these may not be selected aimlessly, or with the idea of choosing the easiest, or of obtaining credit for miscellaneous subjects taken elsewhere or in other courses. The studies of the freshman and sophomore years are basal and are required of all, without exception. They insure a broad and adequate foundation for subsequent work in the several lines of electives. The electives are to be chosen in groups, combined logically in courses approved by the Faculty or by the dean of the Division of General Science. Students changing from other courses to the course in general science receive credit for work done in the other courses so far as it fits into the general plan of this one.

The course in general science in the junior and senior years requires of all students civics, American history, economics, psychology, and philosophy. This gives opportunity for the election of nineteen or more additional studies. Not fewer than seventy-six credit units are to be chosen in groups, in such a manner as to give logical coherence to the course as a whole. The elective portion of the course, as thus made up, will consist for the most part of five or six groups of three full studies or their equivalent. It is possible to include one group of three studies and a single additional study that may be advantageously taken without others. For a few courses special combinations in sewing, cooking, and shop work have been planned to meet the needs of prospective teachers of manual training.

The course in general science is thus many in one. Such various combinations of groups are possible that it is not practicable to print all of them in extended form. There are, therefore, formally presented herewith the required subjects of the course in their specified order by years and terms, together with a considerable number of groups of electives. Finally, combinations of these groups that have been approved

are indicated by means of numbers assigned to the several groups. Other combinations may be arranged.

THE COURSE IN INDUSTRIAL JOURNALISM

Knowledge is power only as it comes into the possession of those who can use it; it gives pleasure in direct proportion to the extent of its diffusion. A discovery is of but little value as long as the discoverer is the only one who knows of its existence, and the printed page is by far the most effective means of extending knowledge concerning it. Magazines and newspapers never sleep, nor do they take vacations, and their power to elevate mankind is incalculable. But printed knowledge becomes effective only as it is read, and to be read in this day it must stand out from the great mass of other matter, and gain the attention and hold the interest of the reader. To do this, its points must be sharp and easily seen, and the style must be attractive. On the other hand, if the presentation is not essentially true, the more attractive it is the worse it is, and the greater the harm that follows wide reading of it.

The purpose of the course in industrial journalism is to equip men and women with fundamental knowledge, that they may both recognize that which is new, and distinguish truth from falsehood; to enable them to set a proper valuation upon facts as related to the industrial world, that the emphasis of their writings may be properly placed; and to write clear, accurate, forceful, entertaining English.

A writer might advantageously know everything; this being impossible and the field being so broad, this course as offered by the College includes, in the first place, studies that are basic to all industrial life and its presentation—English, history, economics, physics, chemistry, the biological sciences, etc., and two years in the theory and practice of effective writing and publication. In the second place, this course gives opportunity for choice from among four groups of subjects directed towards agriculture, mechanic arts, home economics, and general science, respectively. Thirdly, in each of these options several free electives are left which, subject to the approval of the dean of the Division of General Science, may be filled with any subject offered in the College that bears upon the special work contemplated. Thus, a student choosing the agricultural option may elect subjects that will give him additional special knowledge concerning farm crops, live stock, horticulture and forestry, or farm mechanics.

The College thus affords preparation for work in a wide and inviting field. Our unprecedented industrial achievements have been made by the application of discoveries in physical and biological science. Much of discovery, and much of application, is yet to come, and he or she who can write truthfully and entertainingly of that which is, and of that which comes, will find ample reward.

Course in General Science

The Arabic numeral immediately following the name of a subject indicates the number of credit units, while the numerals in parentheses indicate the number of hours a week of recitation and of laboratory, respectively.

All young men in this course below the junior year are required to take military drill; except, that sophomores who have had one year of drill may take physical training instead of military drill, and that physical training taken in the preparatory course may be substituted for a like amount of physical tnining in this course. All men excused from military drill on account of physical disability are provided by their dean with an equivalent or stronger substitute from the regular work required in the course, and their normal work later in the course is increased by that amount.

All young women in this course below the junior year, unless excused by the dean of women, take physical training; except, that in the sophomore year music may be taken instead; provided the student has at least one year of physical training credited; and provided further, that physical training taken in the preparatory course may be substituted for a like amount of physical training in this course. Women excused from physical training on account of physical disability are provided by their dean with an equivalent or stronger substitute from the regular course, and their normal work later in the course is increased by that amount.

FRESHMAN

FALL TERM	WINTER TERM	SPRING TERM
Narrative Writing 4 (4-0)	Theme Writing 4 (4-0)	Hist. of Eng. Literature 4 (4-0)
Chemistry I 4 (2-4)	Chemistry II 4 (2-4)	Chemistry III 4 (2-4)
Algebra IV 4 (4-0)	Plane Trigonometry 4 (4-0)	College Algebra 4 (4-0)
Zoology I 4 (2-4)	Zoology II 4 (2-4)	Zoology III 4 (2-4)
Free-Hand Drawing 1 (0-2)	Geometrical Drawing 2 (0-4)	Object Drawing I 2 (0-4)
Methods of Study 1 (1-0)		

SOPHOMORE

College Rhetoric 4 (4-0)	English Literature I, *or* English Literature* 4 (4-0)	English Literature II, *or* Analytical Geometry* 4 (4-0)
Public Speaking 4 (4-0)	General Physics I 4 (3-2)	General Physics II 4 (3-2)
Qualitative Analysis 4 (2-4)	El. Organic Chemistry 4 (4-0)	English History 4 (4-0)
Plant Morphology 4 (2-4)	Plant Physiology I 4 (2-4)	Plant Physiology II 4 (2-4)

JUNIOR

Psychology 4 (4-0)	Civics 4 (4-0)	Economics 4 (4-0)
Electives† 12 or more credit units	Electives 12 or more credit units	Electives 12 or more credit units

SENIOR

American History I 4 (4-0)	Electives 16 or more credit units	Philosophy 4 (4-0)
Electives 12 or more credit units		Electives 12 or more credit units

* If the student is planning to elect the biological groups for the junior and senior years, English Literature and Analytical Geometry must be chosen at this point instead of English Literature I and English Literature II.

† Electives are to be chosen by groups, and in combinations approved by the Faculty or the dean of the Division of Science.

Elective Groups—Course in General Science

FALL TERM	WINTER TERM	SPRING TERM
	1	
Elementary German I 4 (4-0)	Elementary German II 4 (4-0)	German Readings 4 (4-0)
	2	
German Comedies 4 (4-0)	German Prose I 4 (4-0)	German Prose II 4 (4-0)
	3	
Analytical Geometry 4 (4-0)	Differential Calculus 4 (4-0)	Integral Calculus 4 (4-0)
	4	
Radiant Energy 4 (3-2)	Physical Measurements 4 (2-4)	Physical Manipulations 4 (2-4)
	5	
Inorganic Chemistry I 5 (3-4)	Inorganic Chemistry II 5 (3-4)	Inorganic Chemistry III 5 (3-4)
	6	
Organic Chemistry I 5 (3-4)	Organic Chemistry II 5 (3-4)	Organic Chemistry III 5 (3-4)
	7	
Physiological Chemistry I 4 (4-0)	Physiological Chemistry II 4 (4-0)	Human Physiology 4 (4-0), *or* General Geology 4 (4-0), *or both*
	8	
General Bacteriology 4 (2-4)	Adv. Verteb. Zoology I 4 (2-4)	Adv. Verteb. Zoology II 4 (2-4)
	9	
Plant Pathology I 4 (2-4)	Plant Pathology II 4 (2-4)	Taxonomic Botany 4 (1-6)
	10	Plant Breeding *or*
Economic Botany 4 (3-2)	Evolution of Plants 4 (4-0)	Plant Physiology III 4 (2-4) Mathematics of Biology 4 (4-0)
	11	
General Entomology 4 (3-2)	Taxonomy of Insects 4 (0-8)	Gen. Economic Entomology 4 (3-2)
	12	
Plant Pathology I 4 (2-4)	Embryology 4 (2-4)	General Zoology Technique 4 (0-8) Mathematics of Biology 4 (4-0)
	13	
Plant Pathology I 4 (2-4)	Dairy Bacteriology 4 (2-4)	Hygienic Bacteriology 4 (2-4)
	14	Water Purification and Sewage Disposal 4 (1-6) Mathematics of Biology 4 (4-0)
Soil Bacteriology 4 (2-4)	Serum Therapy 4 (3-2)	
	15	
General Bacteriology 4 (2-4)	Household Bacteriology 4 (2-4)	Human Physiology 4 (4-0)

16

Human Nutrition
4 (4-0)

Food Preparation I
3 (1-4)

Food and Nutrition I
8 (4-8)

Food Preparation II
3 (1-4)

Food and Nutrition II
8 (3-10)

17

Hand Sewing
3 (1-4)

Drafting and Designing
3 (1-4)

Color and Design I
2 (0-4)

Working Drawings I
1 (0-2)

Making Undergarments
2 (0-4)

Dressmaking
3 (0-6)

Working Drawings II
1 (0-2)

Making Shirt-Waist Suit
3 (1-4)

Adv. Dressmaking
2 (0-4)

18

History of Education
4 (4-0)

Methods of Teaching
4 (4-0)

School Management
4 (4-0)

Philosophy of Education
4 (4-0)

19

Farm Crops I
2 (1-2)

Live Stock I
3 (1-4)

Farm Crops II
4 (2-4)

Farm Mechanics I
2 (1-2)

Poultry Management I
2 (1-2)

Live Stock II
3 (1-4)

20

Live Stock III
2 (0-4)

Dairying I
4 (2-4)

Farm Crops III
4 (2-4)

Elective in Agriculture
2-4 (-)

Forestry I
4 (3-2)

Soils
4 (2½-3)

Plant Propagation
5 (3-4)

Live Stock IV
3 (1-4)

Landscape Gardening II
3 (2-2)

21

Woodwork I
2 (0-4)

Woodwork III G.
6 (2-8)

Woodwork II
2 (0-4)

Woodwork IV G
3 (1-4)

Wood Turning G
3 (1-4)

Blacksmithing I
2 (0-4)

Foundry and Pattern Mkg.
6 (0-12)

22

Engineering Physics I
5 (3-4)

Blacksmithing II
3 (1-4)

Machine Shop I
2 (0-4)

Manual Tr. Drawing I
1 (0-2)

Clay Modeling
3 (1-4)

Engineering Physics II
5 (3-4)

Blacksmithing III G
3 (1-4)

Machine Shop II
2 (0-4)

Manual Tr. Drawing II
4 (0-8)

Engineering Physics III
5 (3-4)

Blacksmithing IV G
2 (1-2)

Machine Shop III G
3 (1-4)

Manual Tr. Drawing III
2 (0-4)

Kinematics I
4 (4-0)

23

Rhetoric of Oratory 4 (4-0)	The English Drama *or* The English Novel 4 (4-0)	American Literature *or* 19th Century Literature 4 (4-0)

24

Sociology 4 (4-0)	Business Organization 2 (2-0) Labor Problems 2 (2-0)	Money and Banking 2 (2-0) Public Finance 2 (2-0)

25

Theory of Music History of Music Harmony	One hour of each a week each term through the year with instrumental or vocal music daily. 12 credit units.

26

Harmony, continued through the year, with instrumental or vocal lessons and daily practice. 12 credit units.

27

French History 4 (4-0)	Modern Europe 4 (4-0) *or* Business Law 2 (2-0) *and* International Law 2 (2-0)	American History II 4 (4-0) *or* Kansas History 2 (2-0) *and* Farm Law 2 (2-0)

28

Sociology 4 (4-0)	Business Law 2 (2-0) International Law 2 (2-0)	American Literature 4 (4-0)

29

General Entomology 4 (3-2)	General Bacteriology 4 (2-4)	Human Physiology 4 (4-0) General Geology 4 (4-0)

30

Elementary Journalism 2 (2-0) Journalism Practice I 2 (0-4)	Farm Writing 2 (2-0) Journalism Practice II 2 (0-4)	Gathering News 2 (2-0) Journalism Practice III 2 (0-4)

31

Copy Reading 2 (2-0) Journalism Practice IV 2 (0-4)	Newspaper Law 2 (2-0) Journalism Practice V 2 (0-4)	Editorial Practice 2 (2-0) Journalism Practice VI 2 (0-4)

32

Projection Drawing 2 (0-4)	Object Drawing II 2 (0-4)	Linear Perspective 2 (0 4)
Ink Rendering 2 (0-4)	Water Color Rendering 2 (0-4)	Object Drawing III 2 (0-4)

33

General Bacteriology 4 (4-0)	Histology I 6 (3-6)	Histology II 2 (1-2)
Histology III 4 (2-4)		Pathology I 4 (4-0)
Comp. Physiology I 2 (2-0)	Comp. Physiology II 6 (4-4)	Comp. Physiology III 4 (2-4)
Pathology II 4 (2-4)	Pathology III 4 (2-4)	Pathology IV 4 (2-4)

34

Sociology 4 (4-0)	Rural Sociology 4 (4-0)	Community Surveys 2 (2-0)

35

Argumentation and Debate 4 (4-0)	English Practice 4 (4-0)	Applied English 4 (4-0)

The following subjects and others may be elected independently of other members of groups if prerequisites have been taken:

General Entomology 4 (3-2)	Technique of Speech 2 (2-0)	Human Physiology 4 (4-0)
General Bacteriology 4 (2-4)	General Bacteriology 4 (2-4)	Geology I 4 (4-0)
Sociology 4 (4-0)	Ethics 4 (4-0)	American Literature 4 (4-0)
Industrial Education 4 (4-0)	School Law 2 (2-0)	Forms of Public Address 4 (4-0)
Modern Europe 4 (4-0)	Rural Sociology 4 (4-0)	American History II 4 (4-0)
Photography 3 (2-2)	Rural Education 4 (4-0)	German Classics 4 (4-0)

The following illustrative combinations have been arranged:

Physics and Mathematics—1, 3, 4, 5, 28, and 29.
Chemistry, Physics, and Mathematics—1, 2, 3, 4, 5, 6, and Geology.
Chemistry and Mathematics—1, 2, 3, 5, 6, and 7, including both Physiology and Geology.
Chemistry and Domestic Science—1, 2, 5, 6, 15, and 16.
Biological Science, major work in Botany—1, 2, 7, 8, 9, and 10.
Biological Science, major work in Zoölogy—1, 2, 7, 8, 11, and 12.
Biological Science, major work in Bacteriology—1, 2, 7, 8, 13, and 14.
Education and Domestic Science and Art—1, 2, 15, 16, 17, and 18.
Education and Agriculture—1, 2, 18, 19, and 20.
Education and Manual Training—3, 18, 21, and 22.
Education and Humanities—18, 23, 24, and 27 and two groups Mathematics or Science.
History and English—1, 2, 23, and 27 and two groups Mathematics or Science.
History and Economics—1, 2, 24, and 27 and two groups Mathematics or Science.
Economics and English—1, 2, 23, 24, and two groups Mathematics or Science.
English and Music—1, 28, 25, 26, and two groups Mathematics or Science.

Course in Industrial Journalism

The Arabic numeral immediately following the name of a subject indicates the number of credit units, while the numerals in parentheses indicate the number of hours a week of recitation and of laboratory, respectively.

All young men in this course below the junior year are required to take military drill; except, that sophomores who have had one year of drill may take physical training instead of military drill, and that physical training taken in the preparatory course may be substituted for a like amount of physical training in this course. All men excused from military drill on account of physical disability are provided by their dean with an equivalent or stronger substitute from the regular work required in the course, and their normal work later in the course is increased by that amount.

All young women in this course below the junior year, unless excused by the dean of women, take physical training; except, that in the sophomore year music may be taken instead; provided the student has at least one year of physical training credited; and provided further, that physical training taken in the preparatory course may be substituted for a like amount of physical training in this course. Women excused from physical training on account of physical disability are provided by their dean with an equivalent or stronger substitute from the regular course, and their normal work later in the course is increased by that amount.

FRESHMAN

FALL TERM	WINTER TERM	SPRING TERM
Narrative Writing 4 (4-0)	Theme Writing 4 (4-0)	Hist. of Eng. Literature 4 (4-0)
Chemistry I 4 (2-4)	Chemistry II 4 (2-4)	Chemistry III 4 (2-4)
Algebra IV 4 (4-0)		
Option 6 (-)	Option 10 (-)	Option 10 (-)

SOPHOMORE

College Rhetoric 4 (4-0)	English Literature I 4 (4-0)	English Literature II 4 (4-0)
General Zoology I-W * 4 (2-4)	General Zoology II-W * 4 (2-4)	General Bacteriology * 4 (2-4)
General Bacteriology † 4 (2-4)	General Zoology I-V † 4 (2-4)	General Zoology II-V † 4 (2-4)
English History 4 (4-0)	Modern Europe 4 (4-0)	Economics, *or* in agr. option, Civics 4 (4-0)
Option 6 (-)	Option 6 (-)	Option 6 (-)

JUNIOR

Elementary Journalism 2 (2-0)	Farm Writing 2 (2-0)	Gathering News 2 (2-0)
Journalism Practice I 2 (0-4)	Journalism Practice II 2 (0-4)	Journalism Practice III 2 (0-4)
Civics 4 (4-0), except in agr. option	American History I 4 (4-0)	American History II 4 (4-0)
Option 10 (-) *or* in agr. option 14 (-)	Option 10 (-)	Option 10 (-) *or* in agr. option 6 (-) and Economics 4 (4-0)

SENIOR

Copy Reading 2 (2-0)	Newspaper Law 2 (2-0)	Editorial Practice 2 (2-0)
Journalism Practice IV 2 (0-4)	Journalism Practice 2 (0-4)	Journalism Practice VI 2 (0-4)
Sociology 4 (4-0)	Business Organization 2 (2-0)	Public Speaking 4 (4-0)
Option 10 (-)	Option 12 (-)	Option 10 (-)

* For young women. † For young men.

For options that complete the above course, see the following pages.

Agricultural Option

Course in Industrial Journalism

The Arabic numeral immediately following the name of a subject indicates the number of credit units, while the numerals in parentheses show the number of hours a week of recitation and of laboratory, respectively.

FRESHMAN

FALL TERM	WINTER TERM	SPRING TERM
Farm Crops I 2 (1-2)	Farm Crops II 4 (2-4)	Live Stock II 3 (1-4)
Live Stock I 3 (1-4)	Woodwork I 2 (0-4)	Woodwork II 2 (0-4)
Free-hand Drawing 1 (0-2)	Geometrical Drawing 2 (0-4)	Poultry Management I 2 (1-2)
	Composition I-J 2 (0-4)	Composition II-J 2 (0-4)
		Methods of Study 1 (1-0)

SOPHOMORE

Live Stock III 2 (0-4)	El. Organic Chemistry 4 (4-0)	Plant Propagation 5 (3-4)
Dairying 4 (2-4)	Object Drawing I 2 (0-4)	(Civics) 4 (4-0)

JUNIOR

Plant Morphology 4 (2-4)	Plant Physiology 4 (2-4)	Agricultural Chemistry 2 (2-0)
General Physics I 4 (2-4)	General Physics II 4 (2-4)	(Economics) 4 (4-0)
Farm Crops III 4 (3-2)		
Elective 2 (-)	Elective 2 (-)	Elective 4 (-)

SENIOR

Principles of Feeding 4 (4-0)	Soils 4 (2½-3)	Animal Breeding 4 (4-0)
French History 4 (4-0)		
Elective 2 (-)	Elective 8 (-)	Elective 6 (-)

Mechanic Arts Option

COURSE IN INDUSTRIAL JOURNALISM

The Arabic numeral immediately following the name of a subject indicates the number of credit units, while the numerals in parentheses show the number of hours a week of recitation and of laboratory, respectively.

FRESHMAN

FALL TERM	WINTER TERM	SPRING TERM
Methods of Study 1 (1-0)	Plane Trigonometry 4 (4-0)	College Algebra 4 (4-0)
Free-Hand Drawing 1 (0-2)	Descriptive Geometry I 2 (0-4)	Descriptive Geometry II 2 (0-4)
Geometrical Drawing 2 (0-4)	Object Drawing I 2 (0-4)	Blacksmithing I 2 (0-4)
Woodwork I 2 (0-4)	Woodwork II 2 (0-4)	

SOPHOMORE

Foundry 3 (1-4)	Kinematics I 4 (4-0)	Analytical Geometry 4 (4-0)
Mechanical Drawing I 3 (1-4)	Mechanical Drawing II 2 (0-4)	Mechanical Drawing III 2 (0-4)

JUNIOR

Differential Calculus 4 (4-0)	Integral Calculus 4 (4-0)	Surveying I 2 (0-4)
Engineering Physics I 5 (3-4)	Engineering Physics II 5 (3-4)	Engineering Physics III 5 (3-4)
		Wood Turning and Pattern Making 3 (1-4)

SENIOR

Machine Shop I 2 (0-4)	Machine Shop II 2 (0-4)	Machine Shop III 3 (1-4)
Steam Engineering P 2 (1-2)	Gas Engineering P 2 (1-2)	Electric Motors P 2 (1-2)
C. E. Drawing I 2 (0-4)	Residences 4 (4-0) *or* Spher. Trig. and Astron. 3 (3-0)	Electric Wiring and Lighting 2 (2-0)
French History 4 (4-0)	Composition I-J 2 (0-4)	Composition II-J 2 (0-4)
	Elective 2 (-)	

Home Economics Option

COURSE IN INDUSTRIAL JOURNALISM

The Arabic numeral immediately following the name of a subject indicates the number of credit units, while the numerals in parentheses show the number of hours a week of recitation and of laboratory, respectively.

FRESHMAN

FALL TERM	WINTER TERM	SPRING TERM
Methods of Study 1 (1-0)	Object Drawing I 2 (0-4)	
Free-Hand Drawing 2 (0-4)	Geometrical Drawing 2 (0-4)	Household Physics 4 (4-0)
Hand Sewing 3 (1-4)	Making Undergarments 2 (0-4)	Making Shirt-Waist Suit 3 (1-4)
	Food Preparation I 3 (1-4)	Food Preparation II 3 (1-4)

SOPHOMORE

Drafting and Designing 3 (1-4)	Dressmaking 3 (0-6)	Adv. Dressmaking 2 (0-4)
Color and Design I 2 (0-4)	Color and Design II 2 (0-4)	El. Organic Chemistry 4 (4-0)

JUNIOR

Human Physiology 4 (4-0)	Human Nutrition 4 (4-0)	Food and Nutrition I 8 (4-8)
Textiles 2 (2-0)	Household Entomology 2 (2-0)	
French History 4 (4-0)	Home Decoration 2 (0-4)	
	Composition I-J 2 (0-4)	Composition II-J 2 (0-4)

SENIOR

Food and Nutrition II 8 (3-10)	Household Sanitation 4 (4-0)	Home Nursing 3 (3-0)
Landscape Gardening I 2 (2-0)	Elective 8 (-)	Elective 6 (-)

General Science Option

COURSE IN INDUSTRIAL JOURNALISM

The Arabic numeral immediately following the name of a subject indicates the number of credit units, while the numerals in parentheses show the number of hours a week of recitation and of laboratory, respectively.

FRESHMAN

FALL TERM	WINTER TERM	SPRING TERM
Farm Crops I 2 (1-2)	Plane Trigonometry 4 (4-0)	College Algebra 4 (4-0)
Live Stock I 3 (1-4)	Woodwork I 2 (0-4)	Woodwork II 2 (0-4)
Free-Hand Drawing 1 (0-2)	Geometrical Drawing 2 (0-4)	Methods of Study 1 (1-0)
	Composition I-J 2 (0-4)	Composition II-J 2 (0-4)

SOPHOMORE

Qualitative Analysis 4 (2-4)	El. Organic Chemistry 4 (4-0)	Human Physiology 4 (4-0)
Elective 2 (-)	Object Drawing I 2 (0-4)	Elective 2 (-)

JUNIOR

Plant Morphology 4 (2-4)	Plant Physiology I 4 (2-4)	Plant Physiology II 4 (2-4)
French History 4 (4-0)	General Physics I 4 (2-4)	General Physics II 4 (2-4)
Elective 2 (-)	Elective 2 (-)	Elective 2 (-)

SENIOR

Psychology 4 (4-0)	Philosophy 4 (4-0)	American Literature *or* 19th Century Literature 4 (4-0)
Elective 6 (-)	Elective 8 (-)	Elective 6 (-)

Department of Bacteriology

Assistant Professor BUSHNELL
Assistant HUNTER
Assistant JACKLEY

The Department of Bacteriology occupies a part of the first and second floors of the veterinary building. The space is divided into offices and private laboratories, an experiment station and research laboratory, two large general laboratories, incubator or temperature room, wash room, and stock room. The laboratories are well lighted and equipped with gas, lockers, ice chests, sterilizers, wall cases, microscopes, and other modern facilities necessary for bacteriological work.

The instruction consists of lectures, recitations, demonstrations, and laboratory practice. Printed synopses of the lectures, and printed laboratory directions, are furnished the students in some of the courses; in others, textbooks are required. The departmental library contains all of the textbooks on bacteriology and allied subjects, also the current files of the important technical periodicals relating to bacteriology. These are at the constant disposal of the students for reference. To those who desire to do graduate work, the department offers excellent facilities.

The science of bacteriology is presented to the student as a biological science and as a practical factor in every-day life. In this subject only the simplest forms of life, consisting almost invariably of one-celled organisms, are studied. At the present time it is possible to study these microscopical forms with ease and accuracy, thus paving the way for a more complete study and a better understanding of cells in the aggregate. The second point of view from which this subject is approached is in respect to its practical application in agriculture, medicine, domestic science, and sanitary engineering.

COURSES IN BACTERIOLOGY

1. **General Bacteriology.** Sophomore year, fall, winter, spring term, and junior year, fall term. Two lectures and four laboratory hours per week. Four credits. Required in the courses in agronomy, animal husbandry, dairy husbandry, horticulture, veterinary medicine, printing, industrial journalism, and home economics; elective in the course in general science.

A general introductory course, consisting of lectures, recitations, and demonstrations, covering the morphological and biological characters, classification, and distribution of bacteria; factors necessary for the development of bacteria; culture media, cultural features, staining values, and fundamental principles of applied bacteriology. Printed synopses of the lectures are furnished. No textbook is required.

Laboratory.—The student prepares culture media and becomes familiar with the principles of sterilization, incubation, and general laboratory technique. During the last half of the term organisms representing the different families and genera of Migula's classification are studied microscopically and culturally. Printed laboratory directions are furnished.

2. **Sanitary Biology I and II.** Junior year, fall and winter terms. One lecture and four laboratory hours per week. Three credits each term. Required in the course in civil engineering.

Consideration is given to morphology, classification, distribution, and life processes of bacteria. Attention is given also to general characters of algæ, fungi, and protozoa in their relation to potable water. The interpretation of the results of quantitative and qualitative bacteriological examinations of water. Significance of the presence of various bacterial species in drinking water. Water-borne diseases and microörganisms involved. Typhoid fever epidemics. The bacteriology of sewage and sewage effluents. Methods of water purification and sewage disposal.

Laboratory.—During the first term of this course the student acquires a working knowledge of bacteriological technique. The second term is utilized in conducting quantitative and qualitative examinations of water and sewage from different sources according to the standard methods. The course includes a comparative study of presumptive tests for the detection of the presence of *B. coli communis* in water. Printed laboratory directions are furnished.

3. **Soil Bacteriology.** Junior or senior year, fall term. Two lecture and four laboratory hours per week. Four credits. Elective in the course in general science.

An introductory course covering the principles of soil bacteriology as defined at the present time, and fitting the student for independent research on soil bacteriological problems. Historical sketch of bacteriology. The influence on bacterial flora of depth and character of soil, temperature, moisture, chemical reaction, aëration, and other factors. Activities of soil bacteria, ammonification, nitrification, denitrification, symbiotic and nonsymbiotic nitrogen fixation. Printed copies of synopses of lectures are furnished. Lipman's *Bacteria in Relation to Country Life* is recommended as a reference book. Prerequisite: General Bacteriology.

Laboratory.—The preparation of various special culture media and reagents necessary to conduct bacteriological analyses of the soil. Gravimetric and volumetric methods of quantitative analysis. Qualitative analysis and the laboratory study of ammonification, nitrification, denitrification, symbiotic and nonsymbiotic nitrogen fixation. Pot experiments and field work illustrating the influence of various factors upon the bacterial flora, and the inoculation of soil with symbiotic nitrogen-fixing bacteria. Printed laboratory directions are furnished.

4. **Household Bacteriology.** Junior year, winter term. Class work, two hours; laboratory, four hours per week. Four credits. Elective in the course in general science. The laboratory work is required in the course in home economics. Two credits.

This course is designed to give the student a more thorough knowledge of those microörganisms of importance in the household. The significance of bacterial findings in the analysis of water, milk, and foods. Consideration of those conditions which tend to increase or decrease the bacterial content of these substances. Some time is given to the principles of sanitation in regard to public health. The classwork is a more theoretical consideration of the problems undertaken in the laboratory.

Laboratory.—A study of bacteria and their activities, both beneficial and harmful, in their relation to household economy. Bacteriological study of water, milk, and foods. The determination of potability of water. Milk contamination, effect of cooling upon the bacterial content of milk, and pasteurization of milk. Microscopical study of yeasts and molds. The spoilage of canned vegetables and fruits. Methods of food preservation. The manufacture of vinegar. Study of fermentations, thermal death point of various species of bacteria, and the germicidal action of various disinfectants. Printed laboratory directions are furnished. Prerequisite: General Bacteriology.

5. **Dairy Bacteriology.** Junior year, winter term. Two lecture and four laboratory hours per week. Four credits. Required in the course in dairy husbandry; elective in the course in general science.

Consideration of bacterial flora of milk, butter, and cheese, infectious diseases conveyed through dairy products, bacterial contamination of milk by air, water, utensils, etc. Normal and abnormal fermentations in milk, their significance and control. Printed synopses of the lectures are furnished. Conn's *Dairy Bacteriology* is recommended as a text and reference book. Prerequisite: General Bacteriology.

Laboratory.—The preparation of cultural media necessary for dairy bacteriological work. The study of milk contamination and quantitative and qualitative bacteriological analyses of milk. The microscopical and cultural characters of the types of microörganisms representing the flora of milk, butter, and cheese. Types of milk-fermenting organisms. The examination of cream, wash water, and separator slime. The effect of temperature on the growth of milk bacteria. Pasteurization of milk. Examination of milk for the presence of *Bacterium tuberculosis,* leucocytes and streptococci. Printed laboratory directions are furnished. Russell and Hastings's *Experimental Dairy Bacteriology* is recommended as a reference book.

6. **Pathogenic Bacteriology.** Junior year, spring term. Two lecture and four laboratory hours per week. Four credits. Required in the course in veterinary medicine.

A study of the morphology, powers of resistance, pathogenesis, distribution, channels of infection and means of dissemination of pathogenic bacteria, especially those related to the specific infectious diseases of animals. Variations in the form of infectious diseases. Antitoxins, vaccines, and specific treatments. Epizoötic and epidemic diseases of unknown etiology. Buchanan's *Veterinary Bacteriology* is recommended as a textbook. Prerequisite: General Bacteriology.

Laboratory.—A study of the microscopical and cultural character of pathogenic bacteria. Laboratory animal inoculation, autopsy, and diagnosis. The preparation of tuberculin, mallein, and other biological products used in the diagnosis, prevention, and treatment of specific infectious diseases. Printed laboratory directions are furnished.

7. **Hygienic Bacteriology.** Junior or senior year, spring term. Two lecture and four laboratory hours per week. Four credits. Elective in the courses in home economics and general science.

A study of pathogenic bacteria, especially those related to diseases of man. Channels of infection and means of dissemination of pathogenic bacteria. Epidemics, their cause and control. Isolation, disinfection, and quarantine. Prophylaxis against specific infectious diseases and important precautions necessary in the control of communicable diseases. Printed synopses of the lectures are furnished. Jordan's *Textbook of Bacteriology* is recommended as a textbook. Prerequisite: General Bacteriology.

Laboratory.—Microscopical and cultural study of pathogenic bacteria. Technique involved in the demonstration of flagella, diagnosis of *Bacterium tuberculosis* in sputum and in the culture of pathogenic anaërobic bacteria. The isolation and identification of pathogenic bacteria from animal tissues, from pus and exudates. Printed laboratory directions are furnished.

8. **Water Purification and Sewage Disposal.** Junior or senior year, spring term. One lecture and six laboratory hours per week. Four credits. Elective in the course in general science.

A study of the bacterial content of natural waters and the factors which may influence the bacterial flora of the water. Bacterial indicators of pollution. The collection and transmission of water samples. Interpretation of results of bacteriological analyses. Methods of water purification and sewage disposal. The application of water sanitation to rural homes and municipalities. *Elements of Water Bacteriology,* by Pres-

cott and Winslow, and *Water Supplies,* by Savage, are recommended as textbooks. Prerequisite: General Bacteriology.

Laboratory.—Quantitative and qualitative examinations, according to standard methods, of water and sewage samples. Methods involved in the enumeration and identification of intestinal bacteria in water. Laboratory study of conditions influencing the bacterial content and potability of water. Printed laboratory directions are furnished.

9. **Serum Therapy.** Senior year, winter term. Three lectures and two laboratory hours per week. Four credits. Elective in the course in general science.

A detailed study of the manufacture, standardization, preparation for the market, and use of vaccines, antitoxins, and other biological products related to the diagnosis, prevention, and treatment of specific infectious diseases. Susceptibility, immunity, and infection. Theories of immunity. Anaphylaxis, opsonins, preciptins, bacteriolysins, and agglutinins. Prerequisites: General Bacteriology, and either Pathogenic Bacteriology or Hygienic Bacteriology.

Laboratory.—Experimental production of opsonins, antitoxins, agglutinins, preciptins, and cytolysins. Experiments showing the constitution and mode of action of these antibodies. Production of active and passive anaphylaxis and of anaphylatoxin. Methods for the production and standardization of biological products, such as diphtheria and tetanus antitoxin, bacterins, etc. The application of the various phenomena of immunity in the diagnosis of infectious diseases, and the identification of animal and vegetable proteids. Complement fixation tests for glanders, Wassermann tests, opsonic technique, etc.

Department of Botany

Professor ROBERTS
Assistant Professor DAVIS
Instructor MILLER
Instructor STEVENS
Assistant ROSE
Assistant WOODMAN

The instruction given in the Department of Botany has a threefold purpose:

First, general training in botany as an observational science, familiarizing the student with the meaning and relations of the manifold forms of plants, and the principles governing their life processes. For those who wish to pursue the subject of botany professionally, excellent opportunities are offered to secure a broad and thorough training in the advanced courses given by the department.

Second, the importance of a scientific knowledge of the laws of plant life being fundamental in agriculture, it is sought in

the elementary courses to provide such training as will generally fit the minds of agricultural students to grasp the underlying meaning of familiar field work with crops; such training, moreover, as may be built upon in a carefully graded series of advanced courses.

The third phase of the work of the Department of Botany lies in the investigation of those economic problems in plant life which affect agriculture. Three distinct general lines of work in botany and plant breeding are being conducted in the Experiment Station: experimental plant breeding; the investigation, prevention, and control of plant diseases; and seed control—*i. e.*, the determination of the purity and vitality of agricultural seeds for farmers, seedsmen, and others.

The equipment for elementary instruction comprises thirty compound and sixty-four simple microscopes, a series of Jung, Peter, Kny, and Frank botanical charts, a Bausch & Lomb projection apparatus, and a very full collection of preserved material for general morphology and pathology. For advanced work, Zeiss and Spencer microscopes with apochromatic lenses, a filar micrometer, a Bausch & Lomb camera lucida, a Zeiss drawing table, a Zeiss binocular microscope, and Bausch & Lomb simple microscopes of the highest grade, provided with special camera lucida attachment, are furnished for the use of the members of the staff and graduate students. A Minot precision microtome, embedding and sterilizing ovens, and the usual supplies of reagents and glassware, are provided for histological study.

In physiology, a complete equipment of the Ganong and the Cambridge lines of physiological apparatus and supplies is available. A large, well-equipped dark room, provided with a Folmer & Schwing enlarging, reducing, and lantern-slide camera, a field camera of the best type, and a Bausch & Lomb photomicrographic apparatus, affords opportunity for the preparation of botanical photographs, lantern slides, illustrations for bulletins, etc.

In the Experiment Station laboratory are kept various instruments of precision employed in quantitative work in plant-breeding investigations, including special forms of apparatus used for taking measurements of organs, a specially designed gravimeter, an improved colorimeter, an Egli calculating machine, a Comptograph adding machine, a Corelli polar planimeter, specific gravity apparatus, numerous balances, the usual glassware, etc.

For general botanical reference there is an excellent herbarium, especially complete for the state of Kansas, and a very full collection of economic fungi. A very good botanical library is available, containing the usual standard texts and reference works and files of the principal foreign journals.

COURSES IN BOTANY

1. **Elementary Botany I.** Subfreshman, first year, fall term. Class work, two hours; laboratory, two hours. Three credits. Required of all subfreshman students.

This course constitutes an introduction to the life of plants, and a study of their elementary processes and responses to stimuli. Textbook, *Practical Botany,* by Bergen and Caldwell.

Laboratory.—The laboratory work comprises individual studies of germination, growth, response to temperature, light, moisture, etc.; the absorption and transportation of raw materials and their elaboration into food; the respiration of plants, and the transpiration of water. The student performs a number of simple experiments, and makes an elementary examination of the microscopic structure of the organs and tissues concerned. Laboratory outlines are furnished by the department.

2. **Elementary Botany II.** Subfreshman, first year, winter term. Class work, two hours; laboratory, two hours. Three credits. Required of all subfreshman students.

This course is a continuation of Elementary Botany I, effecting a gradual extension of the student's knowledge of the groups of plants, and of their relationships. Textbook, *Practical Botany,* by Bergen and Caldwell. Prerequisite: Elementary Botany I.

Laboratory.—Similar in general outline to the work in Elementary Botany I, but more advanced in character. First studies of the characters of the chief plant groups. Laboratory outlines are furnished by the department. Prerequisite: Laboratory work in Elementary Botany I.

3. **Elementary Botany III.** Subfreshman, first year, spring term. Class work, two hours; laboratory, two hours. Three credits. Required of all subfreshman students.

This course is a continuation of Elementary Botany II, and comprises further study of the chief groups of plants, with especial reference to a comparative study of their life histories. In this term the student is introduced to the geographical distribution of plants and to the formation of plant societies under different environments, and becomes acquainted with the history and relationships of the chief economic and useful plants. Textbook, *Practical Botany,* by Bergen and Caldwell. Prerequisite: Elementary Botany II.

Laboratory.—Chiefly a study of the life histories of plants, and of the changes in plant tissues and organs induced by different environments. Some microscopic study of economic plant products is included. Laboratory outlines are furnished by the department. Prerequisite: Laboratory work in Elementary Botany II.

4. **Plant Morphology.** Sophomore, junior, or senior year, fall term. Class work, two hours; laboratory, four hours. Four credits. Required in the courses in agronomy, animal husbandry, dairy husbandry, horticulture, printing, and general science, and in options in the course in industrial journalism.

A detailed study of the morphology of plants from the developmental standpoint. The chief great groups of the plant kingdom are taken up successively, from the algæ to the seed plants, such members of each group being selected as throw the greatest light on the evolution of plant organs and structures, the object being to present, as nearly as may be, a conception of the development of the plant world, and the interrelationships of its chief representative forms. Textbook, to be selected. Prerequisite: Elementary Botany III.

Laboratory.—Microscopic examination of the chief morphological types of plants, extending through all the great groups. Careful consideration is given to the details of organ and tissue differentiation, especially with reference to reproduction. Liberal use is made of a series of prepared slides. Laboratory outlines are furnished by the department. Prerequisite: Laboratory work in Elementary Botany III.

5. **Plant Physiology I.** Sophomore, junior or senior year, winter term. Class work, two hours; laboratory, four hours. Four credits. Required in the courses in agronomy, animal husbandry, dairy husbandry, horticulture, printing, and general science, and in options in the course in industrial journalism.

This is a course of lectures, combined with special study of a required text and with reference reading. The principal life functions of plants, such as photosynthesis, respiration, transpiration and growth, and the responses of plants to environmental conditions and physical stimuli, are studied in detail. In this course the student gains a general introductory knowledge of the functions and reactions of plants, and learns to regard them from the dynamic standpoint, as working organisms. Textbook, *Plant Physiology,* by B. M. Duggar. Prerequisite: Plant Morphology.

Laboratory.—A series of typical experiments is followed out in the physiological laboratory and in the greenhouse. Each student is furnished with a set of the necessary apparatus, and learns to apply quantitative methods to the study of functions. Laboratory outlines are furnished by the department. Prerequisite: Laboratory work in Plant Morphology.

6. **Plant Physiology II.** Sophomore or junior year, spring term. Class work, two hours; laboratory, four hours; or laboratory only, four hours. Four or two credits. The full work is required in the course in general science; only the laboratory

work is required in the courses in agronomy, animal husbandry, dairy husbandry, and horticulture.

This is work of a more advanced character, dealing with the chief life functions in considerable detail, and from the quantitative rather than the descriptive standpoint. In this course the student is conducted into exact and special studies of a few of the most important functions. Lectures and required readings. Prerequisite: Plant Physiology I.

Laboratory.—Apparatus of precision of the most accurate type is used by groups of students, who follow the exact details of functional behavior in the more important life processes, keep quantitative data, and become gradually trained in methods of research. Laboratory outlines are furnished by the department. Prerequisite: Laboratory work in Plant Physiology I.

7. **Medical Botany.** Sophomore year, spring term. Class work, one hour; laboratory, two hours. Two credits. Required in the course in veterinary medicine.

This course involves a brief survey of the principal plants of the pharmacopœia. Especial attention is given to poisonous plants and their identification. Instruction is by lectures. Prerequisite: Elementary Botany III.

Laboratory.—This comprises microscopic study of plant products used as drugs, and a laboratory study of toxic plants. Laboratory outlines are provided by the department. Prerequisite: Laboratory work in Elementary Botany III.

8. **Plant Pathology I.** Junior or senior year, fall term. Class work, two hours; laboratory, four hours. Four credits. Required in the courses in agronomy and horticulture; elective in the course in general science.

The diseases affecting the chief economic crops of field, orchard, and garden are studied in considerable detail. The etiology of the various diseases and their most evident symptoms are discussed, and the student learns to recognize at sight the principal plant diseases he is likely to encounter on the farm, and in nursery and in market-garden work. Physiological and bacterial diseases are considered to some extent, but the time is devoted chiefly to the more important diseases caused by the higher fungi, the life histories of which are studied in detail. Preventive measures are considered in each case, with special reference to the scientific principles underlying their application. An extensive collection of preserved pathological material, and a large herbarium of exsiccatæ of economic fungi, are available. Textbook, *Diseases of Economic Plants,* by Stevens and Hall. Prerequisite: Plant Physiology II.

Laboratory.—Detailed microscopic studies of diseased tissues, and identification of the fungus parasites which cause them, comprise the laboratory work. In the case of physio-

logical diseases, the structural changes induced in the tissues are worked out with the microscope. Laboratory outlines are furnished by the department. Prerequisite: Laboratory work in Plant Physiology II.

9. **Economic Botany.** Senior year, fall term. Class work, three hours; laboratory, two hours. Four credits. Elective in the course in general science.

This course is designed especially for students intending to enter professional work in botany in experiment stations. It involves a study of the history of cultivated plants, with a course of lectures on the chief groups of the higher plants containing economic species. In this connection a very broad survey is taken of the world's economic plants, considerable attention being given to the derivation of economic products and to methods of cultivation and harvesting. The plants of tropical and subtropical agriculture and horticulture are given considerable attention. Forestry products are not considered. Textbook, *The Origin of Cultivated Plants,* by De Candolle. Lectures and reference reading. Prerequisite: Plant Morphology.

Laboratory.—A microscopic study of economic plant products, such as fibers and textiles, food products, spices, etc. Laboratory outlines are furnished by the department. Prerequisite: Laboratory work in Plant Morphology.

10. **Plant Pathology II.** Senior year, winter term. Class work, two hours; laboratory, four hours. Four credits. Elective in the course in general science.

This is a continuation of Plant Pathology I, involving the study of laboratory and field methods in the investigation of plant diseases, the growing of pure cultures of parasitic fungi, the making of inoculations, etc. This course is especially designed for those who intend to pursue plant pathology as investigators in experiment stations. Lectures and reference reading. Prerequisite: Plant Pathology I.

Laboratory.—As described in the preceding course. Laboratory outlines are furnished by the department. Prerequisite: Laboratory work in Plant Pathology I.

11. **Evolution of Plants.** Senior year, winter term. Class work, four hours. Four credits. Elective in the course in general science.

Careful consideration is given to the lines along which evolution has proceeded in the plant kingdom, to the relationships of the more important phyla and to the probable derivation of the chief groups of plants. Textbook, *Evolution of Plants,* by Campbell. Lectures and reference reading. Prerequisite: Economic Botany, class and laboratory work.

12. **Plant Breeding.** Senior year, spring term. Class work, two hours; laboratory, four hours. Four credits. Required in the courses in agronomy and horticulture; elective in the course in general science.

This subject involves a study of the present knowledge of variation and heredity as applied to the breeding and improvement of economic plants. The history of the principal theories bearing upon genetic problems is reviewed, and the experimental data are critically considered. The principles underlying the behavior of hybrids are discussed. A survey is given of the practical results achieved in the breeding of plants, together with a scientific analysis of the methods used. Lectures and reference reading. Prerequisite: Plant Morphology.

Laboratory.—Practice work in the measurement of variation in organisms; plotting of data in curves to express individual variation; the plotting of frequency polygons and the fitting of them to theoretical curves; the study of correlation and regression of characters, and determination of the chief constants. Laboratory guide: *Statistical Methods with Special Reference to Biological Variation,* by Davenport. Prerequisite: Laboratory work in Plant Morphology.

13. **Taxonomic Botany.** Senior year, spring term. Class work, one hour; laboratory, six hours. Four credits. Elective in the course in general science.

This course is designed to give biological students a broad training in the systematic relationships chiefly of the flowering plants. Practice is acquired in the use of manuals or keys to floras, and the student is taught especially to recognize the morphological characters which distinguish the principal orders, families, and genera of the angiosperms. The course is designed to be a strictly practical one, its purpose being to equip the student with the necessary data for recognizing at sight a large number of the plants of the field, mainly of the higher groups, although some attention is also paid to the identification of ferns, mosses, and liverworts, and of the commoner algæ and fungi. Lectures and reference reading. Prerequisite: Plant Morphology.

Laboratory.—The identification, by means of standard manuals and floras, of a large number of native and exotic plants. Considerable field practice is required, and attention is directed to differences in structure which the same species may show under different environments. An endeavor is made to train the student's mind to a broad, comprehensive conception of species characters, using manuals merely as convenient guides to this end. Laboratory guide, Gray's *Manual of Botany,* seventh edition, revised. Prerequisite: Laboratory work in Plant Morphology.

14. **Seed Testing.** Senior year, spring term. Laboratory, two hours. One credit. Required in the course in agronomy.

The student becomes familiar with the details of structure of the seeds of all the principal races of agricultural plants grown in this region, and learns to distinguish those seeds which are used as adulterants or as fraudulent substitutes. Considerable time is also devoted to the identification of weed seeds and of weed plants, in both the seedling and the adult stages. Practice work is given in making purity and germination tests of seeds, according to the official rules and methods for seed testing. Prerequisite: Elementary Botany III.

15. **Plant Physiology III.** Senior year, spring term. Lecture, two hours; laboratory work, four hours. Elective in the course in general science.

This course offers opportunity for advanced work upon special problems in plant physiology, to be selected by the department for investigation. Prerequisites: Plant Physiology I and II.

Department of Chemistry

Professor WILLARD
Assistant Professor KING
Assistant Professor WHELAN
Assistant Professor SWANSON
Instructor NEWMAN
Assistant HUGHES
Assistant GUTSCHE
Assistant BURNS

All of the industries are becoming more and more dependent for their highest success upon intelligent application of the sciences, and the special sciences are making their greatest progress by tracing their phenomena back to the physical and chemical changes that accompany them. A study of chemistry and physics is therefore essential to any understanding of the processes of nature or of human industry. In the instruction in chemistry, the aim is to insist upon a mastery of the chief concepts of the pure science through the agency of textbook drill, accompanied by demonstrations in the lecture room, and experimental observations by the student himself in the laboratory. As the course proceeds, illustrations of chemical principles are drawn from the industrial processes of the chemical, agricultural, domestic, and other arts, thus impressing upon the mind the practical nature of the study. The ultimate object of instruction in this science is to develop in the student the power to form independent judgments upon the manifold problems of daily life in which chemistry plays a part.

The lecture rooms are amply equipped for experiments and demonstrations, and the laboratories are designed to accommodate 800 students per term in freshman work and qualitative analysis. The laboratories for more advanced work provide space for 100 students, and are well supplied with general

and special facilities. The State work in foods, feeding stuffs, and fertilizers, and the chemical investigations of the Experiment Station in soils, crops, animal nutrition, etc., afford unusually good opportunities for students to obtain experience in practical chemistry.

COURSES IN CHEMISTRY

1. **Chemistry I.** Lectures and recitations, two hours; laboratory, four hours. Four credits. Required in all courses.

This term's work begins the study of elementary inorganic chemistry, and includes a study of the elements oxygen, hydrogen, chlorine, and their compounds, this being accompanied by theoretical treatment of the subjects of matter, energy, properties of gases, chemical law and theory, solution, electrolytic dissociation, acids, bases, and salts, and chemical change as related to light, heat, and electricity. It is designed, with the succeeding terms, to give the student a knowledge of the fundamental principles of chemistry. As all subsequent progress in this science requires a working knowledge of its principal theoretical conceptions, the principles of nomenclature, the significance of formulas, chemical equations, etc., much attention is given to these, while at the same time the practical uses of the substances, and the processes used in metallurgy, engineering, agriculture, and other arts are emphasized. Newell's *Inorganic Chemistry for Colleges* is used, this term's work covering the first 209 pages. The text is supplemented by lectures and is amply illustrated by experimental demonstrations.

Laboratory.—As far as time permits, the student performs independently experiments touching the preparation and properties of the more important substances. Preference is given to those operations which illustrate important principles, and the student is required, as far as possible, to study experiments in that light. In this, as in all other laboratory work in chemistry, the objects are to illustrate chemical phenomena and to teach care in manipulation, attentive observation, logical deduction, and discrimination and accuracy in recording results and conclusions. The student is required to give the designated amount of time, and a minimum amount of work must be satisfactorily performed in order to obtain credit. *Laboratory Exercises in Elementary Chemistry*, by William McPherson, is used as the laboratory guide.

2. **Chemistry II.** Lectures and recitations, two hours; laboratory, four hours. Four credits. Required in all courses.

The work under this head is a continuation of the study of elementary inorganic chemistry, and includes the elements nitrogen, carbon, sulphur, and their compounds, and a consideration of atomic weights, valence, and the classification of the elements. These subjects are included in pages 210 to 355 of Newell's *Inorganic Chemistry for Colleges.*

Laboratory.—The laboratory work of this term is a continuation of that begun in the preceding term.

3. **Chemistry III.** Lectures and recitations, two hours; laboratory, four hours. Four credits. Required in all courses.

This work completes the study of elementary inorganic chemistry begun in the preceding terms, and includes the consideration of fluorine, bromine, iodine, silicon, phosphorus, arsenic, antimony, and the metals.

Laboratory.—The laboratory work in this course is a beginning in qualitative analysis, for which *McPherson's Elementary Treatise on Qualitative Analysis* is used as the guide.

4. **Qualitative Analysis.** Sophomore year, fall term. Lecture, two hours; laboratory, four hours. Four credits. Required in the courses in agronomy, animal husbandry, dairy husbandry, horticulture, veterinary medicine, home economics, and general science, and in the general science option in the course in industrial journalism.

In this course the prime object is to increase the student's knowledge of chemistry as a whole. The standard methods of analytical chemistry are made the basis of a systematic study of the chemical properties of the most important metals, nonmetals, acids, bases, and salts. The teaching of analysis as such is a secondary object, although the student is held to the exact observations and careful reasoning required in ascertaining the composition of single substances and mixtures. The exercises, which are outlined in a special pamphlet, include a review of the more important topics of inorganic chemistry, in which natural occurrence of elements and compounds, industrial chemical processes, and analytical reactions are seen to be closely connected. The exercises are so arranged as to pass from the simpler to the more difficult ones, and at the same time to facilitate the comparative study of the several cations and anions. The theories of chemistry receive constant application. The effect of the course is to broaden, strengthen, and unify the student's ideas of general chemistry, to enlarge greatly his knowledge of chemical facts, and at the same time to fix many of them in his mind by associating them with the reactions made use of in analytical processes. This subject must be preceded by Chemistry III.

Laboratory.—The regular methods of qualitative analysis serve as a basis for a laboratory study of the chemical properties of substances. Laboratory manual, *Qualitative Analysis,* by W. A. Noyes.

5. **Elementary Organic Chemistry.** Sophomore year, winter term or spring term. Four hours a week, lectures and recitations. Four credits. Required in the courses in agronomy, animal husbandry, dairy husbandry, horticulture, home economics, and general science, and in options in the course in industrial journalism.

A systematic study is made of the simpler examples of the more important classes of organic compounds in their logical chemical relations. Such substances as touch the every-day affairs of life are treated in greater detail. Opportunity is thus afforded to consider the hydrocarbons, alcohols, organic acids, fats, soap, sugars, starch, proteids, and other less known substances. Compounds used for clothing, food, fuel, light, antiseptics, disinfectants, anesthetics, poisons, medicines, solvents, etc., are included. While especial attention is given to the useful organic compounds, the study of others is not excluded, when they contribute to an understanding of the systematic relations existing among the several groups. Any serious study of the biological sciences, or of the arts connected with them, must require this as a foundation, and a knowledge of the properties of organic compounds finds frequent application in engineering as well. The subject is amply illustrated by experiments in the lecture room. Textbook, Remsen's *Organic Chemistry,* in part, accompanied by lectures amplifying certain parts of the subject. Chemistry III is a prerequisite.

6. **Agricultural Chemistry.** Sophomore year, spring term, and junior year, fall term or spring term. Class work, two hours per week. Two credits. Required in the courses in agronomy, animal husbandry, dairy husbandry, and horticulture, and in the agricultural option in the course in industrial journalism.

The work of this term consists chiefly of a detailed study of the application of chemistry to agricultural problems, with especial reference to the income and outgo of the elements which determine success or failure in crop production, and hence the agricultural prosperity of a country. The following topics are among those included: the atmosphere, the soil, natural waters, plants, farm manures, commercial fertilizers, crops, feeds, and animal products. Textbook, *General Agricultural Chemistry,* by Hart and Tottingham. Prerequisite: Qualitative Analysis.

7. **Quantitative Analysis I.** Sophomore year, spring term, or junior year, fall term. Laboratory, four hours. Two credits. Required in the agricultural courses; elective in others.

This consists of simple quantitative exercises leading up to work upon substances of direct agricultural interest. These are so planned as to give as great variety in training as is possible in the limited time available. Laboratory guide, *Elementary Quantitative Chemical Analysis,* by Lincoln and Walton. Prerequisite: Qualitative Analysis.

8. **Household Chemistry.** Junior year, fall term. One class-room exercise and six hours of laboratory work a week. Four credits. Required in the course in home economics.

This course is designed to give the women in the home economics course qualitative and quantitative work in the chemistry of the materials most intimately related to their daily life. Air, water, foods, fuels, fabrics, disinfectants, metals, and other materials used in and about the home are the subjects of numerous experiments touching their properties, usefulness, and defects. Prerequisite: Qualitative Analysis.

9. **Human Nutrition.** Junior year, fall term or winter term. Four hours a week. Four credits. Required in the course in home economics and in the home economics option in the course in industrial journalism, and elective in the course in general science.

This is a course in the chemistry of foods and nutrition, and includes, among others, the following topics: the composition of the animal body; the composition of foods and methods of investigation employed in their study; the changes that the several classes of foods undergo in cooking and digestion, and the functions that they perform in nutrition; daily food requirements, and the balancing of dietaries; food economy. *Chemistry of Food and Nutrition,* by H. C. Sherman, is used as a textbook, but is supplemented by lectures. Elementary Organic Chemistry and Physiology must precede this course.

10. **Chemistry D-I and D-II.** Junior year, fall and winter terms, respectively. Four hours of laboratory work a week each term. Two credits each term. Required in the course in dairy husbandry.

Feeding stuffs and dairy products furnish the materials which are drawn upon for exercises in quantitative analysis. Laboratory guide, Lincoln and Walton's *Elementary Quantitative Analysis,* supplemented by special directions. Prerequisite: Quantitative Analysis I.

11. **Chemistry C-I and C-II.** Junior year, winter and spring terms, respectively. During the first term one hour a week is given to a lecture or recitation, and four hours are given to laboratory work. The second term consists of laboratory work only, six hours a week. Three credits each term. Required in the course in civil engineering.

These courses are designed to give students of civil engineering as much training in qualitative and quantitative analysis as time permits, the special direction given to the work being such as to lead to the greatest amount of practical benefit. Textbooks: *Qualitative Analysis,* by W. A. Noyes, and *Quantitative Analysis,* by Lincoln and Walton, supplemented by pamphlets and mimeographed matter. Prerequisite: Chemistry III.

12. **Chemistry E.** Junior year, spring term. A laboratory course of six hours a week. Three credits. Required in the course in electrical engineering.

Instruction is given in the testing of water, fuel, and flue gases from the standpoint of the operator of a power plant. Prerequisite: Chemistry III.

13. **Engineering Geology.** Junior year, spring term. Four hours class and four hours laboratory work. Six credits. Required in the course in civil engineering.

The first half-term's work in this subject is given in the Department of Geology. The class work of the second half-term, given in the Department of Chemistry, consists in a study of rocks in respect to their mineral composition, structural properties, changes on weathering, etc. Textbook, *Geology for Engineers,* by R. F. Sorsbie.

Laboratory.—This consists in a laboratory study of the principal rocks and their mineral constituents.

14. **Principles of Animal Nutrition.** Graduate or elective, spring term. Four hours class work a week. Four credits.

This course gives a thorough study of the relations of animals to matter and energy. The methods of research and the results obtained are treated in an extended and scientific manner. Textbook, *Principles of Nutrition,* by H. P. Armsby. Prerequisite: Elementary Organic Chemistry.

15. **Quantitative Analysis.** For each two hours' work a week for a term, one credit.

This is given as part of the laboratory work accompanying certain courses, and may be elected independently at any time after completing qualitative analysis. In all cases certain preliminary training and exercises are given, after which the student's attention may be more especially directed toward any one of several groups of material for analysis, such as feeding stuffs, dairy products, soils and fertilizers, ores and rocks, water, gases, fuels, foods and beverages. The chemical study of special problems is encouraged. Prerequisite: Qualitative Analysis.

16. **Inorganic Chemistry I, II, and III.** Graduate or elective; junior or senior year; fall, winter, and spring terms. The subject extends throughout a year, and is given in three class exercises and four hours of laboratory work a week. Five credits each term.

This course consists of a thorough study of the facts of chemistry and their theoretical interpretation according to the views of the present day. Textbook, *Introduction to General Inorganic Chemistry,* by Alexander Smith. Prerequisite: Qualitative Analysis.

17. **Organic Chemistry I, II, and III.** Graduate or elective; junior or senior year; fall, winter, and spring terms. Three lecture hours and four hours of laboratory work through the year are required for this course. Five credits each term.

The course includes a careful, systematic study of the aliphatic and aromatic compounds to such an extent as the time permits. Textbook, *Theoretical Organic Chemistry,* by Cohen.

18. **Physiological Chemistry I and II.** Graduate or elective; junior or senior year; fall and winter terms. Four hours a week. Four credits each term.

A systematic and thorough study of the synthetic and analytical chemical changes that accompany the physiological processes of animals and plants. The chemical properties of food and body substances and their general and specific functions; the changes that take place in digestion, assimilation, and elimination, and the means by which these are brought about; enzymes and their functions; the blood and lymph; general metabolism and the interrelations of organs are among the important topics studied. Textbook, Abderhalden's *Text-Book of Physiological Chemistry.* Prerequisite: Elementary Organic Chemistry.

Department of Economics

Professor KAMMEYER

Vocational training alone does not fully prepare a student for his life's work, nor for the acceptable discharge of his duties as a citizen. It is necessary that he should have at least a general knowledge of the social and economic conditions under which he works, in order that he may benefit society as well as himself. The State needs men and women trained for citizenship, and it is the purpose of this department to plan and to direct its work with this need in view.

A departmental library of well-selected books bearing on economics, sociology, and statistics is at the disposal of students, and is used for collateral readings, book reviews, and reports.

COURSES IN ECONOMICS

1. **Economics.** Sophomore year, spring term; or junior year, fall or spring term; or senior year, spring term. Four hours a week. Four credits. Required in the courses in architecture, engineering, printing, home economics, and general science, and in options in the course in industrial journalism.

A general survey of economic principles underlying the phenomena of wealth production, consumption, distribution, and exchange, including a study of the State in its relation to industry, transportation, public utilities, insurance, socialism, etc. A brief study also of public revenues and expenditures, and of the history of economic thought. Instruction by recitations and lectures. Text, Ely's *Outlines of Economics.*

2. **Business Organization.** Junior or senior year, winter term. Two hours per week. Two credits. Required in the

courses in engineering, architecture, printing, and industrial journalism; elective in the course in general science.

A study of entrepreneurial, partnership, and corporate business organization and management; the advantages and disadvantages of each, and restrictive legislation. The centralization and integration of industries, trusts, pools, and combinations are studied with reference to their origin and effects, social and economic. Considerable time is given to a detailed study of stocks and bonds in all their variety of form, and to such phenomena as speculation, overcapitalization, etc. Instruction by recitations, lectures, and reports. Text, Sparling's *Business Organization.* Prerequisite: Economics or Agricultural Economics.

3. **Agricultural Economics.** Junior year, spring term; or senior year, winter term. Four hours a week. Four credits. Required in the courses in agriculture; optional in the course in veterinary medicine.

This course is intended especially for students pursuing one of the agricultural courses, and in the main is similar to Economics, with the distinction that more time and emphasis are given to such subjects as rent, size of farms, ownership and tenancy, transportation to markets, agricultural credit associations, farm labor, and agricultural problems of an educational and social character. Instruction by recitations, lectures, and reports. Text, Carver's *Rural Economics.*

4. **Labor Problems.** Senior year, winter term. Two hours a week. Two credits. Required in the course in printing; elective in the course in general science.

A comparative study of the various theories of wages. Special emphasis is given to the history, organization, functions, results, and legal status of labor unions both in the United States and in England. Such phenomena as strikes in their moral and economic aspects, boycotts, arbitration, etc., are made subjects for study and investigation. The course also includes a study of the various plans which have been proposed and tried for the more equitable distribution of wealth, such as profit sharing, consumers' leagues, etc. Instruction by lectures, assigned readings, and reports. Prerequisite: Economics or Agricultural Economics.

5. **Money and Banking.** Senior year, spring term. Two hours a week. Two credits. Required in the course in printing; elective in the course in general science.

A study in detail of money, its history and characteristics as a medium of exchange and standard of value. Bank currency: its nature, forms, and limitations. The principal banking systems of the world, their machinery and methods; branch banks, clearing houses, foreign and domestic exchanges, etc. Instruction by lectures, assigned readings, and reports. Prerequisite: Economics or Agricultural Economics.

6. **Public Finance.** Senior year, spring term. Two hours a week. Two credits. Required in the course in printing; elective in the course in general science.

This course is designed to meet the needs of those who desire to make a more specific study of public revenues and expenditures than is given under the head of taxation in a general treatise on economics. It includes also a study of money and credit funds, their origin and character, and the agencies employed in funding operations, such as savings banks, building and loan associations, trust and insurance companies, etc. Instruction by lectures, assigned readings, and reports. Prerequisite: Economics or Agricultural Economics.

Department of the English Language

Professor SEARSON
Instructor RICE
Instructor LEONARD
Instructor KNIGHT
Instructor BOOT
Instructor RAVITCH
Assistant FURLEY
Assistant CRAWFORD

Ability to use language accurately, clearly, and concisely is recognized as an essential part of the training of every educated person. The work of the Department of the English Language is to acquaint the student with the best standards of English practice and to encourage him to maintain those standards in all his work. To this end, the department offers studies in cultural and technical English and special drills in expressing thought freely and effectively in matters touching the vital interests of the student. The study of the English language is thus made the means of increasing the power and efficiency, and consequently the capacity for enjoyment, of the individual. It is the aim of the department, in coöperation with the technical departments of the College, to increase the knowledge, usefulness, and joy of the young workers of the State.

COURSES IN THE ENGLISH LANGUAGE

1. **Advanced Grammar.** Subfreshman, first year, fall term. Four hours a week. Four credits. Required of subfreshman students.

This course is a review of the essentials of English grammar. Grammar is taught as a means of strengthening the pupil in thought-getting. Short, interesting selections are studied definitely and interpreted clearly. The proper analysis and thought-interpretation of ordinary English sentences is taught in connection with the selections read and studied. The aim is to give a minimum of theory and a maximum of practice in the intelligent use of the language. Standard texts in English grammar are used for reference.

2. **English Readings.** Subfreshman, first year, winter term. Four hours a week. Four credits. Required of subfreshman students.

In this course a careful study is made of interesting standard literary selections. Definite work is assigned, and definite oral and written recitation work is required. Class readings, class discussions, written sketches, abstracts and outlines, and training in the proper use of the dictionary, give the student ample opportunity to increase in the power to think clearly and to express himself accurately. This course is enriched by interesting outside readings. Prerequisite: Advanced Grammar.

3. **Elementary Composition.** Subfreshman, first year, spring term. Four hours a week. Four credits. Required of subfreshman students.

The work of this term includes: instruction in the elementary principles of composition; drill in the use of the dictionary; a study of words and sentences; special drills in punctuation; exercises in letter writing; drills in abstracting; and the writing of short themes. The written exercises are carefully corrected, and returned with helpful suggestions. Special personal help is given the student in consultation hours. Text, Smith and Thomas's *A Modern Composition and Rhetoric.* Prerequisite: English Readings.

4. **English Classics.** Subfreshman, second year, fall term. Four hours a week. Four credits. Required of subfreshman students.

The work of this course is centered in the study of selected literary masterpieces. The careful preparation of outlines, sketches, paraphrases, and abstracts; class readings; general class discussions; and special exercises in interpreting character and life, are essentials of the term's work. This intensive study is broadened and enriched by well-selected supplementary reading. Prerequisite: Elementary Composition.

5. **Paragraph Writing.** Subfreshman, second year, winter term. Four hours a week. Four credits. Required of all subfreshman students.

This course opens with a brief review of the sentence as the grammatical unit of thought expression, and continues with a thorough study of the paragraph as the rhetorical unit. The structure of effective paragraphs, the preparation of sentence abstracts of paragraphs, the expansion of topic sentences into paragraphs, are taught by means of the study of the best models and by encouraging the student to write paragraphs on subjects touching his keenest interests. Text, Scott and Denney's *Paragraph Writing.* Prerequisite: English Classics.

6. **Elementary Rhetoric.** Subfreshman, second year, spring term. Four hours a week. Four credits. Required of all subfreshman students.

This course includes a general survey of description, narration, exposition, and argumentation, with special emphasis placed upon the clear, interesting, and effective expression of the thought in mind. Special exercises in punctuation, short drills in proofreading, advanced drills in outlining and abstracting, oral discussions, and elementary debating, are also emphasized in the course. Texts: Carpenter's *Rhetoric and English Composition,* Nutter, Hersey, and Greenough's *Specimens of Prose Composition.* Prerequisite: Paragraph Writing.

7. **Narrative Writing.** Freshman year; offered each term. Four hours a week. Four credits. One term's work required in all courses.

This course includes a thorough study of the principles of narration, and the analysis and the writing of narrative paragraphs and short stories. The student is permitted to select subjects from a wide range of human interests. The fields of agriculture and country life, engineering, home economics, general science, sociology, psychology, and general economics, are explored freely for topics of vital interest. Special consultations are held with all students, and special supplementary drills are given to all who need additional help. Texts: Buck and Morris' *Narrative Writing;* Matthews' *The Short-Story.* Prerequisite: Elementary Rhetoric.

8. **Theme Writing.** Freshman year; offered each term. One term's work required in all courses.

This is a continuation of the course in narrative writing. Special emphasis is placed upon exposition, or clear-cut explanation. How things are done in every field of human activity is told clearly, accurately, and interestingly by students whose interests are aroused and stimulated to the expression point. The course is conducted with the central idea of assisting the freshman student to acquire the habit of clear, accurate thought-getting and thought-expression in all his technical work. Text to be selected.

9. **Special English.** This course is offered each term as supplementary to the courses in freshman English, and may be required of any student whose written work shows that he is unable to express his ideas clearly and accurately. Students may be admitted to the course by the head of the Department of the English Language upon the recommendation of the instructor and the student's dean. The course consists of special exercises, helps, and consultations, and may be continued in each case as long as is necessary to give the student the assistance needed.

10. **College Rhetoric.** Sophomore year, offered each term; junior year, fall or spring term. Four hours a week. Four credits. One term's work required in all courses.

This course includes a brief review of the essentials of thought expression, library investigation, bibliography work, logical brief making, and the preparation and oral delivery of arguments and orations. In addition, class reports upon projected engineering enterprises, explanations of mechanical and chemical processes, descriptions of new inventions by means of drawings and diagrams, special reports of significant agricultural experiments, and practical discussions of problems in home economics, are required. Attention is also directed toward the accurate and effective use of English in business letters, applications, shop reports, specifications, contracts, and bulletins. Text, Canby's *English Composition in Theory and Practice.* Prerequisite: Courses 1 to 8 and History of English Literature.

11. **Argumentation and Debate.** Juniors and seniors, fall term. Four hours a week. Four credits. Elective in the courses in home economics, agriculture, and general science, and in the options in the course in industrial journalism.

This course includes a systematic study of the theory of debate, brief making, classroom practice in debating, defending propositions, extemporaneous speaking, how to collect and classify material, and how to refute arguments effectively. Special help is given to those desiring to participate in intercollegiate debates. Consultations, library investigations, and special group conferences form helpful laboratory features of the course. Text, Pattee's *Argumentation and Debate.*

12. **English Practice.** Juniors and seniors, winter term. Four hours a week. Four credits. Elective in the courses in home economics, agriculture, and general science, and in the options in the course in industrial journalism.

This course offers advanced work in correct English practice. Definite work is assigned in practical, every-day English. The object of the course is to afford students special advanced training in the use of English. The course is specially planned to meet the needs of those who intend to teach English, and of those who desire to record the results of technical investigations in most effective form. Work done in other departments may be used as a basis of a part of the laboratory practice of this course. Regular conferences and consultations offer the student an opportunity to secure systematic personal help. Text, to be selected.

13. **Applied English.** Junior and senior years, spring term. Four hours a week. Four credits. Elective in the courses in home economics, agriculture, and general science, and in the options in the course in industrial journalism.

This course is a continuation of the one in English practice, and includes a study of correct standards and usage as applied in all branches of ordinary technical research. Defi-

nite assignments, carefully directed practice and advanced drills, and group studies showing the identity of higher theory and practice in English, are special features of the course. A series of the best texts will be used as a reference basis of the course.

Department of English Literature

Professor BRINK
Assistant Professor BEALL

An ultimate purpose of the instruction in literature is to train students in the art of effective writing. No better way has yet been found for the accomplishment of such an end than the study and emulation of the great writers of the language. The courses seek to give the student an understanding of the nature and characteristics of literature in its leading forms, to develop in him a taste for noble expression and a desire to attain high ideals in his own writings, to develop in him the ability to judge with confidence the literary qualities of any given work, and through sympathetic study of masterpieces to give him some idea of the leading authors.

In most of the courses in literature the work is pursued by means of a combination of lectures, classroom study, and seminary investigation, accompanied, of course, by frequent written reports for criticism and discussion. The literature is read at first hand, and the student is required to interpret for himself as far as possible, with the idea that it is more profitable for him to know an author than to know what some one has said about that author. The extensive and intensive methods are combined—wide reading to obtain literary atmosphere and breadth of view; critical study to develop accuracy and insight.

COURSES IN ENGLISH LITERATURE

1. **History of English Literature.** Freshman year, winter or spring term, and sophomore year, fall term. Four hours a week. Four credits. Required in all courses.

A text is studied and representative specimens are constantly read both in and out of class. The members of the class prepare frequent papers, including biographical essays, critical reviews of periods, criticisms of authors, and book reviews. Text, Halleck's *History of English Literature.* Prerequisite: Theme Writing.

2. **English Literature.** Sophomore year, winter or spring term. Four hours a week. Four credits. Required in the courses in agriculture and home economics; optional in the course in general science.

This course gives a brief review of the rise and development of English literature, with library study of periods and typical authors. Lectures are given on the nature of literature; the

nature of poetry; linguistic and race contributions to the literature; the great literary periods. The work includes class study, reports, and the study of masterpieces. Prerequisite: College Rhetoric.

3. **English Literature I.** Sophomore year, winter term. Four hours a week. Four credits. Required in the courses in industrial journalism and printing; optional in the course in general science; elective in other courses open to electives.

This course comprises an outline of the history of the language and literature. The students are required to prepare dissertations, both oral and written, on periods and types of literature, on representative writers, and on significant movements. Lectures are delivered on the following subjects: What is Literature? What is Poetry? Forms of Poetry; Criticism; The Beginnings of English Fiction; The Age of Scott, Burns, and Wordsworth; Tennyson and His Age. Members of the class report the lectures and apply principles in the actual study of suitable selections. The class carries on extensive study of such writers as Shakespeare and Thackeray out of class, and intensive study of somewhat difficult poetical selections in class, with reports and informal discussions. Prerequisite: College Rhetoric.

4. **English Literature II.** Sophomore year, spring term. Four hours a week. Four credits. Required in the courses in industrial journalism and printing; elective in the course in home economics; optional in the course in general science.

This is a continuation of English Literature I. The work includes: some plays of Shakespeare by the seminar method; reports and discussions; principles of Shakespearian criticism; linguistic elements and tendencies of the Lowland Scotch, with illustrations from the poetry of Burns. Critical study is made of typical productions of such writers as Shelley, Burns, Thackeray, Tennyson, Browning. The principles of Browning criticism are taken up. Prerequisite: English Literature I.

5. **The Rhetoric of Oratory.** Junior or senior year, fall term. Four hours a week. Four credits. Elective in the courses in general science and home economics.

This course is a study of that type of oral discourse, the ultimate purpose of which is to move the determination of hearers. The distinctions between spoken and written discourse are drawn. The class examines as many great speeches, especially of modern orators, as the time will permit. The course further includes the logic of oratory; study of oratorical style; and practice in the writing of speeches with a view to effective and persuasive utterance. Prerequisite: College Rhetoric.

6. **The English Drama.** Junior or senior year, winter term. Four hours a week. Four credits. Elective in the courses in general science, home economics, and industrial journalism. Given in 1911-'12, and in alternate years thereafter.

This is a study of the nature of the romantic, as distinguished from the classical, school of this great type of literature. The course is devoted mainly to Shakespeare, with reports and informal lectures on the drama before his time, and the reading of one or two plays of the subsequent period. The seminar method is mainly employed. The technique of the drama is studied, including character analysis, thought interpretation, and plot development. Prerequisite: College Rhetoric.

7. **The English Novel.** Junior or senior year, winter term. Four hours a week. Four credits. Elective in the courses in general science, home economics, and industrial journalism. Given in 1912-'13, and in alternate years thereafter.

This course is a study of the beginnings and development of this order of fiction; the laws of its art; its leading types, including the society novel, the historical novel, the novel with a purpose, the psychological novel, etc.; how to judge a novel. As many books as time will permit are read from typical authors, such as Jane Austen, Lytton, Scott, Dickens, Thackeray, Eliot, Charles Reade and others. The scientific method is followed, and the aim is to make the course as useful as possible to all who read novels and wish to make such reading profitable as well as interesting. Prerequisite: College Rhetoric.

8. **Nineteenth Century Literature.** Junior or senior year, spring term. Four hours a week. Four credits. Required in the general science option of the course in industrial journalism; elective in courses in general science and home economics. Given in 1911-'12, and in alternate years thereafter.

This course is a study of the great writers of the Victorian period. Some attention is given to the Romantic Revival in English poetry, but most of the time is devoted to a first-hand study of Carlyle, Tennyson, Wordsworth, Browning, Shelley, and other writers of the period, who either expressed the life of their time or were leaders in shaping the life of their own or of subsequent years. Prerequisite: College Rhetoric.

9. **American Literature.** Junior or senior year, spring term. Four hours a week. Four credits. Required in the general science option of the course in industrial journalism; elective in the courses in general science and home economics. Given in 1912-'13, and in alternate years thereafter.

A rapid survey is made of the rise and development of American authorship from colonial times to our own day, with study of the lives, and criticism of the works, of representative men of letters, and intensive reading of their works so far as the time will permit. The transcendental movement and the Brook Farm experiment are considered. Seminar study is made of some of the great novels, longer poems, and speeches. The course includes Emerson's essays and poems. Prerequisite: College Rhetoric.

Department of Entomology

Professor HEADLEE
Assistant Professor DEAN
Instructor MERRILL

In all courses a special effort is made to make the student realize that he is studying living things which form a part of his daily environment, and upon which his welfare in many cases vitally depends. In courses in which both class and laboratory instruction is given, the closest correlation is striven for, and wherever possible the same form is studied simultaneously in laboratory and class. The student is led to integrate his classroom knowledge with local animal life by means of frequent and carefully planned field excursions, and by the free use of vivaria in laboratory and museum. The courses offered are intended to awaken in the student a keen appreciation of the general principles underlying insect life, of the life economy of the more beneficial as well as of the more injurious species, and of the general principles governing methods for their control.

Standard anatomical charts, a representative collection (especially of local species), a high-grade lantern for the projection of lantern and microscope slides, a large and excellent series of lantern slides (many of them colored), and a series of microscope slides are available for illustration. (The lantern is used also for zoölogy and geology.) Compound and dissecting microscopes sufficient for the needs of laboratory classes have been provided.

COURSES IN ENTOMOLOGY

1. **General Entomology.** Senior year, fall term. Class work, three hours; laboratory, two hours. Four credits. Required in the courses in agronomy, animal husbandry, dairy husbandry, and horticulture; elective in the course in general science.

This is a study of the elementary anatomy and physiology of insects, of the life economy of the most important species, and of the general principles upon which the control of these economic forms is based. The class work consists of lectures and of text and special reference study. Prerequisites: Zoölogy I and II, or General Zoölogy I-V.

Laboratory.—The laboratory work consists of a study of the external features of the insect body, and of the classification to the family of representative types.

2. **Taxonomy of Insects.** Senior year, winter term. Laboratory, eight hours. Four credits. Elective in the course in general science.

This is a study of the general principles of the classification

of representative insect forms. The purpose of this course is so to familiarize the student with the literature, methods, and ideals of classification that he will be able expeditiously to identify forms unknown to him and to pursue advanced taxonomic studies. Prerequisite: General Entomology.

3. **Horticultural Entomology.** Senior year, winter term. Class work, two hours. Two credits. Required in the course in horticulture.

This is a study of the most important insect pests of orchard, garden, and forest, and of standard methods for controlling their ravages. The class work consists of lectures and the study of references. Prerequisite: General Entomology.

4. **Household Entomology.** Senior or junior year, winter term. Class work, two hours. Two credits. Required in the course in home economics, and in the home economics option in the course in industrial journalism.

This course comprises both reference study and a series of illustrated lectures on the habits, life history, and general methods of controlling, the principal insects injurious to house, garden, and human health. Prerequisite: General Zoölogy I-W.

5. **General Economic Entomology.** Senior year, spring term. Class work, three hours; laboratory, two hours. Four credits. Elective in the course in general science.

This is a study of the life economy of the more important economic insects, of methods to be used in dealing with them, and of the literature of economic entomology. The student is made familiar with our present knowledge of the most important of our injurious insects, with the sources of economic literature, and with methods commonly used in the investigation of problems in economic entomology. The class work consists of lectures, and of text and special reference reading. Prerequisites: General Entomology, and Taxonomy of Insects.

Laboratory.—The laboratory work consists of the formation and study of a collection of injurious insects, and in insect breeding. This work naturally involves much field study, in the course of which the student gains a first-hand acquaintance with the more important injurious insects at home in nature.

6. **Research in Entomology.** The special student approaching graduation, if willing and capable, is drawn into the research work of the Experiment Station during the summer vacation, and during his last school year is encouraged to undertake the solution of a problem of his own. By this means his information is integrated with the practical problems which he must later meet.

Department of Geology

Professor HEADLEE
Assistant Professor NABOURS

By use of abundant illustrative material, a special effort is made to make the student realize that he is dealing with natural forces which intimately affect his own well-being and that of his fellows. So far as conditions permit, the agencies that have made the earth what it is are observed and studied in the field. The purpose of these courses is to arouse in the student an appreciation of the general principles underlying the structure and formation of the earth.

Some charts, a large and excellent series of lantern slides, a representative collection of fossils and minerals, and a surrounding country exhibiting considerable variety of hill and valley, are available for illustrative purposes.

COURSES IN GEOLOGY

1. **General Geology.** Junior or senior year, winter or spring term. Class work, four hours. Four credits. Required in the courses in agronomy, animal husbandry, dairy husbandry, and horticulture; elective in the course in general science.

This course consists of a brief study of the underlying principles of structural, dynamic, and historical geology. The class work consists of lectures, and of the study of a text and references.

2. **Engineering Geology.** Junior year, spring term. Class work, four hours; laboratory, four hours. Six credits. Required in the course in civil engineering.

The first half of this course consists of a study of the general principles of structural and dynamic geology. The class work consists of lectures and of the study of a text and references. The second half of the work of the term is given in the Department of Chemistry.

Laboratory.—The laboratory work consists of the observation and description of such structural and dynamic features as this locality affords.

Department of German

Professor CORTELYOU
Instructor HEILMANN

In whatever direction the modern student turns his energies, a practical knowledge of German is found to be very useful—often quite indispensable. In the sciences, in the arts, and in literature, much of the newest and best work appears in German, so that he who would keep abreast of the times is forced to acquire at least the rudiments of the language. It is desired that the work of this department shall be as practical as possible, without, however, failing to encourage a fondness for German literature. The plan of instruction in general is a combination of the grammatical and conversational methods, each of which has its own special advantages.

A number of literary and scientific periodicals published in German are received by the College library, and afford the student a practical opportunity to amplify his knowledge of the language as derived in the class room. Participation in and attendance upon the programs of the *Deutscher Verein,* a club fostered by the Department of German and admitting to membership advanced students and instructors, tends toward the same end.

COURSES IN GERMAN

1. **Elementary German I.** Junior year, fall term. Class work, four hours. Four credits. Required in the course in home economics; optional in the course in veterinary medicine; elective in other courses.

After two periods given to the acquisition of the sounds of the German letters, the student at once begins reading. Vocabularies are learned from the outset, while grammar is acquired gradually through reading. Oral and written work and simple conversational exercises begin with the first reading lesson. In the work of this term there is included the study of articles, prepositions, declensions of nouns and pronouns, the numerals, the declension and comparison of adjectives, and sentence order. Frequent reviews enable the student to digest the facts presented, while the abundant conversation and written work subserves the same end. Text, Spanhoofd's *Lehrbuch der deutschen Sprache* (first sixteen lessons).

2. **Elementary German II.** Junior year, winter term. Class work, four hours. Four credits. Required in the course in home economics; optional in the course in veterinary medicine; elective in other courses.

The remaining important points of grammar are studied. Students are repeatedly drilled on the grammatical constructions already emphasized in Elementary German I. The gen-

eral plan of the work is the same as in the preceding term. Essential facts of grammar are insisted upon, but German is taught as a living language. Conversational exercises in German and written translations from English into German are frequent. Text, Spanhoofd's *Lehrbuch der deutschen Spracke* (completed). Prerequisite: Elementary German I.

3. **German Readings.** Junior year, spring term. Class work, four hours. Four credits. Required in the course in home economics; optional in the course in veterinary medicine; elective in other courses.

This course embraces readings of dialogue selections which deal in detail with German life, customs, history, and mythology. A few of the best and most popular song poems also are studied. Grammatical drill is continued, with occasional sight readings and translations into German. Conversations are based on the readings. Text, Bacon's *Im Vaterland.* Prerequisite: Elementary German II.

4. **German Comedies.** Senior year, fall term. Class work, four hours. Four credits. Elective in the courses in general science and home economics.

The course comprises the reading of recent one-act comedies of literary merit, and of a realistic, lively, and cleanly humorous nature, including the following: Julius Rosen's *Ein Knopf,* Gustav von Moser's *Ein amerikanisches Duell,* Hugo Mueller's *Im Wartesalon erster Klasse,* and Emil Pohl's *Die Schulreiterin.* Exercises in conversation and composition based on these plays are occasionally introduced. Text, Manley and Allen's *Four German Comedies.* Prerequisite: German Readings.

5. **German Prose I.** Senior year, winter term. Class work, four hours. Four credits. Elective in the courses in general science and home economics.

This is a practical course designed to give the student an intimate knowledge of every-day German as used among the Germans in their varied activities. The following are studied in this course: visits; the various stores and the making of purchases; cafés, restaurants, and drinking customs; meals, and expressions used at table; society events; dwellings, boarding houses, and hotels; the family, weddings, marriages, etc.; dress; the human body; diseases; the school system; religion and church life; divisions of society, occupations; applied mathematics; money, measures, and weights. Text, Kron's *German Daily Life* (first 155 pages). Prerequisite: German Comedies.

6. **German Prose II.** Senior year, spring term. Class work, four hours. Four credits. Elective in the courses in general science and home economics.

The general plan of the work is the same as that of the preceding course. The following subjects are covered: time; the

seasons and the weather; festivities, recreations, the theater, games; traveling, the railroads, and ships; street cars, cabs, motor cars, airships, etc.; the postal system, the telegraph, and the telephone; the city in general; Berlin and cities of the provinces; inquiring directions; in the country; the German empire; the military system; conversational phrases; the best German; every-day German. Occasionally some supplementary work is done, Wesselhoeft's *German Composition* being the text used. There are sight translations of easy selections. Text, Kron's *German Daily Life* (completed). Prerequisite: German Comedies.

7. **German Classics.** Elective, spring term. Class work, four hours. Four credits. Elective in the course in general science.

This is a course introductory to a study of the German classics. Two or three of the simpler works of classic authors, such as Lessing's *Minna von Barnhelm* and Goethe's *Hermann und Dorothea,* are translated in the work of this term. Textbooks: Lessing's *Minna von Barnhelm,* edited by von Minckwitz and Wilder, and Goethe's *Hermann und Dorothea,* edited by Allen. Prerequisite: German Prose I or II.

8. **Teachers' German.** Elective, spring term. Class work, four hours. Four credits. Elective in the course in general science; elective, optional with German Prose II, in the course in home economics.

In this course a rapid but thorough review of the grammar is given, and composition work is carried on in connection with it. Sight translations and conversation also occupy part of the class period. Text: Bierwirth's *Elements of German,* and mimeographed matter furnished by the department. Prerequisites: At least five terms of college German or its equivalent. Germans who have not had the formal preparation for this course, may be assigned to it upon obtaining the consent of the head of the department.

Department of History and Civics

Professor PRICE
Instructor TAYLOR
Instructor ILES
Instructor JAMES
Assistant REYNOLDS
Assistant GORDON
Assistant SANDBORN

The Department of History and Civics offers sixteen different courses, as described below. Five of these are offered in the subfreshman years, and are to be taken in the order in which they are numbered, though each of these courses is taught every term. The department is well equipped with maps and charts, and has, all things considered, an unusually strong library.

Training for citizenship, breadth of view, historic-mindedness, fairness of judgment, and general culture are constant aims of each course offered by the Department of History and Civics. As a result of the training received in these courses, the student is better prepared to understand and appreciate the institutions in the midst of which he lives and of which he is a part. He is also prepared to act more wisely his part as a leader in good citizenship wherever his lot may be cast.

COURSES IN HISTORY

1. **Ancient History.** Subfreshman, first year, fall term. Class work, three hours. Three credits. Required of all subfreshmen.

This course is introduced by a brief study of the beginnings of civilization in the valleys of the Nile and of the Tigris-Euphrates and among the Hebrews. In the history of Greece, emphasis is laid on the life and government of the people in their city-states, on the age of Pericles, and on the art, literature and philosophy of the Greeks. Alexander the Great is studied, not as a military leader, but rather as the disseminator of Greek civilization. The growth of Rome is sketched from the founding of the city until the time when the great republic surrounded the Mediterranean and embraced practically all of the then known world. The Romanizing of Europe; the reasons for the change from republic to empire, and the method of its accomplishment; Rome's contributions to civilization, such as her roads and her laws; the origin of the Christian church; the Augustan Age; and the lasting impression that five hundred years of world empire made on mankind, are among the points emphasized. An attempt is made, in the very brief time allotted to this subject, to acquire some familiarity with the great personages, such as Pericles and Cæsar, who played principal parts in the ancient world. Text, Myers's *Ancient History.*

2. **Medieval History.** Subfreshman, first year, winter term. Class work, three hours. Three credits. Required of all subfreshmen.

This course begins with a review of the fall of Rome and the migrations of the Teutonic tribes, thus discovering the very beginnings of the modern European nationalities and languages, and traces the story of European history and institutions to the Renaissance. The institution of feudalism; the Christian church and monasticism; Mohammedanism; the achievements of the Northmen; the Hundred Years' War; the Crusades; the Italian cities, and the Renaissance, are among the subjects studied. Special attention is given to England and to the rise and power of the medieval church. Text, Robinson's *History of Western Europe* (through chapter XXII).

3. **Modern History I.** Subfreshman, first year, spring term. Three hours class work. Three credits. Required of all subfreshmen.

This course commences with a survey of the European states at the opening of the sixteenth century. It includes a study of the Protestant Reformation and of the later developments in the history of the church; the rise and fall of Spain; England under the Tudors; the heroic struggle of the Netherlands; the Reformation and the civil wars in France; the Thirty Years' War, especially its causes and results; the Stuarts and the Puritan Revolution in England; and the ascendancy of France under Louis XIV. Text, Schwill's *Political History of Modern Europe* (to page 289).

4. **Modern History II.** Subfreshman, second year, fall term. Class work, three hours. Three credits. Required of all subfreshmen.

This is a continuation of course 3. It includes a study of the second great series of wars between England and France, including the French and Indian Wars, the American Revolution, and the Napoleonic wars to 1815; the French Revolution; the growth of France and recent changes in her government; the creation of the German empire and of the Italian kingdom; the growth of Russia; the situation in Austria and the Turkish problem. Contemporary events in American history are noted throughout this and the preceding course. Text, Schwill's *Political History of Modern Europe* (beginning at page 289).

5. **The American Nation.** Subfreshman, second year, winter term. Class work, three hours. Three credits. Required of all subfreshmen.

In conformity with the plan worked out by the American Historical Association, and in keeping with the practical nature and spirit of the College, the subfreshman work in history reaches its culmination in a term's study of our American nation—its history and its government. The roots of our American history and institutions are found in the history and institutions of European nations, especially in those of England. In order really to understand American history, one must know the history of Europe. This is an important reason—though not by any means the only reason—for the preceding study of ancient, medieval and modern history. This course in the American nation includes a brief study of the fundamental principles of our government and a review of the chief facts in the history and development of the nation from the discovery of America to the present date. Text, Woodburn and Moran's *American History and Government.* This course should be preceded by courses 1 to 4, inclusive.

6. **Industrial History.** Sophomore year, fall term; junior year, fall term; senior year, fall or spring term. Class work four hours. Four credits. Required in the courses in archi-

tecture and engineering, and in the courses in the Division of Agriculture, except in the course in veterinary medicine, where it is optional.

This course covers—

First. A study of the physical geography, geology, climate, etc., of the American continents and how these have affected our history and institutions.

Second. A study of the discovery and colonization of America—the impelling motives, the life, occupations, religion, psychological temperament, political institutions, etc., of the people; and the attitude of the mother country toward colonization and the colonists (especially the colonial policy with respect to the occupations and industries of the people) and the reasons for this policy. A careful study is made of the later history of immigration as to its causes and its volume, its character and direction, and its effect on our industries, politics, and institutions.

Third. The influence of the frontier on American history and development. The growth of the great West, and of the spirit and institutions there engendered, is traced. The effect of the abundance of free land, of the public educational system, and of the life of the frontier, on the evolution of typical American citizenship are considered. Present-day irrigation —its needs, methods, and advantages—is also dealt with.

Fourth. A study of the South before the war (under slavery), and of the new South as it has been developing since the war, including a comparison of the South with New England and the West.

Fifth. A study, running throughout the course, of the life and the industries or occupations of the people—how they were making their living and how they lived. This includes a study of the evolution of agricultural methods, of the growth of the mining and manufacturing industries, of the development of transportation facilities; our maritime shipping interests; inventions, such as the sewing machine, the reaper, the steam engine, and the telegraph. It includes a study of the growth of our cities as a combined result of the operation of natural trade routes and of the exhaustion of our free lands, together with the effect of the development of manufactures and transportation facilities.

Finally. A review of the leading facts in the political history of the nation. An attempt is made to appreciate the influence of the above-suggested factors on political parties and party issues—*e. g.,* tariffs, internal improvements, expansion and slavery—and to appreciate the attitude of sections and of individual leaders toward these issues. This course is based on an American history notebook, prepared by the department; but special use is made of such texts as Bogart's *Economic History of the United States,* Coman's *Industrial History of the*

United States, and Simon's *Social Forces in American History.* Lectures, assigned readings, and reports. (The substance of this course is incorporated in courses 10 and 11, below.)

7. **English History.** Sophomore year, fall or spring term, or senior year, spring term. Class work, four hours. Four credits. Required in the courses in printing, industrial journalism, and general science; elective in the course in home economics.

This course traces the story of the growth of England from the Britain of the earliest time to the British empire of to-day. The political history is clearly traced, but emphasis is laid upon the constitutional development, and the practical working of the present government is carefully studied. Due emphasis is given to the industrial and social development of the people, especially to the more recent industrial revolution. One of the especially interesting features of this course is the study of England's institutions and government as her colonial empire emerged, and the conditions under which the United States of America became independent of England. While this is primarily a textbook course, with Cheyney's *Short History of England* as the text, supplementary reading is required, especially from Green's *Short History of the English People* and Cheyney's *Industrial and Social History of England.* As far as the limited time permits, lectures are given on contemporary continental institutions, movements, and conditions.

8. **Modern Europe.** Sophomore, junior or senior year, winter term. Class work, four hours. Four credits. Required in the courses in printing and industrial journalism; elective in the courses in general science and home economics.

This is a study of the evolution of the modern European nations out of eighteenth century conditions, especial emphasis being laid on the period since the French Revolution. A study is made of the principal features of their present governments as actually conducted, together with the leading questions that are now agitating the several European states. An investigation is also made of existing international relations, and of the more important problems of the modern world, such as the Turkish problem, China, and the partition of Africa. Text, Robinson and Beard's *Development of Modern Europe.*

9. **French History.** Junior or senior year, fall term. Class work, four hours. Four credits. Required in the course in industrial journalism; elective in the courses in home economics and general science.

The story of the growth of the French nation is traced from the days when Gaul was a Roman province, through the fall of Rome and the German conquest to the development of the Christian church and of the institution of feudalism. Then occurs a study of the Crusades, of the formation of the French nation, and of the beginnings of absolute monarchy, to the time

of the emergence of France into a great European power. There follows a survey of the Hundred Years' War, of the Protestant Revolution, of the religious civil wars, and finally of the monarchy under Louis XIV. The study of the old régime in France, of the French Revolution, of Napoleon, and of the new nation, brings this course to the point where the course in modern Europe begins. Text, Adams' *The Growth of the French Nation,* supplemented by special library assignments.

10. **American History I.** Junior year, winter term, or senior year, fall term. Class work, four hours. Four credits. Required in the courses in general science, home economics, printing, and industrial journalism.

This is an advanced course in the history of America, especially from 1754 to 1845. The course is introduced by a study of the results, or effects, of the French and Indian War and of those causes and conditions that led to the war of American independence. The Treaty of 1783, the governmental and political conditions during the confederation period, the Convention of 1787, and the struggle for the adoption of the new constitution are next carefully examined. The following lines of national history are especially studied: the establishment of the nation and the organization and functions of the various departments of its government; the important presidential elections; the financial measures of Hamilton, taxation, banks, internal improvements; history of political parties—their issues and their leaders; foreign relations and the consequent links connecting Europe and America, as in the case of the Monroe doctrine; the slavery question—compromises, the laws and the constitution; nullification and secession throughout our history; annexation and the government of territories; national boundaries; the growth and development of the West, with a study of its influence on our national character and history. Throughout this course careful attention is given to the industrial phases of our history, including that of the period of discovery, exploration, and colonization (incorporating the first part of course 7 above). This is a library course, and each student uses an American history notebook of topics and references prepared by the department, as an aid to larger, more definite, and more thorough work.

11. **American History II.** Junior year, spring term, or senior year, winter or spring term. Class work, four hours. Four credits. Required in the courses in home economics, printing, and industrial journalism; elective in the course in general science.

The work of this term continues the course in American History I down to the present time. It includes a study of the annexation of Texas and the Mexican War, with the resulting slavery issue; the compromise of 1850; the Kansas-Nebraska bill and the early Kansas struggle "to the stars through

difficulties," including the various constitutions and the final admission to statehood; the origin of the Republican party; the election of 1860; secession; a comparative study of the North and the South before, during, and after the war; a study of some leading features of the war, including financial questions and foreign relations; reconstruction—political, social, and industrial; presidential elections, especially that of 1876; and finally, a study of the Spanish War and of America's new position as a world power. The American history notebook is continued. Emphasis is given to the industrial phases of our history, in an effort more clearly to understand and appreciate the present industrial age. This course incorporates the latter part of Industrial History above. Prerequisite, American History I.

12. **Kansas History.** Elective, spring term. Class work, two hours. Two credits.

This course covers the history of Kansas from the beginning down to the present time, with emphasis on the period of statehood. The conquest of the frontier, the building of the state, and the social, industrial, and political advance to the present day are studied. This is a library course, based on outlines and references furnished by the department.

COURSES IN CIVICS

13. **American Government.** Sophomore year, spring term. Class work, two hours. Two credits. Required in the courses in architecture and engineering.

A study of the essentials of American government, local, state and national, with emphasis on real governmental operations rather than on mere academic theories of constitutional law is here given. This is primarily a textbook course, based on some such text as Guitteau's *Government and Politics in the United States* or Hinsdale's *American Government.*

14. **Civics.** Sophomore year, spring term; or junior year, fall, winter, or spring term. Class work, four hours. Four credits. Required in the courses in agriculture, home economics, general science, printing, and industrial journalism.

This course in civics, or actual government, reviews definitely the fundamental principles and operations of our state and national governments, including the essential principles of constitutional law, but gives special emphasis to the actual present-day conditions and movements in our governmental and political life. Among the subjects especially studied are the initiative and referendum, suffrage and primary elections, the recall, city government and government of territories, the regulation of commerce, conservation of national resources, national defense, taxation and finance, the actual methods of congressional activity, and the function, organization, power,

and importance of political parties in our government. The course is primarily based on such texts as Beard's *American Government and Politics* and Hart's *Actual Government.*

15. **Business Law.** Junior or senior year, winter or spring term. Class work, two hours. Two credits. Required in all the courses in the Division of Mechanic Arts; elective in the course in general science and in all the courses in the Division of Agriculture.

This course is planned to give, primarily, a definite knowledge of the essentials of the law of contracts, followed by a briefer study of agency, bailments, and carriers, the law of sales and of negotiable instruments; secondly, the elements of the law of real property, including study of deeds, mortgages, leases, franchises, rights of way, and water rights; finally, a brief study of patent rights and of torts, especially the law of negligence. Text, Huffcut's *Elements of Business Law.*

16. **International Law.** Junior or senior year, winter term. Class work, two hours. Two credits. Required in the course in printing; elective in the course in general science.

The fundamental principles of international law and international relations, and rights and obligations, public and private, in time of peace and in time of war, are studied, especially in the light of recent developments, such as the Hague conferences. Text, Wilson and Tucker's *International Law* (fifth edition, 1910), or *Wilson on International Law* (*Hornbook Series,* 1910).

17. **Farm Law.** Elective, spring term. Class work, two hours. Two credits. Elective in the course in general science and in the courses in the Division of Agriculture.

This course outlines the following subjects as far as the time permits:

First. The title to the farm—deeds, etc.; boundaries of the farm—fences, etc.; water rights, including irrigation; police power of the State—quarantine, destruction of diseased animals, pure food; live stock—liability of owner, trespassing animals, estrays. *Second.* Contracts, including hired help, etc.; farm crops and their ownership; renters; sales, including warranty, etc.; factors, or commission merchants; common carriers, such as railroads; insurance. The course is based on Green's *Law for the American Farmer,* supplemented by the Kansas statutes.

Department of Industrial Journalism

Professor DILLON
Assistant SMITH

The purpose of the course in industrial journalism is to give greater facility in the use of English, with especial reference to the demands of newspapers, farm publications and magazines, in disseminating information concerning agriculture and the industries generally. Students desiring to take the course may approach it from any of four directions: agriculture, mechanic arts, home economics, or general science.

While instruction in industrial journalism does not begin until the junior year, students desiring to take it must come prepared with the necessary training in English and other fundamentals of such a course. They will be required, also, to conform to a schedule of optional courses particularly suited to this profession, and certain to be valuable to them after they leave college. Special students with the necessary prerequisites will be admitted.

A series of lectures describing the theory and practice of journalism is continued throughout the two years. Especial emphasis is given to the industrial branch of the profession. A part of every lecture hour may be used for criticism or special instructions to the class.

COURSES IN INDUSTRIAL JOURNALISM

1. **Elementary Journalism.** Junior year, fall term. Class work, two hours. Two credits. Required in the courses in industrial journalism and printing; elective in other courses.

In this course the students learn the first principles of the profession as they are acquired in actual service. Examples of industrial writing, good and bad, are presented for consideration; farm journals and their ideals and requirements are discussed; and the students are told just what to do and how to do it under given circumstances.

2. **Farm Writing.** Junior year, winter term. Class work, two hours. Two credits. Required in the courses in industrial journalism and printing; elective in other courses.

This course contemplates the most careful instruction in preparing material for publication in daily and weekly papers throughout the State, and in farm journals. The work covers the principal points and objections noted by editors of both classes of publications, and gives particular attention to suggestions leading to the development of attractive features in stories of agriculture, home economics, and mechanic arts, and in campus news. The ordinary laboratory or practice work incidental to assignments is continued. Prerequisite: Elementary Journalism.

3. **Gathering News.** Junior year, spring term. Class work, two hours. Two credits. Required in the courses in industrial journalism and printing; elective in other courses.

The lectures and work of this course are designed to familiarize students with the requirements of newspapers in small cities and towns in respect to the matter of gathering and presenting current events. Prerequisite: Farm Writing.

4 to 9. **Journalism Practice I to VI.** Junior and senior years; four hours, two credits, each term. Required in the courses in industrial journalism and printing; elective in other courses.

Journalism practice consists in gathering information, or news, to which the students have been assigned, and in writing the stories, or articles, in the department workroom. Assignments are given at regular periods and must be accounted for exactly as in a newspaper office, or as in any college course in which certain tasks are performed in the presence of the instructors. The students write articles for *The Kansas Industrialist,* the official paper of the College, and for farm journals and newspapers, describing the work of the Experiment Station, and the industrial work of the various departments. At least one article, and in emergency, two or more articles, must be written every week. In proportion as they advance, the students do more important laboratory, or practice, work. They are required to write special stories and editorials, and in every possible way conduct the actual business of a newspaper office. References are looked up, and special articles prepared for publication under personal supervision. Special instruction is given in the use of technical and semi-technical expressions in writing, with a clear understanding of their meaning. In this way students learn to avoid many of the errors inevitably made in newspaper articles written by persons unfamiliar with the phraseology of the professions. The prerequisite for each term is the work of all preceding terms in Journalism Practice.

10. **Copy Reading.** Senior year, fall term. Class work, two hours. Two credits. Required in the courses in industrial journalism and printing; elective in other courses.

This work teaches the students how to detect, avoid, and correct the common errors in newspaper writing. The lectures cover practically every point encountered in many types of publications. In this part of the course students learn how to emphasize in the headlines the most important and interesting features of a manuscript. Prerequisite: Gathering News.

11. **Newspaper Law.** Senior year, winter term. Class work, two hours. Two credits. Required in the courses in industrial journalism and printing; elective in other courses.

This course is intended to supply the most valuable instruction in the law covering the conduct of newspapers and other

publications, particularly with respect to libel. The ethics of the profession, invaluable to every one desiring to write for the press, are discussed. The students continue their agricultural and industrial writings as in the other terms. Prerequisite: Copy Reading.

12. **Editorial Practice.** Senior year, spring term. Class work, two hours. Two credits. Required in the courses in industrial journalism and printing; elective in other courses.

A cultural course designed to broaden the student's viewpoint as to the conduct of the editorial department of newspapers and farm journals, as to the theories that underlie its work, and as to the factors and influences that control it. To encourage the formation of opinion and to stimulate thought, acceptable contributions written by the students are printed in the College paper. Prerequisite: Newspaper Law.

Department of Library Economy

Librarian SMITH
Assistant Librarian BARNES
Reference Librarian DERBY
Loan Assistant TINKEY
Cataloguer WARNER
Assistant Cataloguer GULICK

The library supplements the work of every department of the College. It is a storehouse of knowledge for every student. It supplies information and the latest results of scientific research for every instructor. The library is thus essential to the College, forming, as it were, a center from which its various activities radiate.

In order that the library perform its functions with the highest degree of efficiency it is necessary that instruction be given regarding its use. With this thought in mind a course is offered the purpose of which is to familiarize the student with scientific, up-to-date methods in the use of books and to acquaint him with the best general reference books as well as with standard works on various subjects. Placed at the beginning of his College course it should tend to increase largely his efficiency in study throughout the entire course.

COURSE IN LIBRARY ECONOMY

1. **Methods of Study.** Freshman year, fall, winter or spring term. One hour of class work a week one half-term and two hours of laboratory work a week one half-term. One credit. Required of all freshman students.

One half-term of this course is given by the Department of Philosophy and the other half-term by the Department of Library Economy. The half-term offered by the Department of Library Economy is given during the fall term only.

The course given by the Department of Library Economy consists of laboratory work on classification and arrangement of books in the library; card catalogues; the principal works of reference, such as dictionaries, encyclopedias, atlases, handbooks of general information, handbooks of geography, history, literature, economics, quotations, statistics, etc.; public documents and their indexes; indexes to periodicals; trade, national and subject bibliographies, etc. Instruction will also be given students in methods of indexing their current technical reading for purposes of future reference.

Department of Mathematics

Professor REMICK
Assistant Professor ANDREWS
Assistant Professor WHITE
Instructor ZEININGER
Instructor CLEVENGER
Assistant MCGARRAH
Assistant PORTER
Assistant HOLROYD
Assistant KAY
Assistant FEHN
Assistant STRATTON

The courses in mathematics are offered primarily with the following ends in view: (1) The attainment of mental power and accuracy in the interest of general culture; (2) the acquirement of facts and processes that will provide the student with valuable tools for further scientific and technical study.

Subfreshman and freshman courses are offered each term, sophomore courses at least twice within the year.

COURSES IN MATHEMATICS

1. **Algebra I.** Subfreshman, first year, fall term. Four hours. Four credits. Required of all subfreshman students.

This course includes a study of the four fundamental operations, integral linear equations, factoring, highest common factor and lowest common multiple by factoring. Text, *First Course in Algebra,* by Hawkes, Luby, and Touton.

2. **Algebra II.** Subfreshman, first year, winter term. Four hours. Four credits. Required of all subfreshman students.

Fractions, fractional and literal linear equations, simultaneous linear equations, graphical representation, are treated in this course. Text, *First Course in Algebra,* by Hawkes, Luby, and Touton. Prerequisite: Algebra I.

3. **Algebra III.** Subfreshman, first year, spring term. Four hours. Four credits. Required of all subfreshman students.

The subjects considered under this head are: involution, evolution, theory of exponents, radicals, quadratic equations, with applications to practical problems. Text, *First Course*

in Algebra, by Hawkes, Luby, and Touton. Prerequisite: Algebra II.

4. **Plane Geometry I.** Subfreshman, second year, fall term. Four hours. Four credits. Required of all subfreshman students.

Books I and II of *Plane and Solid Geometry,* by Wentworth and Smith, are studied in this course. Prerequisite: Algebra III.

5. **Plane Geometry II.** Subfreshman, second year, winter term. Four hours. Four credits. Required of all subfreshman students.

This course includes a study of books III, IV and V of *Plane and Solid Geometry,* by Wentworth and Smith. Prerequisite: Plane Geometry I.

6. **Solid Geometry.** Subfreshman, second year, spring term. Four hours. Four credits. Required of all subfreshman students.

Books VI, VII and VIII of *Plane and Solid Geometry,* by Wentworth and Smith, are studied in this course. Prerequisite: Plane Geometry II.

7. **Bookkeeping.** Subfreshman, second year, spring term. Three hours. Three credits. Required of all subfreshman students.

This is an elementary course taking up the fundamental principles of debit and credit, the formal methods of keeping the more common books, and some work in the practical application of these principles to the keeping of farm, household, and shop accounts. Text, Bogle's *Comprehensive Bookkeeping.*

8. **Algebra IV.** Freshman year, fall term. Four hours. Four credits. Required in the courses in agriculture, architecture, engineering, general science, home economics, printing, and industrial journalism.

This course includes a rapid review of complex fractions, theory of exponents, radicals, with special attention to rationalization and radical equations, quadratic forms, theory of quadratics, simultaneous quadratic equations with graphical work, ratio and proportion, variation, the progressions, binomial theorems with any exponent, logarithms without theory proofs. Text, *College Algebra,* by Rietz and Crathorne.

9. **Plane Trigonometry.** Freshman year, winter term. Four hours. Four credits. Required in the courses in engineering, architecture, general science, and in options of the course in industrial journalism.

This course treats of the functions of acute angles, right triangles, goniometry, oblique triangles, practical problems. Text, Rothrock's *Plane and Spherical Trigonometry.* Prerequisite: Solid Geometry and Algebra IV.

10. **College Algebra.** Freshman year, spring term. Four hours. Four credits. Required in the courses in engineering, architecture, general science, and in options in the course in industrial journalism.

Complex numbers, logarithms (theory and practice), undetermined coefficients, permutations and combinations, determinants, theory of equations, limits, and infinite series, are treated under this head. Text, *College Algebra,* by Rietz and Crathorne.

11. **Analytical Geometry.** Sophomore year, fall term. Four hours. Four credits. Required in the courses in architecture and engineering, and in options in the course in industrial journalism, and elective in the course in general science.

This course treats of coördinate systems, projections, graphical representation, loci, straight line, conics, parametric equations, maxima and minima, empirical equations. Emphasis is placed upon graphical work. Text, Rigg's *Analytic Geometry.* Prerequisites: Plane Trigonometry, and College Algebra.

12. **Differential Calculus.** Sophomore year, winter term, or junior year, fall term. Four hours. Four credits. Required in the courses in architecture and engineering and in the mechanic arts option in the course in industrial journalism; elective in the course in general science.

This course includes a study of fundamental principles, derivatives, differentials, maxima and minima, partial differentiation, applications to geometry and mechanics. Text, *Essentials of Calculus,* by Townsend and Goodenough. Prerequisite: Analytical Geometry.

13. **Integral Calculus.** Sophomore year, spring term, or junior year, winter term. Four hours. Four credits. Required in the courses in architecture and engineering and in the mechanic arts option in the course in industrial journalism; elective in the course in general science.

The topics here treated are: fundamental formulas, integration of standard algebraic and transcendental expressions, definite integrals, applications to plane areas, to lengths, to surfaces, to volumes, and to problems of mechanics. Text, *Essentials of Calculus,* by Townsend and Geedenough. Prerequisite: Differential Calculus.

14. **Mathematics of Biology.** Senior year, spring term. Four hours. Four credits. Elective in the course in general science.

Elements of differential and integral calculus, curve plotting, and determination of equations of curves, are here considered. This course is designed to meet the needs of students in biology and is taught largely by the lecture method. Prerequisite: Analytical Geometry.

Department of Military Training

First Lieutenant HARBOLD, Professor of Military Science and Tactics
Commissary Sergeant CLAEREN (U. S. A., retired), Assistant
B. H. OZMENT, Band Leader

Since this College is one of the beneficiaries of the act of Congress of 1862, military tactics is required in the College curriculum. All young men of the freshman and sophomore years are required to take military drill four full hours per week.

The course of instruction is concisely stated in General Orders No. 231, War Department, 1909, as follows:

"The main object of military instruction given at civil educational institutions having army officers as professors of military science and tactics, will be to qualify students who enter the military departments of such institutions to be company officers of infantry, volunteers or militia."

In compliance with this general requirement, the course of instruction is divided into practical and theoretical work, arranged as follows:

a.—Practical.

Infantry drill, including school of the battalion.
Butts' Manual, with music.
Signal drill: Meyer system.
First-aid drill.
Minor tactics: advance and rear guard, outposts, patrolling, and marches.
Target practice.
Ceremonies: parade, guard mounting, review, inspection, funeral escort, and escort to the colors.

b.—Theoretical.

Company administration for cadet officers.
War Department manuals.
Lectures.

Students under military instruction are organized into a battalion of infantry, the organization, drill, and administration of which conform to that of the army.

Since the number of students assigned to military drill is sufficient to maintain a battalion organization, a band is also provided, the members of which must be thoroughly trained in the drill of the school of the squad. Assignments to the band are made upon request of the band leader, who is charged with the technical instruction.

Officers and noncommissioned officers are selected by the professor of military science and tactics, with the approval of the President. This selection is made from among those cadets who have been the most studious and soldierlike in the performance of their duties, and the most exemplary in their general deportment. In general, the cadet captains and lieuten-

ants are taken from the senior class, the sergeants from the junior class, and the corporals from the sophomore class.

The degree of excellence attained in military drill by the corps of cadets is limited wholly by the state of discipline existing in the corps. Therefore, military discipline, as far as compatible with College regulations, is rigidly enforced during the hour allotted to military work; and it is impressed further upon all cadets that their actions and behavior at times other than the hour for military drill should be regulated by the standards of honor and duty inculcated in military discipline. Each cadet is furnished with a copy of the Regulations for the Corps of Cadets, Kansas State Agricultural College, and will conform to the rules and requirements of the same.

All young men in College courses below the junior year, unless excused by reason of physical disability, are required to take military drill, and to complete the work of each term in a satisfactory manner. All requests for credit, for excuse on surgeon's certificate of permanent disability, or for postponement because of exceptional circumstances, are made to the President through the Commandant of Cadets, who thoroughly investigates each case on its merits and forwards the request, with his recommendations, for executive action. Additional work is optional with seniors and juniors, who are given preference for appointments as cadet officers and noncommissioned officers. A senior or junior having enrolled optionally, and having accepted a commission or warrant, is required to continue the work throughout the College year, subject to the same regulations as other cadets.

The uniform conforms to the West Point cadet pattern in all particulars. The cost of cap, blouse, and trousers is $14.50. This expenditure actually represents an economy, as the young man receives an excellent, well-fitting suit, durable in texture and build, which gives him at all times a well-dressed appearance. The uniform must be purchased immediately after enrollment. New cadets, after being assigned to military drill, will report at once to the office of the Commandant of Cadets for measurement, and will then make their cash deposits to cover the cost of the uniform. The buying of old or of second-hand uniforms is absolutely prohibited, and they will not be accepted as satisfactory uniforms by the Commandant of Cadets.

At the close of the year the names of the cadets most distinguished in military science and tactics are reported to the War Department, and also to the adjutant-general of the State of Kansas.

To the cadets completing the full course in military science and tactics, many excellent opportunities are offered. These young men are well prepared to stand examinations for commissions in the regular service or in the Philippine constabu-

lary, and their training at this institution makes of them efficient subalterns. In addition to such positions, opportunities exist for affiliation with the National Guard of the State. The War Department is in fact now preparing a plan whereby certain honorably mentioned graduates of institutions of this character may be commissioned in the National Guard.

Department of Music

Professor VALLEY
Assistant Professor BROWN
Assistant BAUM
Assistant PING
Assistant BIDDISON
Assistant BEACH
Band Leader OZMENT

Recognizing the importance of music in our daily life, the power, cultural influence, inspiration, and pleasure it affords, and the necessity of musical knowledge for those who intend to enter the profession of teaching, this College offers to the earnest student a good opportunity for the study of music.

No regular or required course is given. The student may take music for one term only, or for an extended period of four years. Instruction is furnished free to all regular students assigned to music in the following branches: Voice, piano, violin, wind and brass instruments; notation, theory, harmony, and musical history.

CLASS INSTRUCTION. Class organization is wholly under the control of the professor of music, and classes are organized at such periods as best accommodate the students interested. There is a growing demand for teachers of music in high schools, and those taking advantage of the courses as offered will be well equipped to teach the subject.

COURSES IN MUSIC

VOCAL

Development and cultivation of the voice.

First Year.—The course for this year includes a study of breathing, tone placing, vocal physiology, simple forms of vocal technique, and the rendition of simple songs and ballads. Text, *Teacher's Exercises.* Concone's *Vocalises,* op. 9-17.

Second Year.—The study of vocal technique is extended. Concone's *Exercises* are continued. Sacred songs and ballads are studied.

Third and Fourth Years.—*Vocalises* by Bordese, Lamperti, Marchesi, Nava, Panseron, Rubini, and songs by Schubert, Brahms, Schumann, and other masters, as well as oratorio and operatic arias are studied during these years.

PIANO

First Year.—This course includes: studies in the rudiments of music, melody, rhythm, and the underlying principles of touch and technic; etudes by Gurlitt, Streabbog, Burgmuller, Kohler, Biehl, and simple selections from modern composers.

Second Year.—In this course are studied the compositions of Loeschhorn, Czerny, Heller, Lecouppey, Bertini, Duvernoy, and Smith. Preparatory octave studies, a study of scales, and special technical work are also offered.

Third Year.—Advanced work in technic and scales; studies by Cramer, Czerny, Field, Bach's little preludes and fugues, two-part inventions, Kullak octave studies, sonatas by Haydn and Mozart, selections from Chaminade, Rubenstein, Grieg, Scharwenka, Godard, Jensen, and Poldini, form the basic matter of this course.

Fourth Year.—Advanced work in technic, phrasing, and interpretation; Bach's three-part inventions and well tempered clavichord, Clementi's *Gradus ad Parnassum,* Foote, MacDowell, and Henselt etudes, Beethoven sonatas, and more difficult selections from classic and modern composers, are studied during this year.

VIOLIN

First Year.—Particular attention is given to attaining correct position, intonation, and bowing. Methods by Hohmann, Wichtl, etudes by Wohlfahrt; scale studies; easy pieces, are considered in this course.

Second Year.—Methods by Wichtl, Dancla, etudes by Wohlfahrt, Kayser's Technical Studies; duets by Pleyel, Mazas, etc.; selections from Dancla, Singelee, DeBeriot, and modern composers, are the subjects of study during the second year.

Third Year.—Methods by DeBeriot, David; technical studies by Schradieck, special studies, Mazas scale studies; etudes by Kreutzer, selections from DeBeriot, Alard, and others; orchestral playing, comprise the work in this course.

Fourth Year.—Etudes by Kreutzer, Mazas's brilliant studies; scale studies; selections from Mozart, Tartini, Vieuxtemps, Wieniawski, and others; orchestral playing; ensemble classes, comprise the work of this advanced course.

ELECTIVE IN MUSIC

In connection with vocal and instrumental music the following subjects are required:

JUNIOR YEAR

Fall Term.—Theory, including notation of music, pitch, rhythm, measure, symbols, metronome marks, acoustics, chromatic signs, keys, major and minor scales, signatures; harmony, including intervals, triads of the major and minor scales; the history of music, including ancient and oriental

music, and the progress of musical development to the close of the sixteenth century, are studied in this course.

Winter Term.—Theory, including intervals, chords, ear training, thinking tones, nonchordal tones, embellishments, and abbreviations used in music; harmony, including inversions of triads, dominant sept-chords and inversions; and history of music, treating music in the seventeenth century, opera, oratorio, and instrumental music to the present day, are studied during this term.

Spring Term.—Theory, including musical forms, vocal, instrumental, instrumentation and uses of various instruments, modern orchestra, prosody, musical terms in general use; harmony, including collateral sept-chords of the major and minor scales, inversions, cadences; and the history of music, including the biographies of great musicians—Bach, Haydn, Handel, Beethoven, Chopin, Schumann, Liszt, Wagner, Grieg, and others, are treated in this course. Texts: Theory, *Musical Essentials*, by Maryatt; Harmony, text by Brockhoven; History, text by Fillmore.

SENIOR YEAR

Fall Term.—Two lessons a week in vocal music or in specialized instrument are given. The work in harmony includes a study of chords of ninth, eleventh, etc., and altered chords.

Winter Term.—Two lessons a week in vocal music or in specialized instrument are given. The work in harmony includes a study of suspensions, analysis, and modulation.

Spring Term.—Two lessons a week in vocal music or in specialized instrument are given. The work in harmony includes a study of modulation, and harmonization of melodies.

Musical Organizations. Each instrument has a distinct function in the science of tonal expression, and only in the combination of instruments are the finest effects in the coloring of the melody, harmony, and rhythm procured. This combination is made possible in the Department of Music by the number of students and by the variety of instruments. Students who are sufficiently advanced to join the College Choral Union, the College Glee Club, the College Orchestra, or the Military Band, may become members by assignment.

The Orchestra. This organization endeavors to maintain a correct and well-balanced instrumentation; and gives the members opportunity for practical orchestral playing. The work is highly educational, including as it does the study and performance of standard overtures, symphonies, and concert pieces in classic and modern form. The orchestra furnishes music for the College Assembly each morning and assists in several concerts and entertainments during the year.

Choral Union. Chorus singing is of great importance to students in voice, and this society was organized for their bene-

fit. The students receive here much needed experience in sight reading, become familiar with choral masterpieces, and enjoy the broadening influence of these works. One rehearsal is held each week. Regular attendance is required.

Assembly Chorus. The more advanced students are invited to sing in this chorus, which has for its object the rendition of a weekly choral selection at the assembly. Only the highest class of church music is used on these occasions. Rehearsals are held on Friday afternoons.

Glee Club. The college Glee Club averages about sixteen of the best male voices in the institution.

Military Band. The band is a part of the cadet corps, and practice in the band is accredited, through the Military Department, in lieu of drill and theoretical instruction. Members of the band are required to conform strictly to cadet regulations. Assignments to the band are made for the entire year by the leader. Members of the band are required to attend regularly until after Commencement exercises. The band furnishes music for all ceremonies of a military character and for various other college occasions.

Annual Concert. On Wednesday of Commencement week, an annual concert is given by the Choral Union, assisted by the orchestra. In the spring term a number of musical recitals are given, of which the students furnish the entire programs. These recitals are open to the public.

Department of Philosophy

Professor McKeever

The courses offered in the Department of Philosophy are intended to give the student practical assistance in the performance of his chosen work. With this end in view, the abstract speculations which once characterized many of the philosophic subjects are studiously avoided, while the concrete and human aspects of things are emphasized. In every course it is sought to have the student keep consciously in mind the human society in which he lives, and to set up for himself the goal of efficient membership therein.

The department is reasonably well equipped for doing satisfactory work. The psychology laboratory contains enough apparatus to meet the practical needs of the course, and the department library is sufficiently well stocked to admit of a liberal amount of reference work.

Courses 6 to 10, inclusive, are electives for those who wish to prepare to teach the subjects upon which the College places special emphasis, such as agriculture, domestic science and art, manual training, and the physical and biological sciences.

With the foregoing, the young men should have psychology and philosophy, and the young women psychology and ethics. Young women finishing the course in home economics may take for their electives a double group, including history of education, philosophy of education, methods of teaching, sociology, ethics, school law, and school management.

COURSES IN PHILOSOPHY

1. **Methods of Study.** Freshman year, fall, winter or spring term. One hour of class work a week one half-term and two hours of laboratory work a week one half-term. One credit. Required of all freshman students.

One half-term of this course is given by the Department of Philosophy and the other half-term by the Department of Library Economy. The half-term offered by the Department of Library Economy is given during the fall term only.

The course given by the Department of Philosophy is based on elementary psychology. Its chief purpose is to assist the student in acquiring a better method of expending his time and energies in the pursuit of College work. Each member of the class is required to work out carefully a plan or program of the College exercises in which he is at the time most directly interested, and to submit this schedule for criticism. A balanced schedule of study, work, and recreation is made the subject of special consideration.

2. **Philosophy.** Sophomore or senior year, winter term. Four hours a week. Four credits. Required in courses in general science, printing, and veterinary medicine, and in the general science option in the course in industrial journalism.

This is a lecture and recitation course in which the student is introduced to some of the more important and practical aspects of philosophy, such as (1) the special point of view of philosophy; (2) the philosophic implications of modern science; (3) man's destiny in the light of evolution; (4) the philosophy of work and of the vocational life. Brief consideration is given to defining the positions of some of the world's greatest philosophers. The student is required to do a liberal amount of reference reading and to offer a number of specially prepared discussions. The term's work is based on portions of Paulson's *Introduction to Philosophy.*

3. **Psychology.** Junior year, fall or winter term, or senior year, fall term. Four hours a week. Four credits. Required in the courses in home economics, general science, and printing, and in the general science option in the course in industrial journalism.

This is a general course, combining lecture, recitation, and laboratory methods of instruction. An effort is made to master the general principles of the subject and to show the application of these principles to every-day life. The student is re-

quired to spend about one-half of the preparation time in reference reading, and to offer before the class during the term two or more independent discussions. It is also required that each student, by the use of laboratory instruments furnished by the department, make out a personal table of biometric measurements, a duplicate copy of which is kept on file. A short time is devoted to the study of some of the more important problems in social psychology. James's *Psychology* is used as a text, with the works of Angell and Judd as reference texts.

4. **Ethics.** Junior or senior year, winter term. Four hours a week. Four credits. Elective in the course in general science.

This is a lecture course giving brief consideration to systematic ethics and a fuller treatment of practical ethics. Theories of conscience and of the highest good are subjects of special consideration, as is also the psychological aspect of the development of the ethical judgment. Each member of the class is required to present a number of discussions of reference readings and to consider the application of ethics to his chosen vocation. Text, Thilly's *Ethics.*

5. **Research and Laboratory Psychology.** Senior year. Eight hours a week. Four credits. An individual elective laboratory course, open to a very limited number of students.

Either one of two types of work may be attempted: (1) The pursuit of an inquiry into some carefully chosen social problem, with a view to securing new psychological data thereon; (2) the study of one or more laboratory problems, new to the student, with the use of the instruments for psychological measurements. In each case a full tabulated report of the work is required of the student.

COURSES IN PEDAGOGY

6. **History of Education.** Junior or senior year, fall term. Four hours a week. Four credits. Elective in the courses in general science and home economics.

The course includes a brief survey of ancient, medieval, and modern education, with special attention to epoch-making movements and the great educators connected with them. The student is asked to work out individually, during the term, an outline of the course, showing the movement of educational history toward modern systems.

7. **School Law.** Junior or senior year, winter term. Two hours a week. Two credits. Elective in the courses in general science and home economics.

The purpose of this course is to review briefly the laws referring directly to the public schools of the State of Kansas, and to note any radical differences that may be found in the school laws of other states.

8. **Methods of Teaching.** Junior or senior year, winter term. A lecture and recitation course, four hours a week. Four credits. Elective in the courses in general science and home economics.

This course embodies the application of the principles of psychology to teaching, and begins with a cursory review of such principles, but the greater portion of the time is given to a consideration of methods of teaching the various special branches, emphasis being placed upon the particular line of work which the student is preparing to teach. Each member of the class is required to do a liberal amount of reference reading and to offer for criticism several written dissertations.

9. **School Management.** Junior or senior year, spring term. Four hours a week. Four credits. Elective in the courses in home economics and general science.

This is an elementary course, giving consideration to questions of management and discipline in graded and ungraded schools, and treating briefly some of the minor problems of higher school administration. An effort is made to prepare the teacher to exercise proper judgment and authority in the position which he is preparing to hold.

10. **Philosophy of Education.** Junior or senior year, spring term. Four hours a week. Four credits. Elective in the courses in general science and home economics.

A careful analysis of the formal processes of the school, and of the educational influences of the institutions outside of the school, with a view to determining how these experiences all tend to unify life. The student is asked to formulate an ideal which the teacher might consciously set up as a goal of his efforts. Throughout the course a distinctive point of view of the philosophy of education is given prominent consideration. Somewhat extensive readings in general philosophy and psychology are required. Horne's *Philosophy of Education* is the guide book of the course.

Department of Physical Education

Professor LOWMAN
Instructor ENYART

The purpose of this department is to assist the students of the College to live to the best advantage, and so to aid them in the formation of hygienic habits that during their college course they may make profitable preparation for life. It is an urgent necessity that every student should have an intelligent appreciation of the means requisite for the preservation of his health, in order that he may be able to formulate intelligently his own policy of health control.

All young men and all young women of the College are entitled to the privileges of the gymnasium, which is one of the largest in the West and is well equipped with all sorts of apparatus for physical training, with lockers, plunge baths, shower baths, and other accommodations.

Physical training three times a week is required of all subfreshman students, both young men and young women. All young women below the junior year are required to take physical training, unless excused by the Dean of Women, except that in the sophomore year music may be taken instead; provided, that the student has a credit of at least one year of physical training; and provided further, that physical training taken in the preparatory course may be substituted for a like amount of physical training in this course. Women excused from physical training on account of physical disability are provided by their dean with an equivalent or stronger substitute from the regular course, and their normal work later in the course is increased by that amount.

The following phases of departmental work are combined for the purpose of accomplishing the desired end.

PHYSICAL TRAINING FOR MEN

PHYSICAL EXAMINATIONS

The work of the department is based largely upon a physical examination given each student upon his first entrance to the College. A second examination is given at the close of his sophomore year. All students, whether taking work in the department or not, are entitled to receive a physical examination, and advice as to their physical condition.

The measurements taken and the tests given have each a definite purpose with reference to ascertaining the muscular condition of the individual. A diagnosis is also made of the vital organs to ascertain their functional condition, and a complete inspection of the whole body is made to detect any weakness or deformity that may exist. Based upon the information thus obtained, advice is given and work is assigned to

students in accordance with their physical needs and tastes, and their condition of fitness. Delicate students, and those suffering from functional disorders, receive individual attention. Students organically sound are assigned work in a carefully graded and progressive system of gymnastics and athletics. All candidates for athletic teams, class as well as College teams, are required to enroll in the department, submit to a thorough physical examination, and pass the grade tests before being allowed to compete for positions on the various teams. Students engaging in two or more College sports during the school year must undergo a physical examination before undertaking any given sport. This is required in order that no student may indulge in athletics to his own permanent physical injury. Each student may secure a copy of his own physical measurements, and an anthropometric chart, showing in graphic form his own development as compared with the average or typical man.

Physical training is required to be taken three hours a week regularly each term, by all subfreshman young men. Members of the College teams, reporting regularly, are excused from regular class work, and are entitled to full credit in that portion of their work; but before the completion of the course, at least two terms' work must be done in the gymnasium. While no regular time credit is given, a passing grade is required for promotion and for graduation. The individual's grade rests largely on the basis of attendance, punctuality, earnestness, and application; but written and practical tests are also given.

Optional work, designed to meet the needs of freshmen and upper classmen, is offered from December to March. Hours are arranged by the director. Regulation uniforms must be worn in the gymnasium. Students are advised not to procure uniforms until after their arrival at the College.

HYGIENIC INSTRUCTION

This instruction gives an insight into the practical problems of daily healthful living from a personal point of view. Directions are given for avoiding the common ills of student life, and for maintaining the highest physical and mental condition while in college, as well as for gaining the highest development of vital power and health for future duties.

1. **Subfreshman Course.** Sixteen lectures. These lectures give special attention to exercise, rest, food, respiration, care of excretions, clothing, and bathing and cleanliness. The effects of certain abnormal bodily conditions and habits are also given due consideration, *e. g.*, adenoids, large tonsils, decayed teeth, mouth breathing, rapid eating, the use of narcotics and stimulants, constipation, and certain phases of social hygiene. Training principles for athletic contests and athletic equipment also receive attention.

2. **Freshman and Sophomore Course.** Twelve lectures. This course reviews and enlarges upon certain phases of the subfreshman course; deals with bacteria and a few other common causes of disease, their distribution and transmission; includes a discussion of the "common carriers" of disease, such as food, water, clothing, flies, mosquitoes, other insects, animals, and careless human beings; discusses the defenses against disease, such as established boards of health and quarantine, and appropriate sanitary legislation. The defenses of the individual, such as cleanliness, avoidance of the carriers of disease, the use of antiseptics, sunshine, fresh air, and immunity are further discussed.

INSTRUCTION IN PHYSICAL EXERCISE

This course furnishes instruction in all the various grades of gymnastic and athletic exercises offered by the department. The great variety of exercises offered is intended to meet all individual needs, capacities and tastes. A physical examination and test determines the grade or class of exercises for which a student is fitted.

A. **Gymnastics.** During the winter term the work is conducted indoors, and consists of light and heavy gymnastics, which are selected with a view to obtaining progressive effect upon the bodily organism:

a. FREE CALISTHENICS. Exercises are selected for their different effects upon the bodily organism, and are arranged in the order of increasing difficulty. They involve hygienic or body-building work, educative movements, and corrective or remedial exercises. Both the Swedish and the German systems are used.

b. TACTICS. A modified form of the military and of the German system is used, both for convenience in handling classes and for disciplinary value.

c. LIGHT APPARATUS. Training is given in the use of Indian clubs, dumb-bells, wands, bar bells, etc.

d. HEAVY APPARATUS. Graded exercises are given on parallel bars, vaulting bars, bounce board and mat, side and long horse, high and low horizontal bars, traveling and flying rings, etc.

e. INDOOR ATHLETICS. Instruction is given in all indoor track events preparatory to indoor track meets.

f. GAMES. There are included basket ball, indoor baseball, volley ball; also, other games of a more recreative nature.

g. SPECIALS. Under this head come fencing, boxing, wrestling, tumbling, and advanced apparatus work, offered as advanced work to those who have had not less than two terms' work in the gymnasium. Hours are arranged with the instructor.

B. **Departmental Athletics.** In the fall and spring terms, the courses in the gymnasium are supplemented by instruction in outdoor athletics. Individuals are assigned to the kind of work best suited to them. Attendance is compulsory upon those participating. In the fall the following sports are offered: football; track and field events; cross-country running; and outdoor basket ball. In the spring are offered: baseball; track and field events; cross-country running; and outdoor basket ball.

Cross-country running is encouraged throughout the year. Natural exercise in the open air takes precedence of all other forms of exercise. Opportunity is offered for tennis, but it can not be elected in place of required work.

Days unsuited for outdoor work are devoted to a discussion of playing rules, the principles of training for athletic contests, and lectures on team work.

C. **Intercollegiate Athletics.** These contests are promoted and encouraged for the more vigorous students, because of their effect upon college life, and their wide social and moral values to the participants. Intercollegiate teams should represent the final stage of selection in an educational process and development among a large number of students, thereby giving both a rational physical education system and a healthy system of sport. Intercollegiate contests are scheduled for the different sports; viz., football, basket ball, baseball, track athletics, and tennis.

PHYSICAL TRAINING FOR WOMEN

PHYSICAL EXAMINATIONS

A physical examination of each young woman is made by the instructor in charge of women before permission to enter a class is given. This includes an elaborate system of body measurements and an examination of the condition of the heart and lungs. Physical defects, abnormalities, and weaknesses are noted and judicious healthful exercise is prescribed to fit the student's individual needs.

A suit has been adopted which consists of black serge blouse and bloomers, and must be made in uniform style. The pattern for the suit is the Ladies' Home Journal pattern number 5431.

INSTRUCTION IN PHYSICAL EXERCISE

1. **Physical Training I.** Freshman year, each term. Four hours. Required of all young women.

Correction of improper standing and walking, marching, free exercises, fancy steps, elementary series in wands, dumbbells, Indian clubs, balance ladder, and gymnastic games.

2. **Physical Training II.** Freshman year, each term. Four hours. Required of all young women.

Military marching, continuation of work with light apparatus, stall bars, flying rings, giant stride, chest weights, games, and basket ball. Prerequisite: Physical Training I.

3. **Physical Training III.** Freshman and sophomore years, each term. Four hours. One term required of all young women; three subsequent terms, optional with music, required of all sophomore young women.

Fancy marching, advanced free exercises, coördination work with Indian clubs, wands, and dumb-bells, jumping horse, and parallel bars. Folk dances and song plays, tennis, and indoor baseball. Prerequisite: Physical Training II.

Department of Physics

Professor HAMILTON
Instructor JENNESS
Instructor FLOYD
Assistant RABURN
Assistant BLATTNER

Recognizing the need of a thorough knowledge of the fundamental laws and principles involved in all physical changes, provision has been made, in the courses which follow, for both a theoretical and a practical treatment of the subject. Instruction is based upon the facts given in selected textbooks, and these topics are enlarged upon by lectures and illustrated by experimental demonstrations. The purpose is to give a training in exact reasoning, and a knowledge of principles that will be factors in the solution of problems in all branches of science as well as in every-day life.

The laboratory work which accompanies the courses in physics gives the student abundant opportunity to test the principal laws of the science, and, since he is expected to arrange and operate the apparatus, the work should enable him to acquire skill in manipulation, precision of judgment, and care in the use of delicate instruments. The laboratories are well arranged for the work, and the equipment provided is of a nature adapted to meet the requirement of accurate work in all courses. The manual in use in most of the courses is one prepared by the department to meet the exact conditions and equipment of the laboratory.

COURSES IN PHYSICS

1. **Elementary Physics I.** Subfreshman, second year, fall term. Class work, three hours. Three credits. Required of all subfreshmen.

This course is intended to give a general view of the subjects of mechanics and sound. Special emphasis is placed upon those principles which will be met again in later work in the same or other sciences. Textbook, Carhart and Chute's *Physics*. Prerequisite: Algebra III.

2. **Elementary Physics II.** Subfreshman, second year, winter term. Class work, two hours; laboratory, two hours. Three credits. Required of all subfreshmen.

This course includes a study of heat and light, and is a continuation of Elementary Physics I. Discussion of the most important laws involved in each of the above, together with the explanation of many every-day phenomena, is followed by problems. Textbook, Carhart and Chute's *Physics*.

Laboratory.—The importance of accurate measurements, observations, and conclusions is emphasized in the use of such instruments as the calipers, balances, micrometer, spherometer, barometer, and thermometer, and in measurements in reflection and refraction. The measurements taken are made the basis of problems to illustrate the various laws discussed in the class.

3. **Elementary Physics III.** Subfreshman, second year, spring term. Class work, two hours; laboratory, two hours. Three credits. Required of all subfreshmen.

This course is a continuation of Elementary Physics I and II, and includes a study of magnetism and electricity. After a brief study of magnetism, the fundamental laws of electricity are studied and illustrated, and the working principles of many of the electrical appliances in daily use are made subjects for class discussions. Textbook, Carhart and Chute's *Physics*.

Laboratory.—Construction and use of cells, simple forms of wiring, use of instruments for measuring currents.

4. **Household Physics.** Freshman year, spring term. Class work, four hours. Four credits. Required in the course in home economics and in the home economics option in the course in industrial journalism.

A course of lectures and demonstrations, in which the laws relating to principles involved in appliances of the household are explained and illustrated. The work in heat is based upon thermometry, calorimetry, radiation, absorption, and methods of refrigeration and ventilation. The course includes a study of light with its color phenomena and actinic effects, and of some of the optical instruments used in scientific work, and a study of electric lighting and illumination, and of the cost of operating many of the appliances used in the home, including suggestions for the proper use and care of electrical apparatus for the protection of the appliance and of the operator.

5. **General Physics I.** Sophomore or junior year, winter term. Class work, three hours; laboratory, two hours. Four credits. Required in the course in general science and in the general science option in the course in industrial journalism.

This course, like the one following, is provided for those intending to specialize in scientific lines. It covers, in as

thorough a manner as possible, the general principles involved in mechanics and heat. Textbook, Hastings and Beach, *General Physics.* Prerequisites: Plane Trigonometry, and Elementary Physics III.

For students in the courses in printing and in the agricultural option in industrial journalism, a similar course under the same name is given in the fall term for which Plane Trigonometry is not a prerequisite.

Laboratory.—The work is based upon the laws and principles discussed in the class room, and is so arranged that the student may have practical illustrations of the truth of the facts learned.

6. **General Physics II.** Sophomore or junior year, winter or spring term. Class work, three hours; laboratory, two hours. Four credits. Required in the courses in general science and printing and in options in the course in industrial journalism.

This course includes a study of the theory of electricity, sound, and light. The class work follows the subject as outlined in the text, but special emphasis is placed upon those parts that have an immediate bearing on the work of other sciences, such as electrolysis, thermal effects, relation of electrical and mechanical energy, photometry, wave length, and spectrum analysis. Textbook, *General Physics,* by Hastings and Beach. Prerequisite: General Physics I.

Laboratory.—The work follows the subjects presented in the class, and is conducted with a grade of apparatus that gives a training in the use of the better class of instruments for scientific investigations.

7. **Engineering Physics I.** Sophomore or junior year, fall term. Class work, three hours; laboratory, four hours. Five credits. Required in the courses in engineering, in the course in architecture, and in the mechanic arts option in the course in industrial journalism; elective in the course in general science.

This course in mechanics is intended to give the engineering students as thorough a working knowledge as possible of the fundamental units and laws involved in force, work, power, and energy; also the laws of simple machines, gases, and liquids as they occur in the transformation of force and energy. Textbook, *College Physics,* by Kimball. Prerequisite: Trigonometry.

Laboratory.—The work consists of the use of apparatus to test the laws of inertia, moments of force, moments of torsion, elasticity, and rigidity, and other laws and principles involved in mechanics. Accurate measurements and carefully recorded data are required.

8. **Engineering Physics II.** Sophomore or junior year, winter term. Class work, three hours; laboratory, four hours. Five credits. Required in the courses in engineering, in the course in architecture, and in the mechanic arts option in the course in industrial journalism; elective in the course in general science.

This course treats of electricity and light. The work in electricity is of such a nature as to give the student a working knowledge of the units employed, and of the fundamental laws; and to acquaint him with methods of producing a current, its uses, and the system by which electrical energy is measured. The principal phenomena of light, together with the laws that may have a direct bearing upon light as a standard and method of measurement, are treated in this course. Textbook, *College Physics,* by Kimball. Prerequisite: Engineering Physics I.

Laboratory.—The electrical work in this course includes measurements of resistances, a study of primary cells, and the transformation of mechanical into electrical energy. The work on light consists of a study of the laws of reflection and refraction, and measurements of wave lengths by means of the spectroscope, the use of the interferometer, and photometry.

9. **Engineering Physics III.** Sophomore or junior year, spring term. Class work, three hours; laboratory, four hours. Five credits. Required in the courses in engineering, in the course in architecture, and in the mechanic arts option in the course in industrial journalism; elective in the course in general science.

Heat is treated both theoretically and practically, and in such a manner that its relation to mechanical energy is emphasized. The methods of measuring heat energy and the methods of heat transformations and transference are discussed and illustrated. The facts in sound that involve points of special use and training are discussed. Textbook, *College Physics,* by Kimball. Prerequisites: Elementary Physics III and Engineering Physics II.

Laboratory.—This course consists of measurements of velocity of sound in solids and gases, thermometry, calorimetry, expansion of solids, liquids, and gases, and the mechanical equivalent of heat.

10. **Agricultural Physics.** Junior year, spring term. Class work, four hours. Four credits. Required in the courses in agronomy, animal husbandry, dairy husbandry, and horticulture.

A series of lectures and class demonstrations based upon heat, light, and electricity as involved in influencing farm life. The elementary factors of weather and weather forecasting are explained and access given to the weather records and

apparatus of the College weather station. The work in light emphasizes the value of light in plant growth, in spectrum analysis, and in many of the natural phenomena. Electricity is presented in such a manner that the student may gain a working knowledge of the various electrical appliances that can be used on the farm.

11. **Radiant Energy.** Junior or senior year, fall term. Class work, three hours; laboratory, two hours. Four credits. Elective in the course in general science.

Lectures and demonstrations. This course and the two courses following are arranged with the special purpose of giving a sort of training which will be of value to those who may intend to teach physics, chemistry, or mathematics, or to those expecting to do advanced scientific work. The various forms of radiant energy are discussed; spectra and spectrum analysis, polarized light, radioactivity, electric and magnetic waves, absorption and dispersion and their phenomena.

Laboratory.—The work is based upon theory as developed in the class work, and includes the use of the spectrometer, polariscope, interferometer, optical bench, of photometry, etc.

12. **Physical Measurements.** Junior or senior year, winter term. Class work, two hours; laboratory, four hours. Four credits. Elective in the course in general science.

The class work is based upon principles that are involved in instruments for accurate measurements. The instruments described and used are typical ones employed in measurements of mechanical forces, heat, and electricity. Part of the class work is the development of formulas.

Laboratory.—The work is so selected as to give the widest possible range in the variety of instruments used and of principles illustrated.

13. **Physical Manipulations.** Junior or senior year, spring term. Class work, two hours; laboratory, four hours. Four credits. Elective in the course in general science.

Class periods are utilized for outlining and discussing the selection and arrangement of apparatus for demonstrational work.

Laboratory.—The work consists of glass blowing, bending, and grinding; silvering, photography, electroplating, and the making of pieces of apparatus for special demonstrations. In this course opportunity is given those intending to teach, to become thoroughly acquainted with modern laboratories and laboratory methods.

14. **Photography.** Elective, fall or spring term. Two hours class work, two hours laboratory per week. Three credits.

The importance of a record of exact details, as shown in a photograph, makes this work valuable to all scientists. The

course gives the student some knowledge of the chemical and physical principles involved in the art, as well as practice in making good negatives and prints. The lecture and laboratory work deals with: things to be considered in selecting a camera; proper exposures; composition of pictures; proper development of plates; tests of different developers; retouching; reducing and intensifying negatives; printing and mounting; making lantern slides, bromide enlargments, and the prints best adapted for illustrated articles in newspapers and magazines. Prerequisites: Physics and Chemistry.

Department of Public Speaking

Assistant Professor JOHNSTON

It is the constant effort of this department to correlate the training in public speaking with the work in all the other departments of the College; to harmonize it with the spirit of the school, which is distinctly technical and industrial in character. With this end in view, students in agriculture are trained in the presentation and discussion of agricultural facts before supposed audiences of farmers. Students in engineering, home economics, architecture, etc., are trained in speaking on subject-matter relating to their respective courses of study, and to their probable needs and activities in later life. Conviction, not entertainment, is the dominant purpose in every case.

COURSES IN PUBLIC SPEAKING

1. **Public Speaking.** Sophomore year, fall, winter, or spring term, and senior year, spring term. Four hours a week. Four credits. Required in the courses in agriculture, veterinary medicine, printing, home economics, general science, and industrial journalism.

This course begins with a study of the fundamental principles and accepted rules of public address. These are applied in the interpretation of selected masterpieces of general literature and oratory, and also in the delivery of original subject-matter by each student, the class serving as his audience and critics. Some time is devoted to exercises in correct breathing, articulation, and tone production, and to fit these to the individual needs of students. Instruction is given by recitation, lectures, and platform work. Text, Kammeyer's *Principles and Practice of Public Speaking.*

2. **Extempore Speech.** Sophomore year, spring term. Two hours a week. Two credits. Required in the courses in engineering and achitecture.

This course is an abbreviation of Public Speaking and is limited to students in the Division of Mechanic Arts. It is not

an equivalent of Public Speaking and may not be substituted for it. Instruction is given by means of lectures and platform work.

3. **Technique of Speech.** Junior or senior year, winter term. Two hours a week. Two credits. Elective in the course in general science.

The specific purpose of this course is to offer more extended drill and practice in vocal and physical expression than can be given in the others as outlined. Practically all the time is devoted to exercises for the correction of faulty articulation, grouping, bearing, attitude, gesture, etc. Reading and impromptu speaking before the class afford opportunity for testing the ability acquired. The dominant purpose of the course is to help students to fix correct habits of speech by means of frequent repetitions and conscious effort. Instruction is given by means of drill and platform work. Prerequisite: Public Speaking or Extempore Speech.

4. **Forms of Public Address.** Junior or senior year, spring term. Four hours per week. Four credits. Elective in the course in general science.

A special study of types of utterance and forms of public address is made. Great orations of ancient and modern times are studied in their historical settings, analyzed, and interpreted. Original platform work continues throughout the term, and consists of after-dinner speeches, memorial addresses, debates, and other forms of public address for formal occasions. Instruction by assigned readings, lectures, and platform work. Prerequisite: Public Speaking or Extempore Speech.

Department of Rural Education and Sociology

Professor HOLTON

The courses in this department have for their controlling motive the urgent demand that public education in a democracy shall function in greater social and vocational efficiency. The subject matter for the courses is (1) the elements of sociology, (2) social institutions, (3) vocational education in this and foreign countries, and (4) the application of the fundamental principles and methods of vocational and social education to public education and community life in this State.

COURSES IN SOCIOLOGY

Sociology. Senior year, fall or winter term. Four hours a week. Required in the courses in printing and industrial journalism; elective in other courses.

This is a course in the elements of sociology. An outline syllabus of the course is as follows: primary aspects of social

organization; and the social and industrial mind. The nature of social organizations; the democratic mind; public opinion as an organizing factor; democracy as a training in self-control; commercialism; democracy and Christianity; social classes; the caste principle; race caste; medieval caste; equal opportunity and social efficiency; economic betterment and ill-paid classes; labor organizations; poverty. The nature of social institutions; the family; the church; the economic system; public education. The function of the public will; municipal socialism; growing efficiency of government.

Rural Sociology. Junior or senior year, winter or spring term. Four hours a week. Four credits. Elective.

This is a course in the elements of sociology applied to rural traditions, customs, and institutions. An outline of the course is as follows: old world peasantry; the making of peasantry; prevention; the trend of rural population; composition of rural population; rural social institutions; the rural church; the rural school; farmers' organizations; vital statistics; moral level; delinquency and dependence; insanity; position and work of women; farm labor; rural politics; cultural ideals; standards of business; the social psychology of rural life; class consciousness.

Community Surveys. Senior and graduate students, fall or spring term. One double period a week. Two credits. Elective.

This course is a study of the methods of investigation and plans of work employed by social-service institutions, such as endowed foundations and bureaus of municipal research. Each student works out plans for, and makes a survey of, the health, social, economic and educational conditions in a given community. No credit will be given for this course until the final report has been completed.

COURSES IN RURAL EDUCATION

Industrial Education. Junior or senior year, fall term. Four hours a week. Four credits. Elective.

An outline syllabus of the course is as follows: the development of vocational education; the systems of industrial education in typical countries and cities of America and Europe. The place of industrial education in our public schools; the manual training courses; social and economic significance of industrial education; outlining courses of study and programs of work; equipment and estimates of cost of shops for public schools. The principles of pedagogy applied to the teaching of industrial subjects.

Rural Education. Junior or senior year, spring term. Four hours a week. Four credits. Elective.

This is a course on the subject matter and methods employed

in agricultural education. An outline syllabus of the course is as follows: Development of agricultural education; agricultural colleges; écoles pratiques d'agriculture in France; Folkchojskoler in Denmark; agricultural high schools in Wisconsin, Massachusetts and other states; school gardens; relation of agriculture to consolidation of rural schools; organization of the course of study for high schools and rural schools, extension work; organization of the laboratory and field work; methods of presentation of the subject matter.

Educational Practicums. Senior or graduate students, fall, winter or spring term. One double period per week. The number of credits (not to exceed two for each term) will depend upon the time given to investigation and the quality of the work. Elective.

The problems for study and investigation for 1912-'13 are: "A Course of Study in Agriculture, Shop Work, and Home Economics for a Kansas High School"; "Consolidation of Rural Schools"; "Public Schools as Social Centers for Neighborhood Life"; and "School Gardens." Each student selects a single subject for study and investigation. No credits will be given until the final report has been completed.

Department of Zoology

Professor HEADLEE
Assistant Professor NABOURS
Instructor SCOTT

Classroom teaching and laboratory instruction are closely correlated, and the student is expected to be able to draw conclusions based upon a comparison of information from both sources. As nearly as circumstances permit, the classroom and laboratory work on the same form proceed simultaneously. By means of frequent and carefully planned excursions and the free use of vivaria in the laboratory and museum, the student is never allowed to forget that he is dealing with living creatures, in many cases fellow members of his own environment, some of which are decidedly beneficial or decidedly injurious to his welfare. The courses offered by this department are intended to awaken in the student an appreciation of the general principles of animal life and of its relation to the welfare of man.

A large number of standard anatomical charts, a representative collection of vertebrates and invertebrates, a series of lantern slides, and a series of microscope mounts are available for illustrative purposes. Compound and dissecting microscopes sufficient for the needs of laboratory classes have been provided.

COURSES IN ZOOLOGY

1. **Zoology I, II, and III.** Freshman year, fall, winter, and spring terms, respectively. Each of these courses consists of two hours of class work and four hours of laboratory work a week for one term. Four credits each term. Required in the courses in general science, agronomy, animal husbandry, dairy husbandry, and horticulture.

These courses represent a connected elementary study of the structure and function of types selected to illustrate the development of the animal kingdom. The purpose of these courses is to give the student an understanding of the general principles underlying animal life. The class work consists of lectures and of text and special reference study.

Laboratory.—The laboratory work consists of observations of the form and activities of living animals both in the field and in the laboratory, and of the dissection and sketching of each of the important systems of those animals selected as types.

2. **General Zoology I-V and II-V.** Fall or winter, and winter or spring terms, respectively, of the sophomore year. Each term's work consists of two hours class work and four hours laboratory work a week for one term. Four credits each term. Required of young men in the courses in veterinary medicine and industrial journalism.

These courses cover much the same ground as Zoölogy I, II, and III, and are intended for students pursuing a course where only two terms are required. Fewer types are studied and the emphasis is placed on the vertebrate side. The class work consists of lectures and of text and special reference study.

Laboratory.—The laboratory work is an abbreviation of that offered in Zoölogy I, II, and III.

3. **General Zoology I-W and II-W.** Fall and winter terms, respectively, of the sophomore year. Each term's work consists of two class and four laboratory hours a week for one term. Four credits each term. Required of young women in the courses in home economics and industrial journalism.

These courses are for students taking home economics, and while they cover much the same ground as that scheduled as Zoölogy I-V and II-V, they differ too much from these to justify students of other courses in electing either of them.

Laboratory.—The laboratory work is an abbreviation of that offered in Zoölogy I, II, and III.

4. **Advanced Vertebrate Zoology I and II.** Junior year, winter and spring terms, respectively. Each of these courses occupies two hours of class and four hours of laboratory work a week for one term. Four credits each term. Elective in the course in general science.

These courses consist of a fundamental study of the structure and physiology of vertebrate animals. The class work includes lectures, and text and special reference study. Prerequisites: Zoölogy I, II, and III.

Laboratory.—The laboratory work consists of the dissection and sketching of each of the systems of selected types and of such experiments in fundamental physiology as the time and apparatus permit.

5. **General Zoology Technique.** Senior year, spring term. One lecture and six hours of laboratory a week. Four credits. Elective in the course in general science.

This is designed especially for those expecting to continue work on zoölogical lines. The purpose of the course is to acquaint the student with methods of collecting, killing, and preserving, and with the preparation of various sorts of zoölogical material, both gross and microscopic, for study. It includes the making of whole mounts and the general methods of imbedding, sectioning and staining microscope slides. The lectures explain further the theory and practice of useful methods of technique. Prerequisites: Zoölogy I, II, and III, or General Zoölogy I-V and II-V or I-W and II-W.

6. **Embryology.** Sophomore, junior or senior year; the fall term for young men; the winter or spring term for young women. Three hours of class work and two hours of laboratory work a week. Four credits. Required in the courses in animal husbandry, dairy husbandry, veterinary medicine, and home economics; and elective in the course in general science.

This course consists of a study of the development of the vertebrate embryo. The class work includes lectures and text and special reference study. Prerequisite: Zoölogy II and III, or General Zoölogy I-V and II-V or I-W and II-W.

Laboratory.—The laboratory work consists of the examination and sketching of selected stages in embryonic development, beginning with the ovum and sperm and ending with well-formed organs.

7. **Parasitology.** Senior year, fall term. Two hours of class and two hours of laboratory work a week. Three credits. Required in the course in veterinary medicine.

A study of the characteristic marks, life economy, and methods of controlling the most serious external and internal parasites of domestic animals. Prerequisite: General Zoölogy I-V and II-V or I-W and II-W.

8. **Evolution of Domestic Animals.** Senior year, winter term. One hour of class work a week. One credit. Required in course in animal husbandry.

This course is intended to bridge the gap between ordinary zoölogical study and the study of breeds of domestic animals. It consists of a series of ten lectures and of wide reference reading.

Special Courses for Teachers

At the present time the teaching of vocational subjects in the public schools is undergoing great development. Many schools are introducing manual training, agriculture, domestic science, and domestic art, and many others are extending the work hitherto given. The recent State law requiring the teaching of agriculture in the rural schools will also prove to be a strong movement in the same direction. There is an active demand for teachers who can handle such work successfully.

The College offers to graduates of other institutions, and indeed to all who have studied such subjects as may be prerequisite, unexcelled facilities for securing training in the industrial subjects indicated. Courses extending over one or two years may be arranged by means of which the student who is already prepared in English, mathematics, and to a certain extent in the sciences, may prepare himself to enter a broader and, frequently, a more remunerative field.

Pages 202 and 203, Nos. 15, 16, 17, 19, 20, and 21, exhibit groupings that illustrate the possibilities in work of this character, and other arrangements may be made. Those taking such courses will be cared for in the regular classes provided for other students, and no limitation is imposed except that the prerequisites for any subject must have been taken previously, here or elsewhere. These prerequisites are stated in this catalogue in connection with the description of each subject. The catalogue also shows the terms in which a subject is regularly given, but many of those of the freshman and of the sophomore year are also offered at other times. Prospective students may receive information concerning such other opportunities by addressing the President of the College.

The Summer School

The College has a large and well-equipped plant devoted to the teaching of agriculture, home economics, mechanic arts, and general science, including subjects usually classed as cultural. In order that this plant may not remain idle during the summer months, the Board of Regents authorized the organization of a Summer School. This entire $2,500,000 plant is thrown open to the teachers of Kansas at a time when it is possible for them to avail themselves of these opportunities.

for study. The State Agricultural College is authorized by an act of Congress to expend each year a portion of the national appropriation in "providing courses for the special preparation of instructors for teaching the elements of agriculture and mechanic arts."

During the years 1911 and 1912 the Committee on Recommendations in the College was called upon to furnish teachers in kinds and numbers as follows:

Agriculture	173
Manual training	76
Domestic Science	124
Sciences	29
Principals who were prepared to teach agriculture or manual training in village or city schools	79

On account of not having a sufficient number of trained teachers to recommend, the College was able to fill less than one-third of these positions.

For the training of teachers in vocational and country-life subjects, the College has peculiar advantages. The campus occupies a commanding and attractive site upon an elevation adjoining the western limits of the city of Manhattan, with electric car service into town and to the railway stations. The grounds are tastefully laid out according to the designs of a landscape architect, and are extensively planted with a great variety of beautiful and interesting trees, arranged in picturesque groups, masses and border plantings, varied by banks of shrubbery and interspersed with extensive lawns, gardens and experimental fields. Broad, macadamized and well-shaded avenues lead to all parts of the grounds. Including the campus of 160 acres, the College owns 748 acres of land. Outside the campus proper, all of the land is devoted to educational and experimental work in agriculture, horticulture, and forestry. Within the College grounds, most of the space not occupied by buildings or needed for drives and ornamental planting is devoted to orchards, forest and fruit nurseries, vineyards and gardens.

On pages 127, 183, and 196, attention has already been drawn to a certain extent to the character of the instruction offered in agriculture, mechanic arts and home economics.

While the summer school appeals especially to teachers and the subjects offered are determined to a considerable extent by the needs of teachers, the demand is such that courses in subjects especially for college students of this or other institutions are included.

College credit is allowed on all courses given in the summer school, but if such credit is desired the student is permitted to take subjects aggregating only 16 credit hours per week. The intention to claim College credit must be made known at the time that the assignment to work is taken out, and the fact

entered upon the assignment. Students not desiring to claim College credit are permitted to attend classes to the extent that the schedule permits if approved by the Director of the Summer School.

COURSES IN AGRICULTURE

In agriculture the work offered consists in part of some of the subjects of the College courses, including Farm Crops I, Farm Crops II, Farm Crops III, Soils, Dairying, Live Stock I, Live Stock II, Live Stock III, Plant Propagation, Landscape Gardening, Orcharding, and Poultry Management I. In addition to these subjects from the College courses, special classes are organized in Agricultural Nature Study, Rural School Agriculture, and High-school Agriculture to meet the needs of teachers of agriculture in the rural schools, in the high schools, and in the lower grades.

The College herds, flocks, orchards, plantations, and crops growing in the fields are used for laboratory work and illustration.

COURSES IN MECHANIC ARTS

Several courses are offered in manual training and shop practice, embracing different grades of work and a variety of materials. One of these is for pupils in the primary grades, and includes weaving, cord work, raffia, reed work and cardboard construction. Other grades deal with woodworking for the grammar grades and for high schools. These include not only a careful study of tools and processes, and practice in important exercises in joinery, but practical cabinet construction, wood turning, wood carving and inlaying, polishing and finishing.

In metal work a course in forging includes practical exercises for high-school work, involving operations of drawing, upsetting, welding, twisting, splitting and shaping. Sufficient instruction is given in the forging of tool steel to enable one to make and temper many of the tools needed in high-school work. Another course includes bench work and machine-tool work, and familiarizes the student with some of the fundamental operations of a modern machine shop.

An elementary course in free-hand and object drawing is given, especially designed to assist teachers in the use of the State text in drawing.

COURSES IN HOME ECONOMICS

The courses in home economics embrace both domestic science and domestic art. A special class is organized for study of methods of presentation of home economics in grade and high schools. In this, attention is given to the application of the general principles of teaching to the teaching of

home economics, to the planning of lesson and course outlines, and to the equipment of laboratories. The classes offered in domestic science are Food Preparation I and Food Preparation II of the freshman year of the College course in Home Economics. In domestic art, classes are organized in hand and machine sewing, garment making, and drafting and designing, equivalent to the work of the freshman year and the fall term of the sophomore year of the College course in home economics.

The Department of Architecture and Drawing offers courses in free-hand and object drawing, color and design I, and color and design II.

COURSES IN GENERAL SCIENCE.

The College offers a considerable variety of courses in the sciences and other subjects of general or special educational value.

In mathematics instruction is given in algebra, including college algebra, and in plane and solid geometry and in plane trigonometry. In addition, classes with a special object present industrial arithmetic and secondary mathematics. The former has two distinct aims, (1) to obtain a working knowledge of the principles of numbers, both integral and fractional, and (2) the application of these principles to the practical problems of the farm and the shop; the latter undertakes a critical examination of the mathematical field of the secondary school, including the content of secondary algebra, geometry and trigonometry to the study of the teaching of the mathematics, pedagogical theories of presentation, objective points, etc.

The classes in English of special interest to teachers include literature from the readers, constructive English, and high-school classics. The aim of the first is to stimulate the teacher's love for literature until she becomes conscious of her power to interest, impress and inspire boys and girls. It is planned to meet the needs of rural and grade schools. The course in constructive English should be of special value to teachers of the grammar grades and high schools. By present-day methods of teaching it trains the student to express his thoughts clearly and accurately. Discussion of methods of such teaching is an important part of the work. The course in high-school classics includes lectures by the instructor and interpretation by members of the class of passages assigned for study. The aim of this course is to awaken vital appreciation of the best literature for high schools and to inspire teachers to bring the message of that literature to the pupils. Discussion of methods of teaching occupies one hour each week.

Writing for the journals may be regarded as a special type of English composition, and a series of lectures in industrial

journalism is given, which present the first essentials of newspaper writing, contrast city and farm papers, tell how to get up a magazine story, and describe the work and responsibility of news gatherers and publishers.

Five courses are offered in history and civics: English history, American government, American history, industrial history and Kansas history. All of these give full College credit.

Courses in the physical sciences include elementary physics, electricity and light, photography, elementary chemistry and elementary organic chemistry. The course in elementary physics has special reference to high-school instruction. All of the other courses named are the same as given in the regular College work.

In biological sciences a special course in agricultural botany is offered, designed to give to high-school teachers a method of teaching botany that will bring the students into closer relation with the farm and its problems. A course in economic entomology and also one in economic zoölogy is offered. These are thoroughly practical courses in which the laboratory and field, as well as the lecture room, are used in the study of insects and animals in their economic relations.

The importance of physical education is recognized, and two courses are offered to meet the needs of teachers who wish to direct more efficiently instruction in this subject in the public schools. These treat (1) of physical education in the public schools of all grades, and (2) of playgrounds.

A special pamphlet giving full information concerning the Summer School may be obtained by addressing the President of the College.

Department of College Extension

J. H. MILLER, Director
G. W. CONN, Superintendent of Farmers' Institutes
P. E. CRABTREE, Farm Management
GEO. C. WHEELER, Animal Husbandry
C. V. HOLSINGER, Horticulture
GEO. S. HINE, Dairy Husbandry
FRANCES L. BROWN, Home Economics
ELLA M. NASH, Home Economics
MRS. MARY E. SIMMONS, Home Economics
NELLIE L. THOMPSON, Home Economics
W. S. GEARHART, State Highway Engineer
H. B. WALKER, Drainage and Irrigation
A. R. LOSH, Assistant Engineer
EDWIN L. HOLTON, Rural Education
HARRY L. KENT, Correspondence Courses and Lecture Bureau

Until 1905 the work of college extension, in the form of farmers' institutes, was in charge of a farmers' institute committee of the College. Applications for college lecturers at the institutes were referred to this committee, and such members of the Faculty as happened to be available were detailed to attend the meetings. The State appropriation for institute work was small, no regular staff could be employed, and the institutes themselves were for the most part unorganized and of a temporary and sporadic character. The first step toward the development of the institute work was taken in the employment by the Board of Regents of a superintendent, who assumed the responsibilities of the organization of the work in October, 1905. In July, 1906, the Department of Farmers' Institutes was formally organized by the Board of Regents. An energetic prosecution of the work of agricultural extension had resulted in an awakened interest throughout the State, and in a legislative appropriation of $4000 in 1905, to which amount the College added $800. In 1907 the results of the extension work were seen to be so valuable that the legislature appropriated $11,500, to which the College added $1000. In 1909 the legislature, with unprecedented liberality, made an appropriation for agricultural extension work of $52,500, just five times the appropriation made by the preceding legislature. The legislature of 1911 appropriated for this department $35,000 for the year ending June 30, 1912, and $40,000 for the year ending June 30, 1913.

The principal value of the Agricultural College, as a teaching factor, must be in the training it is able to give to the young people who enter upon and continue through its courses of study, in residence. The Agricultural Experiment Station, as a natural adjunct to the College, has its great field in the discovery of new truths relating to agriculture. So long, however, as the institution limits its efforts to these lines, it is evident that only a small proportion of the people of a state can derive direct and practical benefit from the work of the

College. The progress of agricultural education would be slow indeed if the Agricultural College did not offer other forms of instruction to the people of the State. The same economic principle that justified the expenditure of public funds for educating young people who are able to attend the College justifies a similar expenditure for the purpose of taking the College to those who are not able to come to it. State education is not philanthropy, but self-protection—foresight. An educated citizenship is a prosperous citizenship. The Kansas State Agricultural College, through its several lines of extension, is taking its work each year to nearly two hundred thousand farmers and their families.

While this is directed by the Department of Agricultural College Extension, the scope would be very limited were it not for the coöperation of the other divisions and departments of the College in supplying speakers for institutes, assistants in various lines of demonstration work, teachers for movable schools, and wise counsel in the various lines of public effort.

PUBLIC EXTENSION SERVICE

INSTRUCTION THROUGH ORGANIZATION: Farmers' institutes and Women's Auxiliary institutes; neighborhood improvement clubs; boys' corn, potato, and poultry clubs; rural life boy scouts; girls' home economic clubs; girls' baking and canning clubs; movable schools in agriculture; movable schools in cooking and sewing; special lectures on agriculture, home economics, and industrial education; agricultural trains; pure-bred sire clubs; coöperative breeding associations; cow-testing associations; fruit growers' associations; good roads associations.

INSTRUCTION BY DEMONSTRATION AND SUPERVISION: Road and bridge plans and supervision; drainage plans and supervision; silo plans and supervision; orchard plans and treatment; farm crops and feeding demonstrations; farm management plans and visits; exhibits at fairs.

INSTRUCTION BY CORRESPONDENCE: Correspondence courses in agriculture, home economics, and shop work.

THE FARMERS' INSTITUTES

The farmers' institutes of the State have regular officers, constitutions and by-laws, and are required by law to meet at least annually. Many of these organizations also hold six or more monthly meetings. The College plans to send one or more speakers to present at a meeting certain well-defined lessons in some branch of agriculture. The speakers and their subjects are chosen because of a known need or interest in a particular community, and with a view to starting or encouraging certain definite lines of agricultural work. Effort has been made to build up a fixed membership in these institutes, and the list of members reported to this department

up to March 1, 1912, is about 15,000. This membership roll constitutes the mailing list for the regular pamphlets issued by this department to the members of the farmers' institutes. In addition to these pamphlets, each member who fills out and returns a membership blank will receive from the College, from the government, or from some State Experiment Station such other obtainable literature as his interests demand. Each year some special topic, such as live stock, plant breeding, gardening, orcharding, or dairying, is made especially prominent in institute programs, either for the whole State or for certain specified districts. Special meetings are held by approximately two-thirds of the institutes, for the discussion, on certain designated days, of special subjects, such as "Afalfa," "Poultry," "Good Roads," "Seed Selection," "Silos and Silage," "The Farm Horse," etc.

The programs for all regular meetings are based on suggestive outlines sent out by the Extension Department. When these are returned by the local committees, the programs and posters are printed and sent out free. The department furnishes literature, on request, for members who are to take part in any program of an institute, a Grange, or other organization. During the campaign beginning September 1, 1911, and ending March 1, 1912, the College assisted in the holding of 110 two-day institutes and 248 one-day institutes; a total of 358 institutes, having an aggregate attendance of more than 95,000 farmers with their families.

PUBLICATIONS FOR FARMERS' INSTITUTE MEMBERS

Since definite subjects are selected for each year's institute work, with a view to bringing about a certain unanimity of action, it seems appropriate that some of these subjects be treated more at length, be published in pamphlet form, and then be mailed to all institute members. These pamphlets were first issued as special numbers of *The Industrialist*, but later, under the name of *Agricultural Education*, this publication was entered in the post office as a regular periodical. There is a membership fee in all institutes; all members receive free from four to six or more numbers of the periodical during each year. A large edition of each number is printed, and back numbers are mailed to new members until the supply is exhausted.

Institute Pamphlets Issued.—1907-'08: *Swine, Farm Dairying, Poultry, Sheep, Dry Land Farming, Hay Making, Demonstration Methods.* 1908-'09: *Plant Breeding, Insects Injurious to Farm Crops, Some Wheat Problems.* 1909-'10: *Orcharding, The Silo.* 1910-'11: *Highway Improvement, Economic Value of Bird Life, Swine Problems, Crop Exhibits.* 1911-'12: *The Cement Silo, Farm Drainage, Yards and Lawns, Improving Farm Pastures.*

Pamphlets for Teachers.—1907-'08: *The Soil, How Plants Feed and Grow, Hygienic Cookery, Tree Culture, Bird Life.* 1908-'09: *A Corn Primer, Some Insect Studies.* 1909-'10: *Some Weather Studies.* 1910-'11: *Some Health Problems, A Dairy Primer, A Poultry Primer, A Soil Primer, A Wheat Primer, A Corn Primer, A Plant Propagation Primer.*

BOYS' AND GIRLS' CONTESTS

In the hope of creating a keener interest in rural life, contests in growing corn, potatoes, etc., and in baking, fruit canning, and sewing were inaugurated. They are usually considered a part of the work of the farmers' institutes and are for the most part conducted by these organizations. Prizes are arranged for, which in some counties aggregate as much as $400. Prizes for boys and girls fifteen years old and over are given in the form of free trips to the State institute held at the Agricultural College each winter. This is clearly educational work, and many county school superintendents state that these contests in corn, bread, etc., have stimulated the entire year's work of country schools. For the contests in 1911, the rules of previous years have been changed, and three additional recommendations are made: (1) Each boy shall plant one acre of corn from which his ten ears must be selected for the contest; (2) any boy may join a yield contest, provided he notify the executive committee of his institute, on or before the first of October, that he thinks his acre will yield, for all territory east of the Sixth Principal Meridian, seventy-five bushels, for the next three counties west (to the west line of Barton and Smith counties), sixty bushels, and in all territory farther west, forty bushels per acre, of corn or kafir. (3) Institute committees are urged to introduce for boys between the ages of seventeen and twenty-two, a five-acre contest; the contestant to notify the committee on or before the first of October that he thinks his corn will yield seventy-five, sixty, or forty-five bushels per acre, according to territory. The College recommends that the prize for the one winner in this contest be $50 cash on condition that the winner attend the Farmers' Short Course at the Agricultural College for ten weeks.

HORTICULTURAL DEMONSTRATIONS

The fruit and garden interests of Kansas fully justify the College in employing a practical horticulturist, who spends about five months of each year in attending farmers' institutes and special meetings, and who devotes the remainder of the year to visiting orchards, gardens, and potato fields and to conducting demonstrations in pruning and spraying upon request; he also visits orchards later, to advise as to picking and packing the fruit, and as to the methods and places of marketing. He is available at times for certain investigation work in coöperation with the Horticultural Department of the Experiment Station.

HIGHWAY ENGINEERING

It is eminently proper that the Agricultural College should maintain a trained highway engineer who is primarily the State adviser for county and city officials on matters relating to roads and bridges. He makes plans and specifications for bridges and culverts and advises as to their location. He examines proposed highway improvements, and, if it is desired, makes plans and specifications for such road work, whether the improvement contemplates the use of macadam, oil, or sand-clay, or is simply to be an improved earth road. Later, if desired, he will inspect all bridge and road work on its completion and report its condition to the proper county or city officials. All such work is done without charge to the local community, other than for actual traveling expenses. When other work will permit, he also advises bridge contractors, and furnishes plans, specifications, etc., on the same terms as to officials, except that the contractor will be charged the actual cost of a draftsman's time in drawing the plans.

DRAINAGE AND IRRIGATION ENGINEERING

It has been found by careful investigation, that there are more than twenty counties in eastern Kansas where large areas of valuable land are in great need of systematic tile drainage. In October, 1910, the Agricultural College employed, and is now maintaining, a public drainage engineer whose duties are outlined much as are the duties of others connected with this department—attending farmers' institutes from October to March, and from March to October advising with farmers, county surveyors, and engineers, relative to the best and most economical plans of straightening creeks and rivers, and draining fields and farms, and of developing plants for farm irrigation. To this engineer are assigned all problems relating to farm irrigation. His services are absolutely free other than the usual charge for traveling and local expenses.

HOME ECONOMICS

While thousands of young women have had residence instruction in domestic science at the Agricultural College, there are still many other thousands who have been unable to take advantage of the excellent facilities which the College possesses in this field. Therefore, the Extension Department employs four competent teachers and demonstrators in this subject, to carry instruction in home economics to these absent ones. These teachers attend farmers' institutes for the regular institute period of five months, hold "movable schools" for three months, and then hold "women's meetings," and attend teachers' institutes, chautauquas, Grange meetings, women's club meetings, etc., the rest of the year. At all times

an extensive correspondence is carried on with the women and girls of the State. "Girls' Home Economics Clubs" are also organized in high schools and in rural neighborhoods, using regular cooking and sewing lessons sent out from the department. Correspondence with women's clubs is also invited relative to occasional lessons in cookery, for which printed lessons are sent on request.

RURAL EDUCATION

Recognizing that the problem of education for the farmer must begin with the child, the College maintains in the Extension Department a professor of rural education. He visits the high schools, and, when desired, furnishes advice concerning methods of introducing and teaching agriculture, cooking and sewing, and manual training; he lectures before teachers' institutes and associations, farmers' institutes, high schools, commercial clubs, and all other organizations interested in the introduction of industrial or vocational branches into our schools. He also gives in the College, during the year, a course of lectures on rural education.

MOVABLE SCHOOLS IN HOME ECONOMICS

The College is able to reach a limited number of persons by means of its actual class and laboratory work. The institute program reaches many more with its system of lectures and addresses. In addition, the movable schools in home economics, giving definite courses of instruction which occupy at one place a period of one week, enable the College to carry its educational services directly to the homes of the people. These schools continue during a single week, from 1:15 P. M., Monday to 11:45 A. M., Saturday. The sessions of the schools of economics are conducted according to the following program: Cookery, from 9 to 11:45; sewing, from 1:15 to 3:45; "round table" for the public, from 4 to 5. For a course to be organized, it should have not less than twenty and not more than forty members. A fee of one dollar a member is paid to the local committee for the purchase of supplies, and for the entertainment of the two College teachers who conduct the class. No visitors are permitted until after the conclusion of the day's work, at 3:45 P. M. The sessions of the schools are held in the months of March, April, May, and September.

GIRLS' HOME ECONOMICS CLUBS

The College is able to give personal instruction in home economics each year to only about eight hundred girls; through the "movable schools" it is not likely that more than five hundred women and girls can be reached annually with the limited instruction that can be given by the present force of teachers during the periods of one week each; through the farmers' institutes and women's institutes, not more than five thousand

women are likely to receive the information that can be given in the more or less formal discussions; through correspondence courses it is not probable that more than a few hundred persons will be reached. The College is, therefore, undertaking in addition the work of organizing hundreds of "girls' home economics clubs" in town and village high schools, and in rural communities. A certificate is granted to a club having six charter members, although better results are likely to follow from a larger membership. Printed lessons in cooking and sewing are supplied by the secretary of the club, together with blanks for reports which are to be handed in after each lesson. Literature relating to the work being conducted is sent by the College to the individual members of the clubs. In a limited way this is a form of correspondence study, and girls can to a certain extent be prepared for either the regular correspondence courses, for domestic science work in high school or college, or for their usual home duties. The work also prepares the way for the regular teaching of domestic science and art in the high schools of the State. It is hoped that it may be arranged for a College representative to visit these clubs annually. A small charge, to be paid the College, is required of each club organized under the College auspices.

SCHOOL CAMPAIGNS

A state campaign for agricultural education would be incomplete if it did not affect the rural schools. According to a recent legislative enactment, all teachers are hereafter required to take an examination in elementary agriculture. It is not required that agriculture be taught in the rural schools of the State, but within the next two years it will undoubtedly become a part of the daily course of study of every school in Kansas. In coöperation with the county school superintendents and institute workers, the Agricultural College is each year holding "schoolhouse campaigns" in a few counties, for the purpose of stimulating interest in agriculture among children, teachers, and patrons. In these campaigns the College representative is usually able to speak in four schoolhouses each day, and to give a lecture in the evening, either in a rural schoolhouse or in some village. The representatives sent to the different counties are chosen with reference to the prevailing interests of the respective localities.

AGRICULTURAL TRAINS

The College has enjoyed for several years the coöperation of the leading railroads of Kansas in the matter of special educational trains, such as "corn," "alfalfa," "wheat," "dairy," "drainage," and "good roads" trains. By this means it has been possible to meet many thousand people and to impress upon them in a forceful way the importance of seed selection, of improved methods of culture, of the value of better dairy stock, silos, etc.

BOYS' AND GIRLS' MEETINGS

The College is inaugurating a system of special meetings for the boys and girls who engage in the various contests. This work will usually be conducted in the form of a county campaign, consisting of four or six afternoon meetings a week, for the purpose of reaching the boys and girls engaged in the various contests. When these young people become sufficiently interested the representatives of the College will assist them in forming organizations to be known as the "Boys' Good Farming Club" and the "Girls' Home Economics Club." The College is also organizing, in towns and villages of the State, "boys' poultry clubs" and "boys' garden clubs." "Girls' flower clubs" will also be organized where there are no "city beautiful leagues." Special circuits will be arranged for these boys' and girls' meetings, similar to those of the regular farmers' institutes, and the officers of these clubs will report to a College official as do the officers of the institutes.

CORRESPONDENCE COURSES

The correspondence courses here outlined should be of especial interest to the following classes of persons:

(1) Boys and girls who have completed the common-school course of study, but who can not immediately attend a high school or other preparatory school.

(2) Young men and women who feel that their school days are over, but who have aspirations, not yet satisfied, for a better education.

(3) Men and women of middle life who wish to know more of the sciences of the farm and of the home.

(4) Men who have been farming along general lines, but who have developed an interest in some special kind of work, such as orcharding or dairying, and who wish to direct their attention chiefly to that field.

(5) Road supervisors who need to know more of the science of road making, the building of culverts, etc., but who can not afford to stop their work and take a special course.

(6) Men and women who have passed middle life, who are about to retire from active farming, but who intend to keep their minds young by study, and who desire to enrich their own experience by adding to what they themselves have gained a knowledge of what has been discovered by others.

(7) Capitalists and business men who are holding investments in land, and who should know how to make those investments increase in value.

(8) Teachers who desire to teach agriculture or home economics in special classes, or who wish to learn how to enrich their teaching in the sciences.

Only a small percentage of the farming population of Kansas is able to attend the classes in the Agricultural College; in

all, about 100,000 people attend the farmers' institutes; a few hundred attend the movable schools. There still remain nearly a million adult people living in the country, few of whom have ever read carefully a single book on farm crops, dairying, horticulture, farm drainage, or the like. The College is now prepared to offer correspondence courses in the following subjects:

Animal breeding.
Concrete construction.
Cooking.
Dairy farming.
Dairy manufacturing.
Elementary agriculture.
Elementary woodwork.
Farm building.
Farm crops.
Farm drainage.
Farm mechanics.
Farm motors.
Floriculture.
Forestry.
Fruit growing.
Highway construction.
Home decoration.
Household management.
Household sanitation.
Insects injurious to farm crops.
Insects injurious to orchard crops.
Landscape gardening.
Poultry management.
Rural sociology.
Sewing.
Soils.
Stock feeding.
Vegetable gardening.
Vocational education.

The charge for this instruction is five dollars for each course —a nominal sum, scarcely sufficient to pay for the actual cost of grading the exercises and examination papers, and for other clerical work. The textbook is not provided for by the fee. In all of the courses many state and government bulletins will be furnished free, or at a nominal charge, as material supplementary to the textbook used. About thirty additional courses will be offered after September, 1912. The special announcement for correspondence courses is mailed free on application to the Department of College Extension.

MOVABLE SCHOOLS IN AGRICULTURE

As a means of intensifying the work of the farmers' institutes, "movable schools" are to be held in those communities that have high institute records. Schools will be conducted in "dairying," "poultry," "orcharding," "stock judging and breeding," "corn culture," "road making," and "concrete construction." These schools will continue for three days, from nine A. M. to four P. M. There must be a membership of not less than twenty-five or more than forty, and each member must pay a fee of one dollar to meet the necessary expenses. Where a class of sixty is formed, two instructors will be sent and two courses will be offered. In case a single school possesses a total membership of sixty men and forty women, the instruction may be continued for a period of five days.

FARMERS' READING COURSES

Desiring to be of the utmost assistance to those interested in the study of agriculture, the College has now inaugurated simple reading courses in all subjects enumerated in the regu-

lar correspondence work. Instead of offering from twelve to twenty assignments for each course, there will be sent an outline of an entire book or bulletin intended for study, including many questions and suggestions for laboratory exercises, and additional references. When the book or bulletin has been carefully read, a set of questions will be sent to the student to be answered, and to be returned to the College for examination and criticism. This assistance will be offered not only in the subjects contained in the regular correspondence courses, but with respect to almost any book or bulletin published on the subject of agriculture, home economics, highways, drainage, bridge construction, or education. There will be a general charge of one dollar for the work upon each single book or bulletin used. Many special reading courses, however, call for the use of two or more books or bulletins, in which case an additional charge may sometimes be made.

LECTURES AND ENTERTAINMENTS

Recognizing the need of helpful lecture courses for village and rural communities, the Agricultural College offers to furnish complete courses, comprising lectures on education, agriculture, home economics, and sociology, musical entertainments, and readings. A complete course of five or six numbers may be given, or single lectures will be presented as desired. The charges will be nominal, and will be based on the average expense of travel over the state. On the regular circuits made by this department, the estimated cost will be less. Courses or individual lectures will also be furnished to the larger towns and cities, but preference will be given to the more strictly rural communities. These courses may be arranged for by schools, churches, institutes, or by special committees of any community.

Student Organizations

STUDENT COUNCIL

The student council is a representative body which was organized by the students in 1909 and received official sanction from the Board of Regents and the Faculty of the College. Its objects are: "(1) To act as a representative body before the governing officers of the College in all matters that concern the individual students, student organizations, or the student body as a whole; (2) to act as a body of mediation between different student organizations or enterprises whenever such service is sought by such organizations or enterprises; (3) to take cognizance of all matters that pertain to the good name and scholarship of the student body, to the end that high standards of honor on the campus and elsewhere may be maintained."

This student council consists of four members elected from the senior class, three from the junior, two from the sophomore, and one from the freshman class. In addition, the subfreshman class elect a delegate, who has the privilege of speaking on subjects pertaining to his class, but has no vote. At each meeting of the council a committee of the College Faculty may also be present to participate in the discussions. The members of the council are elected each term, but at each election at least two of the representatives of the senior class and one of those of the junior class must be reëlected.

The student council occupies an interesting and valuable place in the College life, and as a whole may be said to be an unqualified success in establishing a system of representative government among the students touching affairs peculiarly their own, and also in matters involving the Faculty. All acts of the council are submitted to the President of the College, and if they concern the rules, regulations, or ordinances of the College, are subject to approval by the proper governing body. The council is especially helpful in maintaining a high standard of honor among the students in both individual and organized relations. As a means of securing a better understanding in matters likely to cause friction between the student body and the Faculty, the council performs a most important function.

THE CHRISTIAN ASSOCIATIONS

The Young Men's Christian Association and the Young Women's Christian Association are organizations of the greatest worth and value in the College community, forming centers of moral culture and religious stimulus among the young men and women during their developmental period. As

is well known, the Christian associations in colleges stand for the best ideals among the students, and are always accorded the cordial support of the authorities. In addition to general moral and spiritual development, the College Christian associations are of practical and efficient influence among the students in many directions. Membership in these associations is limited to persons connected with Protestant evangelical churches, but others are admitted as associate members.

THE YOUNG MEN'S CHRISTIAN ASSOCIATION

The College Y. M. C. A. has always been a strong and influential body among the students. Its growth may be indicated by the fact that the organization was able in 1908 to erect a handsome building for its purposes at a cost of $35,000, on the corner of Eleventh and Fremont streets, near the College grounds.

This building contains reading rooms, eighteen students' living rooms, a dining hall, and a gymnasium 42 x 70 feet, provided with lockers, baths, etc. The building with its conveniences is open free to all students, although a small fee of five dollars a year is charged for the use of the gymnasium and baths. One of the useful and practical features of the Y. M. C. A. is a students' employment bureau, which is maintained for the benefit of all students seeking employment. The religious work of the organization includes various courses for the study of the Bible and of the work of Christian missions, which are maintained through the winter. The regular religious meetings of the association occur on Thursday evenings from 6:45 to 7:30, while occasional Sunday afternoon meetings are also held. Special meetings and receptions, which serve to broaden the acquaintanceship of the students and promote good-fellowship, are arranged from time to time. Especial attention is given the new students on and after their arrival, and assistance is rendered in securing rooms and boarding places for them. The association maintains a regular secretary, with whom prospective students are cordially encouraged to correspond. Address, General Secretary, Y. M. C. A., Kansas State Agricultural College, Manhattan, Kan.

YOUNG WOMEN'S CHRISTIAN ASSOCIATION

Similar in aim and purpose to the organization of the young men is the Young Women's Christian Association. The Y. W. C. A. home, at 905 Fremont street, is the permanent headquarters of the association, to which all young women of the College are at all times heartily welcome. An office for the secretary and a girls' rest room are also maintained during the College year on the first floor, southwest corner, of the Domestic Science and Art Building. The rooms at the College are open to visitors at any hour of the day and are attractively furnished with conveniences for rest and study.

At the association home, informal gatherings and entertainments lend variety and cheer to the life of the young women members and their friends.

An employment bureau for women students is maintained by the general secretary, without charge to its beneficiaries. Various committees are responsible for the lines of work of the association. One of the most practical of these is the investigation of cases of illness among the College girls, and the rendering of assistance when necessary. At the beginning of the College terms the incoming trains are met by a committee of girls wearing purple bows, by means of which they may easily be recognized. This committee engages in assisting new women students in securing suitable lodging and boarding places.

During the College year various social functions are held for the benefit of the College women. The first of these is an informal reception, held on the first Friday following the opening of College, in order to enable the College girls to become better acquainted with one another. Once each year, in the winter term, the two associations entertain jointly.

The religious life of the Young Women's Association is fostered by weekly religious meetings, by courses in the study of the Bible and in special Sunday services, for which outside speakers are often obtained. Courses for the study of mission work are also conducted.

LITERARY AND SCIENTIFIC SOCIETIES

The literary societies of the College, eight in number, are wholly students' organizations, holding weekly meetings in the College buildings. The Alpha Beta and the Franklin societies are open to both sexes; the Ionian, Eurodelphian, and Browning societies admit only young women to membership, while the Webster, Hamilton, and Athenian societies admit young men only. Students are encouraged to join one of these organizations for the sake of practice in the use of language, training in debate, and general experience in conducting meetings and in dealing with their fellows. These societies jointly maintain a debating council which coöperates with a Faculty committee in arranging for all intercollegiate and interstate debates participated in by representatives of the College. The oratorical board, similarly maintained by these societies, arranges for the intersociety and for the intercollegiate oratorical contests.

THE SCIENCE CLUB

This is an organization of instructors and students for the promotion and advancement of science at the College. Membership is open to all persons interested in science. The meetings are held on the first Monday evening of each month in the lecture room of the Department of Chemistry in Physical

Science Hall. All papers given at these meetings represent original work in science done at the institution. The program is further characterized by free discussion of the papers presented and by general scientific notes and news contributed by the members.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS

This national organization of electrical engineers has a College branch, which holds its meetings on the first Tuesday evening of each month in the rooms of the Department of Electrical Engineering, on the first floor of Physical Science Hall. At these meetings, papers and discussions of professional interest are presented. Membership is confined to instructors and students in electrical engineering.

THE AGRICULTURAL ASSOCIATION

The Agricultural Association, composed of students especially interested in agricultural progress, holds meetings every two weeks, on Monday evening, in Fairchild Hall. This organization has steadily increased in numbers and in interest until it is a potent and progressive factor in spreading the gospel of agricultural betterment.

THE CADET CORPS

Under the provisions of the Morrill act of 1862, under which the College was founded, instruction in military science and tactics is obligatory. Military science and drill are required of all men students in the freshman and sophomore years. This body of young men is formed into a cadet corps, organized into two battalions of infantry, under the command of a United States regular army officer in active service, temporarily detailed to this duty. The cadet corps is officered by upper classmen and constitutes a body under excellent discipline and training, and of attractive military bearing.

The uniforms are of the West Point pattern, and the insignia of rank are those of the United States infantry. The uniform is required to be worn while on military duty by all students subject to the drill regulations, and by reason of its neat appearance and serviceable character, it is also quite frequently used by the under classmen for daily wear. Military discipline and training for a short time in a student's life has undoubted value in creating habits of obedience, neatness, and precision, and in the development of an *esprit de corps*.

THE COLLEGE BAND

The College band is also a military organization, conducted by a chief musician of the United States army (retired), and is composed of cadets assigned to this duty for the College year in lieu of drill and technical military instruction. The band

is limited in its membership, and attendance of the members upon its exercises is obligatory. It has proved an effective aid to the cadet corps, stimulating a love for martial music, and affording an attractive feature of the various public ceremonial occasions at the College.

THE COLLEGE ORCHESTRA

The orchestra is a student organization connected with the Department of Music, membership in which is voluntary. Its daily training under competent leadership results in the acquisition of a considerable repertoire of musical compositions of the best quality. Those connected with the orchestra obtain in this way familiarity with the works of many of the great composers, and among the students at large the orchestra is an efficient aid in cultivating a taste for and an appreciation of good music.

ATHLETIC ORGANIZATIONS

By means of the new gymnasium the College is now prepared to give complete physical as well as mental training. This building, which is equipped with all the usual accessories, assists in developing and maintaining physical tone and health in the student body. In addition to the gymnasium classes, and physical training in the military corps of cadets, all young men are encouraged to develop their physical skill by playing on practice teams in various athletic lines. In the fall, football teams are organized; in the fall and winter basket ball, while in the spring baseball, tennis, and track athletics prevail. Every possible encouragement is given all students desirous of participating in these games to enter the practice teams and receive the necessary instruction. The most proficient of these have opportunity to enter the first teams and participate in intercollegiate contests. The College authorities encourage all reasonable and sane athletic development, as a means for the training of physical qualities desirable in men everywhere. Professionalizing tendencies are strictly repressed, and the athletic rules adopted by the Faculty prevent, by proper regulation, all participation in intercollegiate games on the part of students deficient in their studies.

The women students have equal opportunity for general physical training with the young men. In the gymnasium, under a physical director, they receive training suitable to their needs. Basket-ball and tennis teams are organized among the young women.

List of Students

GRADUATES

Candidates for Master's Degree, 1912

Leila Dunton, B. S. '10 . . . . . *Chemistry, Bacteriology.*
Lebanon, Smith county.

William Hislop, B. S. '11 (Edinburgh University) . . . . . *Animal Husbandry.*
Rathom Mid Lothian, *Scotland.*

Ada Rice, B. S. '95 . . . . . *English Literature and English Language.*
Manhattan, Riley county.

In Course Leading to Master's Degree

Michael Francis Ahearn, B. S. '04 (Massachusetts Agricultural College), *Horticulture, Entomology, Botany.*
Manhattan, Riley county.

John Willard Calvin, B. S. '06 . . . . . *Bacteriology.*
Manhattan, Riley county.

Robert Kilby Farrar, B. S. '96 . . . . . *Agronomy.*
Axtell, Marshall county.

Leslie Arthur Fitz, B. S. '02 . . . . . *Agricultural Chemistry.*
Manhattan, Riley county.

Harry Aiman Geauque, B. S. '11 . . . . *Chemistry, Bacteriology.*
Manhattan, Riley county.

Kenneth Karl Jones, A. B. '10 (Fairmount College) . . . . . *Chemistry, Bacteriology.*
Wichita, Sedgwick county.

Charles Myszka, B. S. '11 . . . . . *Soils.*
Garnett, Anderson county.

August Levi Nelson, B. S. '11 (Utah Agricultural College) . . . . . *Agronomy.*
Manhattan, Riley county.

Oral De Ennon Pyles, B. S. '11 . . . . . *Agriculture.*
Anthony, Harper county.

William Preston Shuler, B. S. '10 . . . . *Bacteriology, Chemistry.*
Burrton, Harvey county.

Allison Morris Woodman, B. S. '11 (University of California) . . . . . *Botany.*
Manhattan, Riley county.

In Advanced Course Not Leading to a Degree

Hulda Bennett, B. S. '08 . . . . . *Domestic Science, English Literature.*
Manhattan, Riley county.

Anna Wilhelmina Carlson, B. S. '09 . . *Mathematics, Sociology, Vocational Education.*
Manhattan, Riley county.

(Mrs.) Edna Warren Clevenger, B. S. '08 (Grinnell College) . . . . . *Music.*
Manhattan, Riley county.

Marie Coons, B. S. '09 . . . . . *Music, History, Domestic Art.*
Manhattan, Riley county.

Sarah Emily Davis, B. S. '02 . . . . . *Domestic Science, Industrial Journalism, Music.*
Bala, Riley county.

Ula May Dow, B. S. '05 . . . . . *Embryology.*
Manhattan, Riley county.

Anna Wilkinson Gordon, A. B. '04 (Iowa College) . . . . . *Photography.*
Manhattan, Riley county.

Josiah Simon Hughes, M. A. '11 (Ohio State University) . . . . . *Bacteriology.*
Manhattan, Riley county.

Harley Main Hunter, B. S. '10 . . . . . *Agriculture.*
Kansas City, Wyandotte county.

Mildred Huse, B. S. '11 . . . . . *Music, Domestic Art.*
Manhattan, Riley county.

Elmer Johnson, B. S. '08 . . . . . *Chemistry.*
Latimer, Morris county.

Madge Kay, B. S. '08 (University of Chicago) . . . . . *Music.*
Manhattan, Riley county.

Jesse Keeble, B. S. '10 . . . . . *Agronomy.*
Coffeyville, Montgomery county.

Edward Henry Kellogg, B. S. '11 . . . . *Agronomy.*
Manhattan, Riley county.

Venus Kimble, B. S. '08 . . . . . *Music, English Literature.*
Keats, Riley county.

Hilmer Henry Laude, B. S. '11 . . . . . *German.*
Rose, Woodson county.

Rose Margaret McCoy, B. S. '03 . . . . *Pedagogy.*
Manhattan, (Pottawatomie county).

Robert Johnson Mackey, M. D. C. '11 (Chicago Veterinary College) . . . . *Bacteriology.*
Topeka, Shawnee county.

Charles Ernest Millar, B. S. '09 (University of Illinois) . . . . . *Agriculture.*
Manhattan, Riley county.

Claude Moorman, B. S. '09 . . . . . *Animal Husbandry, Rural Sociology.*
Burr Oak, Jewell county.

Margaret Dow Morris, B. S. '11 . . . . *Pedagogy, Domestic Art, Music.*
Manhattan, Riley county.

Maria Morris, B. S. '11 . . . . . *Pedagogy, Domestic Science, Music.*
Manhattan, Riley county.

Porter Joseph Newman, B. S. '09 (Franklin College) . . . . . *Agriculture.*
Manhattan, Riley county.

Clara Etta Marguerite Peters, B. S. '11, *Domestic Science, Domestic Art.*
Manhattan, Riley county.

Charles Beryl Pitman, B. S. '10 . . . . *Agriculture.*
Manhattan, Riley county.

Percival Button Potter, B. S. '11 . . . . *Mathematics, Civil Engineering.*
Kiowa, Barber county.

Elizabeth Randle, B. S. '07 . . . . . *Domestic Science, Domestic Art.*
Bala, Riley county.

Jessie Annaberta Reynolds, B. S. '06 . . *Photography, Domestic Art.*
Cawker City, Mitchell county.

Ethlyn Jewell Sandborn, B. S. '10 . . . *Pedagogy, Domestic Art.*
Jewell, Jewell county.

Clara Dorothy Shield, B. S. '08 . . . . . *Music.*
Hanover, Washington county.

Myrtle Lucy Toothaker, B. S. '02 . . . *Domestic Science.*
Wheaton, Pottawatomie county.

Marcia Elizabeth Turner, B. S. '06 . . . *Music.*
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Chester Allen Arthur Utt, M. S. '09 (Cornell College) . . . . . *Bacteriology.*
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Glenn Edwin Whipple, B. S. '11 . . . . *Animal Husbandry.*
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Bessie May White, B. S. '10 . . . . . *Music, Sociology, Domestic Art.*
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Guy Edward Wolcott, A. B. '00 (University of Kansas) . . . . . *Agronomy.*
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Edgar Hamilton Dearborn,	Manhattan, Riley
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Glenn Raymond Fickel,	Holton, Jackson
Benjamin Hillebrandt,	Osborne, Osborne
Frank Livingston,	Axtell, Marshall
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Robert Daniel Van Nordstrand,	Le Roy, Coffey
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Albert John Mack,	Axtell, Marshall
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Floyd Pattison,	Herington, Dickinson
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Mabel May Broberg,	Vesper, Lincoln
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Meta Evalina Buck,	Manhattan, Riley
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Nettie Regina Hanson,	Concordia, Cloud
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Martha Eva Linn,	Manhattan, Riley
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Florence Rilla Whipple,	Longford, Clay
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(Mrs.) Nannie Carnahan Cole,	Manhattan, Riley
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Emmett Emslie,	Manhattan, Riley
Katherine Lucy Emslie,	Manhattan, Riley
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Rees William Hillis,	Reading, Lyon
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Louis Edgar Hutto,	Manhattan, Riley
Willis Norton Kelley,	Hutchinson, Reno
Elmer Frederic Kittell,	Topeka, Shawnee
Walker McColloch,	Anthony, Harper
Irene Sophia McCreary,	Manhattan, Riley
Celia Caroline Moore,	Manhattan, Riley
Ivan Moorhead,	Holton, Jackson
Amelia Gertrude Pierson,	Manhattan, Riley
Ray Hamlin Pollom,	North Topeka, Shawnee
Benjamin Albert Pratt,	Spearville, Ford
Merl Hudson Sims,	Wellsville, Franklin
Earl Springer,	Highland, Doniphan
Chester Francis Turner,	Manhattan, Riley
Edgar Allen Vaughn,	Toronto, Woodson
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Glenn Buckman,	Conway, McPherson
Robert Proffitt Campbell,	Attica, Harper
Horace George Chittenden,	Hays, Ellis
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Charley Ambrose Davis,	Clay Center, Clay
Victor Vincil Dryden,	Larned, Pawnee
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John Hamilton Gill,	Manhattan, Riley
Nathan Arthur Gish,	Manhattan, Riley
Ralph Hawkins,	Marysville, Marshall
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Earl Willis,	Manhattan, Riley

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De Hellick Branson,	Winfield, Cowley
George Wiley Brown,	Highland, Doniphan
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Walter Ellsworth Gilmore,	El Dorado, Butler
Elmer Oscar Graper,	El Dorado, Butler
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Waldo Ernest Grimes,	Greenwood, *Missouri*
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Walter Hoover,	Canton, McPherson
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Frank Kramer,	Zeandale, Riley
Samuel Krehbiel,	Moundridge, McPherson
Perry Herbert Lambert,	Hiawatha, Brown
Dick Lewallen,	Kansas City, Wyandotte
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Nathan Needham, Jr.,	Clifton, Washington
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Walter Edmund Prather,	Oakley, Gove
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Neil Rucker,	Burdett, Pawnee
Ollie Swanson,	Manhattan, Riley
Leo Unruh,	Pawnee Rock, Barton
Daniel Walter Ziegler,	Manhattan, Riley

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Ralph Leroy Miller,	Eureka, Greenwood

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Helen Edna Rannels,	Manhattan, Riley
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Clara Spaniol,	Plevna, Reno
Charlotte Louise Spier,	Salina, Saline
Twyliah Opal Springer,	Tulsa, *Oklahoma*
Ferne Ella Stevenson,	Parkville, *Missouri*
Lyda Stoddard,	Horton, Brown
May Symonds,	Peabody, Marion
Olive Tennis,	Chanute, Neosho
Alice Edna Terrill,	Lawrence, Douglas
Ethel Turner,	Tonganoxie, Leavenworth
Anita Bernice Weible,	Topeka, Shawnee
Lula Willis,	Horton, Brown
Ada Worley,	Natoma, Osborne
Olive Bell Wright,	Ottawa, Franklin
Ola Maude Young,	Beloit, Mitchell

GENERAL SCIENCE

John Gordon Auld,	Loring, (Leavenworth)
Lawrence Brennan,	Maplehill, Wabaunsee
Ida Alfreda Carlson,	Manhattan, Riley
Merle Dolin Collins,	Manhattan, Riley
Myron Sabin Collins,	Manhattan, Riley
Jesse Harrison Corsant,	Salina, Saline
Harriet Ellen Dunn,	Manhattan, Riley
Annie Hattie Ericson,	Lindsborg, McPherson
Clyde Carney Hamilton,	Holton, Jackson
Will Patrick Hayes,	Manhattan, Riley

Name	Post-office and county (or state)
Joseph Hooper,	Manhattan, Riley
George Hower, Jr.,	Sylvan Grove, Lincoln
Don Louis Irwin,	Winfield, Cowley
George Washington Kolterman,	Manhattan, Riley
Thomas Leadley,	Rozel, Pawnee
Fred Herbert Loomis,	Alton, Osborne
John Lyons,	Bendena, Doniphan
Thomas Daniel Lyons,	Manhattan, Riley
Earl Waldo Martin,	Republic, Republic
Dwight Logan Miller,	Manhattan, Riley
Leroy David Moss,	Beloit, Mitchell
John Merton Palmer,	Jewell, Jewell
Lester Pollom,	Topeka, Shawnee
Martin Williams Souders,	Manhattan, Riley
Joe Vale,	Webber, Jewell
Bert Worden Whitlock,	Wichita, Sedgwick
Dolphus Williams,	Langdon, Reno

SOPHOMORES

AGRONOMY

Wilber Scott Acton,	Concordia, Cloud
Glen Harry Anderson,	Lincoln, Lincoln
Jay Andrews,	Bloom, Ford
Alfred Carroll Apitz,	Manhattan, Riley
John Otto Barnes,	Waterville, Marshall
John Bales,	Manhattan, Riley
Elmer Bird,	Great Bend, Barton
Harry Bird,	Great Bend, Barton
Thomas Blackwood,	Manhattan, Riley
Freeland Thomas Boise,	Kansas City, Wyandotte
Leo Bush,	Girard, Crawford
Franklin Coffman,	Manhattan, Riley
George Comfort,	Manhattan, Riley
Louis Arthur Dodd,	Langdon, Reno
Arthur Doryland,	Junction City, Geary
Ernest Doryland,	Junction City, Geary
Fred Dunlap,	Eureka, Greenwood
Frank Fleming,	Reading, Lyon
Arthur Irving Gilkison,	Hutchinson, Reno
Hiram Standley Gish,	Manhattan, Riley
Joe Goodwin,	Asherville, Mitchell
William Inglis Gray,	Jamestown, Cloud
Roy Hagans,	Utica, Ness
Cecil Wick Haines,	Manhattan, Riley
Frank Roger Hazeltine,	Wetmore, Nemaha
Lynn Hildwein,	Hiawatha, Brown
Archie Loy Hodgson,	Harveyville, Wabaunsee
Charles Nathan Howard,	Fort Scott, Bourbon
Frank Robert Howe,	Wymore, *Nebraska*
Francis George Hughes,	Lawrence, Douglas
John Hungerford,	Manhattan, Riley
Robert Earl Karper,	Manhattan, Riley
Charles Parke Lillard,	Bloomington, *Illinois*
John Howard Loomis,	Colby, Thomas
Milton Carl Lytle,	Wellsville, Franklin
Lewis Evermont McGinnis,	Kansas City, *Missouri*
Clayton Alexander McIntosh,	Washington, Washington

Name	Post-office and county (or state)
Homer McNamara,	Soldier, Jackson
Chester Howard Middleton,	Manhattan, Riley
George Denton Miller,	Horton, Brown
Paul Leroy Mize,	Wilder, Johnson
Leon Newton Moody,	Riley, Riley
Clark Mortimer Oursler,	Stillwater, *Oklahoma*
Charles Arthur Patterson,	Ford, Ford
Aaron Ernest Pearson,	Simpson, Mitchell
Raymond Prather,	Tonovay, Greenwood
Frank Pletcher Root,	Iola, Allen
Raymond Walter Schafer,	Jewell, Jewell
Elmer Schultz,	Manhattan, Riley
Herman Henry Sherrard,	Winfield, Cowley
Martin Ivin Shields,	Lost Springs, Marion
Frank Gerald Snell,	Manhattan, Riley
Charles Stacy,	Manhattan, Riley
Merrill Stevens,	Topeka, Shawnee
Elbert Edward Thompson,	Horton, Brown
Matthias Torrence,	Reading, Lyon
George Crider Nan Neste,	Lawrence, Douglas
Howard Oscar Wagner,	Enterprise, Dickinson
George Isidore Walsh,	Manhattan, Riley
John Hanna Welsh,	Kansas City, *Missouri*
Arthur Whitsitt,	Homewood, Franklin
Vard Thomas Worstell,	Manhattan, Riley
Ernest Yingling,	El Dorado, Butler

ANIMAL HUSBANDRY

Harry Allen,	Goff, Nemaha
Lloyd Neil Arnold,	Hays City, Ellis
Harry Grant Avery,	Wakefield, Clay
Leslie Baker,	Washington, Washington
Ross Spencer Bentley,	Valhalla, Gove
Byron Ellsworth Blair,	Pratt, Pratt
William Brigham,	Burlington, Coffey
Arthur Burkholder,	Marion, Marion
Alfred Vivian Byarlay,	Bala, Riley
Ernest Herbert Clark,	Linn, Washington
Lynn Cleland,	Alma, Wabaunsee
Jay Farris,	Denison, Jackson
Verne Farnsworth,	North Topeka, Shawnee
Hilder Forsberg,	Manhattan, Riley
Ward Stanley Gates,	Asherville, Mitchell
Lloyd Wright Gearhart,	Manhattan, Riley
Roy Gwin,	Morrowville, Washington
Howard Hayes,	Olathe, Johnson
Walter Andrew Hepler,	Manhattan, Riley
Louie Horr,	Lawrence, Douglas
Earl Henry Hostetler,	Manhattan, Riley
Evan Liston Jenkins,	White City, Morris
George De Rue Meiklejohn Jones,	Kansas City, *Missouri*
Archer Franklin Kiser,	Geneseo, Rice
Roy William Kiser,	Geneseo, Rice
Karl Knaus,	Benedict, Wilson
Oscar Levine,	Marysville, Marshall
Paul Loomis,	Manhattan, Riley
Clifford Meldrum,	Cedar Vale, Chautauqua
Claude Fred Neerman,	Cummings, Atchison
Gerald Knowlton Nider,	Manhattan, Riley
Earl O'Connell,	Kiowa, Barber
James O'Connell,	Kiowa, Barber

Name	Post-office and county (or state)
Edward Quimby Perry,	Manhattan, Riley
Herbert Clifton Phillips,	Kirwin, Phillips
Claude Radcliff,	Overbrook, Osage
Frank Bennett Sherrill,	Kansas City, *Missouri*
Barney Gayle Sims,	Wellsville, Franklin
Herman Tagge,	Manhattan, Riley
Byron Taylor,	Chapman, Dickinson
Fred Martin Taylor,	Formoso, Jewell
Leon Warden Taylor,	Chapman, Dickinson
Oliver Taylor,	Jefferson, Montgomery
Lanius Emmett Weckman,	Horton, Atchison
Guy Williamson,	Ashton, Sumner
Wilmer Wilson,	Osage City, Osage
Harry Millard Ziegler,	Iola, Allen

DAIRY HUSBANDRY

Darius Coleman,	Denison, Jackson
Floyd Carl Cragg,	Manhattan, Riley
William Cusic,	Tecumseh, Shawnee
William Glenne Davis,	Clay Center, Clay
Harry Dodge,	Salina, Saline
Cameron Goldsmith,	Abilene, Dickinson
Ralph Musser,	Abilene, Dickinson
Donald Louis Parkinson,	Manhattan, Riley
Harry Stockwell,	Havensville, Pottawatomie
Graydon Tilbury,	Arkansas City, Cowley

HORTICULTURE

Lawrence Anderson,	Lincoln, Lincoln
William Curry,	Dunavant, Jefferson
Ray Benjamin Ellis,	Pleasanton, Linn
Basil Clement Hertslet,	Manhattan, Riley
Robert Benjamin Hood,	Hutchinson, Reno
James Donald McCallum,	Kansas City, Wyandotte
Ernest De Lana Miller,	Concordia, Cloud
Fred Thomas Rees,	Grantville, Jefferson
Ernest Shaad,	Manhattan, Riley
David Riley Shull,	Kansas City, Wyandotte
Luther Solt,	Manhattan, Riley
Thomas Spring,	Ellinwood, Barton
William Sweet,	Netawaka, Jackson
L. P. Wehrle,	Scranton, Osage

VETERINARY MEDICINE

Hans William Broberg,	Vesper, Lincoln
Otis Raymond Burket,	Wetmore, Nemaha
Jesse Frey,	Ogden, Riley
Carleton Gilmore,	Oakley, Logan
George Haas,	Baldwin, Douglas
Lucian Hobbs,	Smith Center, Smith
Raymond Houser,	Grainfield, Gove
Aldie Immenschuh,	Manhattan, Riley
Ellis Wesley Kern,	Kirwin, Phillips
Gustav Herman Mydland,	Everest, Brown
Roscoe Parrish,	Macksville, Stafford
Claude Raymond Riney,	Dodge City, Ford
Delos George Tepfer,	Wichita, Sedgwick
Richard Wilson,	Manhattan, Riley

ARCHITECTURE

Name	Post-office and county (or state)
Walter Clement Barton,	Herington, Dickinson
George Christie,	Manhattan, Riley.
Irving Steward Clay,	Kansas City, Wyandotte
Samuel Crotinger,	Bison, Rush
Harold Thomas English,	Hutchinson, Reno
Earl Philip Friedline,	Alden, Rice
Roy Brett Froman,	Winfield, Cowley
Lester Lawrence Howenstine,	Manhattan, Riley
Carl Olaus Johnson,	Frankfort, Marshall
George Washington Packer,	Kansas City, Wyandotte
Floyd Smutz,	Bird City, Cheyenne
Russell Williamson,	Princeton, Franklin

CIVIL ENGINEERING

Arvid Anton Anderson,	Lindsborg, McPherson
Harry Ashley,	Yates Center, Woodson
Arthur Gilbert Beckman,	Lindsborg, McPherson
Frederick Earl Cahill,	Courtland, Republic
Edwin Comfort,	Manhattan, Riley
Lloyd Coughenour,	McCracken, Rush
Frank Elliott,	Anthony, Harper
John Gist,	Bucklin, Ford
Roy William Haege,	Manhattan, Riley
Melvin Hartzler,	Goodland, Sherman
George Arthur Hopp,	Manhattan, Riley
Oscar Lee Humbert,	Silver Lake, Shawnee
Harry Ralph Johnston,	Manhattan, Riley
Ralph Jones,	Cottonwood Falls, Chase
Reuben Edward Lofinck,	Manhattan, Riley
Ralph Denny Rhodes,	Manhattan, Riley
George Raymond Russell,	Rosedale, Wyandotte
Benjamin Scalapino,	Everest, Brown
Charles Scholer,	Milo, Lincoln
Francis Lewelling Shull,	Manhattan, Riley
Ulysses Jay Smith,	Portis, Smith
Clyde Stark,	Waverly, Coffey
Arthur Thompson,	Manhattan, Riley
Ralph Van Zile,	Manhattan, Riley
George Edwin Werner,	Linn, Washington

ELECTRICAL ENGINEERING

Lee Archer,	Glasco, Cloud
Arthur Carl Boyd,	Larned, Pawnee
Verne Howard Brothers,	Agra, Phillips
Henry Brown,	Mont Ida, Anderson
Harry Everett Butcher,	Solomon, Dickinson
Howard Carpenter,	Council Grove, Morris
Nelson Davis,	Delavan, Morris
Shelby Glasgow Fell,	Haviland, Kiowa
Lawrence Fickel,	Manhattan, Riley
Harold Goble,	Riley, Riley
Thomas Hadley,	Coldwater, Comanche
Harold Cartlidge Hawley,	Herington, Dickinson
Frank Henry,	Manhattan, Riley
Harry Elmer Hope,	Topeka, Shawnee
Paul Edward Jackson,	Osborne, Osborne
Walter William Keith,	Ottawa, Franklin
Carl May,	Coldwater, Comanche
Perry Miller,	Garfield, Pawnee
Frank Moore,	Tribune, Greeley

Name	Post-office and county (or state)
Homer Earl Newhouse,	Lane, Franklin
Milo Albert Nicholson,	Spring Hill, Johnson
Lawrence Archibald O'Brien,	Luray, Russell
Guy Clifton Omer,	Mankato, Jewell
Louis Reynolds Parkerson,	Manhattan, Riley
Lloyd Reudy,	Dodge City, Ford
Paul Cotter Ringwalt,	Oakley, Logan
Clarence Webster Rose,	Mankato, Jewell
Gilbert Haven Sechrist,	Meriden, Jefferson
William Ross Smith,	Moran, Allen
Charles Tucker,	Pleasanton, Linn
Leland Ray Varcoe,	Wilsey, Morris

MECHANICAL ENGINEERING

Algot Anderson,	McPherson, McPherson
George Baird,	Valencia, Shawnee
Earl Franklin Baker,	Arkansas City, Cowley
Charles Andros Barrows,	Atchison, Atchison
Trafford Bigger,	Topeka, Shawnee
Bruce Henry Cummings,	Richland, (Douglas)
George Gray,	Peabody, Marion
Cyrus Hazlet,	Almena, Norton
Robert Hofstetter,	Manhattan, Riley
William Warren Humble,	Sawyer, Pratt
William Albert Lathrop,	Manhattan, Riley
William Grant Lay,	Topeka, Shawnee
John Irl Michaels,	Osawatomie, Miami
James Francis Moss,	Eureka, Greenwood
John Dwight Parsons,	Arkansas City, Cowley
Herbert Pierce,	Seely, Cowley
William Leon Rhoades,	Pleasanton, Linn
Archie Monroe Richards,	Manhattan, Riley
Ira Rogers,	Lyndon, Osage
Ralph Allen Shelly,	Atchison, Atchison
Robert Taylor,	Manhattan, Riley
Frank Vincent,	Kansas City, Wyandotte
Victor Whiteside,	Wichita, Sedgwick
Carl Walter Wyland,	Harlan, Smith
James Howard Young,	Kansas City, Wyandotte

PRINTING

Glenn James Graham,	Manhattan, Riley
Athol Vadakin,	Marion, Marion

HOME ECONOMICS

Katherine Adams,	Manhattan, Riley
Harriet Ruth Aiman,	Manhattan, Riley
Eva Alleman,	Kansas City, Wyandotte
Dorothy Allen,	Elmdale, Chase
Myra Amsden,	Manhattan, Riley
Edna Marie Apitz,	Manhattan, Riley
Estella Ruth Axelton,	Randolph, Riley
Madeline Baird,	Manhattan, Riley
Emza Catherine Baker,	Malta Bend, *Missouri*
Florence Annie Baker,	Kansas City, Wyandotte
Florence Elizabeth Baker,	Malta Bend, *Missouri*
Orlena Marguerite Baker,	Manhattan, Riley
Katherine Anna Beck,	Gypsum, Saline
Mabel Bennett,	Manhattan, Riley
Margaret Anne Blanchard,	Manhattan, Riley
Ruth Leota Blevens,	Arkansas City, Cowley

Name	Post-office and county (or state)
Ruby Edna Blomquist,	Kansas City, Wyandotte
Esther Boell,	Riley, Riley
Ethel Marie Boyce,	Kansas City, Wyandotte
Mary Kathryn Boyle,	Chillicothe, *Missouri*
Beatrice Breneman,	McPherson, McPherson
Grace Edythe Brennan,	Maplehill, Wabaunsee
Bess Brown,	Manhattan, Riley
Ethel Louise Brown,	Hutchinson, Reno
Jennie Helen Brown,	Plainville, Rooks
Jessie Mabel Brown,	Ellsworth, Ellsworth
Ruth Minnie Brown,	Kansas City, Wyandotte
Grace Drollinger Burtner,	Manhattan, Riley
Dorothy Buschow,	Colby, Thomas
Mary Alice Canfield,	Belleville, Republic
Cecyl Carter,	Lawrence, Douglas
Ethel Esther Cary,	Manhattan, Riley
Eunice Hazel Catton,	Stafford, Stafford
Ella Rebecca Chitty,	Frankfort, Marshall
Ida Fra Clark,	Colony, Anderson
Mae Clark,	Paxico, Wabaunsee
Ona Bernice Comfort,	Manhattan, Riley
Mary Margaret Courter,	Topeka, Shawnee
Elizabeth Anna Cox,	Goodrich, Linn
Grace Lucile Craven,	Manhattan, Riley
Bessie Cree,	Manhattan, Riley
Carrie Ethel Cutter,	Ogden, Riley
Mary Dahl,	Montrose, Jewell
Nora Dahl,	Montrose, Jewell
Edna Danner,	Topeka, Shawnee
Flossie Davis,	Plevna, Reno
Ethel Margaret Day,	Kansas City, Wyandotte
Josephine Woodman Doran,	Topeka, Shawnee
Marguerite Elliot,	Manhattan, Riley
(Mrs.) Nellie Ferrin Ely,	Coldwater, Comanche
Helen Mary Evans,	Wichita, Sedgwick
Mabel Lucile Falconer,	Kansas City, Wyandotte
Laura Belle Falkenrich,	Manhattan, (Pottawatomie)
Eda Sarah Ferbert,	St. Joseph, *Missouri*
Ruth Marie Ferguson,	Manhattan, Riley
Edith Elizabeth Folz,	Marysville, Marshall
Lena Fossler,	Norcatur, Decatur
Estella Sue Foster,	Sedgwick, Harvey
Velora Fry,	Manhattan, Riley
Olive Ruth Gage,	La Cygne, Linn
Grace Ethel Garvie,	Abilene, Dickinson
Ruth Gilbert,	Wichita, Sedgwick
Josephine Lura Gilmore,	Manhattan, Riley
Anna Lillie Gish,	Manhattan, Riley
Edith Sara Glascock,	Kansas City, Wyandotte
Mabel Lucile Glenn,	Minneapolis, Ottawa
Grace Mildred Goodell,	Tecumseh, Shawnee
Edythe Groome,	Manhattan, Riley
Alma Grace Halbower,	Anthony, Harper
Daisy Arminta Hall,	Speed, Phillips
Alta Marie Handlin,	Manhattan, Riley
Bessie Lourine Hardman,	Commerce, *Georgia*
Vida Agnes Harris,	Manhattan, Riley
Rembert Lydia Harshbarger,	Manhattan, Riley
Lola Garnett Hartwell,	Frankfort, Marshall
Nola May Hawthorne,	Gypsum, Saline
Alta Sarah Hepler,	Manhattan, Riley

Name	Post-office and county (or state)
Mae Virgia Hilderbrand,	Montezuma, Gray
Helen Marie Hockersmith,	Beloit, Mitchell
Bessie Ursula Hoffman,	Enterprise, Dickinson
Mary Hoover,	Manhattan, Riley
Edna Horton,	Yates Center, Woodson
Eva Hostetler,	Manhattan, Riley
Ethel Hotte,	Manhattan, Riley
Ruth Hughes,	Topeka, Shawnee
Bessie Edwill Jay,	Wichita, Sedgwick
Maggie Beatrice Jones,	Kansas City, Wyandotte
Wilma Kammeyer,	Manhattan, Riley
Grace May King,	Burlington, Coffey
Gladys Elsie Kirchner,	Burlingame, Osage
Alice Irene Kiser,	Manhattan, Riley
Vera Belle Kizer,	Manhattan, Riley
Mary Lemon,	Plainville, Rooks
Nelle Florence Longenecker,	Kansas City, Wyandotte
Lillie Edna Lundberg,	Manhattan, Riley
Esther Grace Lyon,	Manhattan, Riley
Pearle Irene McHenry,	Paola, Miami
Elvira Miriam McKee,	Manhattan, Riley
Iona McKeeman,	Manhattan, Riley
Sophia Elizabeth Maelzer,	Centralia, Nemaha
Anna Malm,	Manhattan, Riley
Stella Blanche Manley,	Topeka, Shawnee
Madeline Marshall,	Clifton, Washington
Maud Marshall,	Dighton, Lane
Golda Estella Masters,	Manhattan, Riley
Ethel Louise Mattingly,	Topeka, Shawnee
Lucile Maughlin,	Sylvia, Reno
Edith Maude Maxwell,	Topeka, Shawnee
Ula Merryfield,	Minneapolis, Ottawa
Gertrude Helen Miller,	Langdon, Reno
Mildred Mills,	Topeka, Shawnee
Emily June Milner,	Hartford, Lyon
Flora Seraphine Monroe,	Ottawa, Franklin
Margret Ellenor Moore,	Idana, Clay
Martha Allie Moore,	Manhattan, Riley
Mabel Moyer,	Manhattan, Riley
Jessie Elizabeth Neiman,	White Water, Butler
Mary Eleanor Neiman,	White Water, Butler
Prudence Neiswender,	North Topeka, Shawnee
Mary Nichols,	Nortonville, Jefferson
Ethel Blanche Niver,	Hutchinson, Reno
Mary Nixon,	Manhattan, Riley
Genevieve Alice Nowlin,	Manhattan, Riley
Nellie Olson,	Harveyville, Wabaunsee
Lois Fae Paddock,	Marion, Marion
Mary Ester Peak,	Pratt, Pratt
Anna Lottie Pratt,	Burlingame, Osage
Ethelyn Pearl Pray,	Manhattan, Riley
Thelma Anna Price,	Manhattan, Riley
Mary Edna Puett,	Manhattan, Riley
Esther Katharine Richards,	Manhattan, Riley
Alta Coy Roberts,	Morrill, Brown
Ethel Bruce Roseberry,	Arkansas City, Cowley
Mary Susan Rowan,	Arkansas City, Cowley
Clara Louise Sachan,	Manhattan, Riley
Inez Savage,	Miltonvale, Cloud
Eda Lillian Schowalter,	Halstead, Harvey
Verna Jane Schumacher,	Marysville, Marshall

Name	Post-office and county (or state)
Elizabeth Sellon,	Kansas City, *Missouri*
Sarah May Sellon,	Manhattan, Riley
Laura Lee Setliff,	Manhattan, Riley
Eva Leona Sharpe,	Chase, Rice
Bessie Laura Sheaff,	Kansas City, Wyandotte
Anna Maude Smith,	Lyons, Rice
Luella Smith,	Pratt, Pratt
Mary Kathryn Sterrenberg,	Manhattan, Riley
Lola Stoddard,	Manhattan, Riley
Mary Stoddard,	Manhattan, Riley
Murrel Sweet,	Manhattan, Riley
Gail Tatman,	Manhattan, Riley
Lorena Belle Taylor,	Zenith, Stafford
Cora Tempero,	Clay Center, Clay
Emma Atwood Tomlinson,	Topeka, Shawnee
Lucile Traut,	Sheridan, *Wyoming*
Bernice Truesdell,	Lyons, Rice
Bertha Truesdell,	Lyons, Rice
Grace Rose Tucker,	Kansas City, *Missouri*
Aleatha Mae Tyner,	Overbrook, Osage
Della Unruh,	Pawnee Rock, Barton
Verna May Vanderlip,	Manhattan, Riley
Katheryn Van Noy,	Tribune, Greeley
Christie Florence Van Vliet,	Wheaton, Pottawatomie
Marie Vernon,	Emporia, Lyon
Margaret Esther Walbridge,	Russell, Russell
Bessie Anna Walsh,	Clay Center, Clay
Vera Glendolyn Warren,	Chanute, Neosho
Nellie Merle Wartenbee,	Liberal, Seward
Lillian Caroline Weeks,	Vermillion, Marshall
Blanche Westenhaver,	Manhattan, Riley
Margaret Lee Whitney,	Topeka, Shawnee
Gladys Wilcox,	Manhattan, Riley
Beulah Wingfield,	Dwight, Geary
Laura Wingfield,	Dwight, Geary
Myrtle Louise Young,	Kansas City, Wyandotte

GENERAL SCIENCE

Jesse Bliss Adams,	Mound City, Linn
Clay Alder,	Athol, Smith
Harry Charles Baird,	Kensington, Smith
Albert William Bellomy,	Manhattan, Riley
Frank Bergier,	Glasco, Cloud
Charles Fay Buck,	Oskaloosa, Jefferson
Lois Blanche Burt,	Wabaunsee, Wabaunsee
Leslie Collins,	Manhattan, Riley
James Denison Colt,	Manhattan, Riley
Frank Ray Cross,	Fountain, *Colorado*
Allan Park Davidson,	Manhattan, Riley
Henry Owen Dresser,	Manhattan, Riley
Mina Louise Dyer,	Riley, Riley
Leslie Evan Griffiths,	Hartford, Lyon
Weaver Glenn Hamilton,	Holton, Jackson
Thomas Joseph Harris,	Howard, Elk
Marguerite Hartwig,	Goodland, Sherman
Benjamin Harrison Hirschler,	Hillsboro, Marion
Leonard Joseph Hole,	Manhattan, Riley
Paul Barton Holmes,	El Dorado, Butler
Charles Hopper,	Manhattan, Riley
John Luther Hutchison,	Lincoln, Lincoln
Phoebe Jane Lund,	Manhattan, Riley

Name	Post-office and county (or state)
Harold Russel Mackey,	Junction City, Geary
Ethel Marshall,	Dighton, Lane
William Joseph Marshall,	Dighton, Lane
Junior Mudge, Jr.,	Manhattan, Riley
Kathrina Munger,	Manhattan, Riley
Raymond Smith Orr,	Manhattan, Riley
George Hemrod Railsback,	Norcatur, Decatur
Nellie Reed,	Havensville, Pottawatomie
Leird Richards,	Manhattan, Riley
Lyle Bradford Robinson,	Manhattan, Riley
Ernest Edgburt Seal,	Macksville, Pawnee
Earle Hazlett Smith,	Kansas City, Wyandotte
Orliff Elmer Smith,	Manhattan, Riley
William Burton Smith,	Wellsville, Franklin
William Allison Sumner,	Manhattan, Riley
Harold Adlia Wagner,	Enterprise, Dickinson
Clyde George Winter,	Dover, Shawnee
Charles Wolcott,	Garfield, Pawnee

INDUSTRIAL JOURNALISM

Earl Luther Merryfield,	Abilene, Dickinson
Clifford Graham Mickel,	Soldier, Jackson

FRESHMAN

AGRONOMY

Earle Aurora Ames,	Olathe, Johnson
William James Baker,	Malta Bend, *Missouri*
Fred Miles Bealey,	Morrill, Brown
George Herbert Bunnel.	Iola, Allen
Benjamin Franklin Butler,	New York, *New York*
Percy Walter Cockerill,	Manhattan, Riley
William Coffman,	Manhattan, Riley
Lee Rudolph Cook,	Dillon, Dickinson
Edward Horace Cormack,	Solomon, Dickinson
Cleothorn Edward Cory,	Talmo, Republic
Will Deitz,	Greystone Heights, Wyandotte
Arthur William Ericson,	Junction City, Geary
Charles Earl Foresman,	Manhattan, Riley
Robert Frantz Gerlaw,	Auburn, *Nebraska*
Benjamin Franklin Griffin,	Manhattan, Riley
John Vern Hepler,	Manhattan, Riley
Charles Franklin Holladay,	Spearville, Ford
Kenneth Whitney Hougham,	Manhattan, Riley
James Laurence Jacobson,	Waterville, Marshall
Floyd William Johnson,	Downs, Osborne
Glenn Kepfield,	Topeka, Shawnee
Raleigh Klein,	Topeka, Shawnee
Glenn Henderson Lawyer,	Iola, Allen
Fred Morris Layton,	Blue Rapids, Marshall
James Walton Linn,	Manhattan, Riley
Howard Roland Livingston,	Colony, Anderson
Willard Earl Lyness,	Walnut, Crawford
Guy Everett McCarthy,	Saint Joseph, *Missouri*
Benjamin Warren McCormick,	Manhattan, Riley
Walter McCullough,	Solomon, Dickinson
Joseph Heber Pierce,	Fredonia, Wilson
Theodore Henry Polack,	Marysville, Marshall
Walter Roy Quinn,	Bennington, Ottawa
Robert Rallin Rathbone,	Manhattan, Riley

Name	Post-office and county (or state)
William Albert Sanford,	Kensington, Smith
Richard Sedivy,	Blue Rapids, Marshall
Cedric Hadaway Shaw,	Pratt, Pratt
Wilbur Nelson Skourup,	Colony, Anderson
Victor Fred Stuewe,	Alma, Wabaunsee
William Algernon Sutton,	Carthage, *Missouri*
Lewis Marten Umberger,	Hymer, Chase
Starr Vale,	Webber, Jewell
Julius Van Vleit,	Manhattan, Riley
Reuben Samuel Vilander,	Manhattan, Riley
Francis Marion Wadley,	Braymer, *Missouri*
George Washington Williams,	Bigelow, (Pottawatomie)

ANIMAL HUSBANDRY

Bernard Martin Anderson,	Manhattan, Riley
George Harold Ansdell,	Jamestown, Cloud
Nat Blake,	El Reno, *Oklahoma*
Herbert Otis Brenner,	Havensville, Pottawatomie
Fred Browne,	Burdett, Pawnee
John Raymond Chamberlain,	Carbondale, Osage
Henry Samuel Collins,	Fort Worth, *Texas*
Roy Cecil Durmmond,	Horning, *Oklahoma*
Hugh Melvin Fellows,	Kansas City, *Missouri*
Merrill Lenord Gould,	Jamestown, Cloud
Findley Hartzler,	Goodland, Sherman
Joda Lyman Hill,	Manhattan, Riley
Raymond Hobart,	Paola, Miami
Dan Jackson,	Coldwater, Comanche
Oscar LeRoy Johnson,	Mead, *Nebraska*
Amuel Edwin Jones,	Wymore, *Nebraska*
Frederick Anthony Kays,	Eureka, Greenwood
Jefferson Kubin,	McPherson, McPherson
Ross McDonald,	Manhattan, Riley
Willard Wendall Moore,	Gardner, Johnson
William Symington Morrow,	Kansas City, Wyandotte
Edgar Allen O'Brien,	Luray, Russell
Will Palmer,	Hays, Ellis
Willis Davidson Price,	Reading, Lyon
James Leroy Robinson,	Nashville, Kingman
Albert Mortimer Root,	Kansas City, Wyandotte
Willard Doris Smith,	Manhattan, Riley
Blatchley Wayne Stitt,	Coats, Pratt
Ralph Taylor,	Sedgwick, Harvey
Leonard Vawter,	Carbondale, Osage
John Erwin Vrooman,	Kansas City, *Missouri*
Harry Homer Wilson,	Silver Lake, Shawnee

DAIRY HUSBANDRY

Alvin William Black,	Manhattan, Riley
Oscar Carl Christensen,	Ramona, Marion
Berte Oscar Jones,	Neodesha, Wilson
Howard Allen Lindsley,	Arcadia, Crawford
Kenneth Arthur Sandborn,	Blue Rapids, Marshall

HORTICULTURE

Benjamin Baker,	Topeka, Shawnee
Keith Townsend Corsen,	Kansas City, Wyandotte
Edwin William Faulconer,	Clay Center, Clay

Name	Post-office and county (or state)
Otto Lincoln Hubp,	Mexico City, *Mexico*
Archie Lee Marble,	Esbon, Jewell
Ernest Mendell,	Clay Center, Clay
Harry Moore,	Manhattan, Riley
Alfred Nelson,	Paola, Miami

VETERINARY MEDICINE

Merrill Ellsworth Agnew,	Smith Center, Smith
Laurence Vernon Cummings,	Wichita, Sedgwick
William Arthur Hagan,	Pittsburg, Crawford
Edward Kernohan,	Nashville, Kingman
William Clarence McConnell,	Downs, Osborne
Zara Harmon McDonnall,	Manhattan, Riley
John William Meyer,	Chapman, Dickinson
Jay Shula Moore,	Manhattan, Riley
William James Scanlan,	Chapman, Dickinson

ARCHITECTURE

Earl Leroy Collins,	Wichita, Sedgwick
Walter Thomas Dunn,	Hanover, Washington
Pearl Bernard Durrett,	Manhattan, Riley
Robert Roy Green,	Uniontown, Bourbon
Iver Kempley Johnson,	Corning, Nemaha
John Leroy Marshall,	Rosedale, Wyandotte
Valentine Simpson Rader,	Howard, Elk
Earle Oliver Schwahn,	Lindsborg, McPherson
Charles William Shaver,	Lincoln, Lincoln
Leo Leslie Smith,	Hoisington, Barton
Martin William Wilson,	Lincoln, Lincoln

CIVIL ENGINEERING

Glen Gibson Benton,	Onaga, Pottawatomie
Stewart Adams Blackman,	Brooklyn, *New York*
Luther Dudley,	Independence, Montgomery
Albert Hilery Ganshird,	Manhattan, Riley
Walter Roscoe Kersey,	Mulvane, Sumner
Shone Yue Lay,	Eskridge, Wabaunsee
Josephus Philip Miller,	Eureka, Greenwood
Leo Alexander Mingenback,	McPherson, McPherson
Thomas Moore,	Manhattan, Riley
Guy Allegre Russell,	Lakin, Kearny
Paul Crowder Scheer,	Sabetha, Nemaha

ELECTRICAL ENGINEERING

Benjamin McKinley Andrews,	Norcatur, Decatur
George Bailey,	Bucklin, Ford
Ralph Gahan Baker,	Malta Bend, *Missouri*
Stanley Brown,	Caney, Montgomery
Paul Houston Clark,	Pratt, Pratt
Charles Chadwick Coleman,	Oneida, Nemaha
Francis Howard Dunlap,	Manhattan, Riley
George Louis Farmer,	Wichita, Sedgwick
Gerald Lawrence Fitzgerald,	Colby, Thomas
Louis Charles Geisendorf,	Clearwater, Sedgwick
Maynard Goudy,	Waverly, Coffey
Harry Harcourt,	Rock, Cowley
Calvin Andrew Hooker,	Tyro, Montgomery
Ernest Willard Huston,	Clay Center, Clay
Eddell Charles Jones,	Iola, Allen

Name	Post-office and county (or state)
Merritt Keithline,	Shannon, Atchison
Foo Yueu Lim,	Oxnard, *California*
Willard Jackson Loomis,	Colby, Thomas
Bruce Elmer McKee,	Richland, (Douglas)
Orville Leslie Mendenhall,	Turkville, Ellis
Leroy Moore,	Mayetta, Jackson
Fred Morse,	Lebo, Coffey
Edgar Ralph Moseley,	Niagara Falls, *New York*
John William Musil,	Blue Rapids, Marshall
Wayne Ramage,	Arkansas City, Cowley
Solon Lycurgus Reeves,	Emporia, Lyon
Daniel Andrew Robbins,	Colony, Anderson
William Warren Rutter,	Topeka, Shawnee
Corwin Crittenden Smith,	Dexter, *New Mexico*
George Milton Smith,	Parsons, Labette
John Stockebrand,	Vernon, Woodson
Walter Stockebrand,	Vernon, Woodson
Claude Frederick Stone,	Smith Center, Smith
Alta Roy Tanner,	Iola, Allen
Fred Wenn,	Erie, Neosho
Lyndell Porter Whitehead,	Walnut, Crawford
Elmer Wilson,	Turner, Wyandotte
Paul Benjamin Winchel,	Parker, Linn

MECHANICAL ENGINEERING

Chester Arthur Carter,	Garden City, Finney
Norman Russell Cate,	Dover, *New Hampshire*
Lawrence Champe,	Greeley, Anderson
Kyle George Coffman,	Topeka, Shawnee
Carl Martin Dalbom,	Viola, Sedgwick
Nicholas Enns,	Inman, McPherson
Charles Wallace Giffin,	Paola, Miami
William Joe Glenn,	Waverly, Coffey
George Hamilton,	Manhattan, Riley
Robert John Hanna,	Mankato, Jewell
Carl Otto Hawkinson,	Marquette, McPherson
Ralph Waldo Holland,	Pleasanton, Linn
Marc Atchison Lindsay,	Madison, Greenwood
Otto Low,	Manhattan, Riley
Frank Augustus Madden,	Abilene, Dickinson
Paul Rexford Neal,	Manhattan, Riley
Albert Nelson,	Falun, Saline
Eugene Willis Owens,	Kansas City, Wyandotte
Horace Pateman,	White City, Morris
Thomas James Reynolds,	Erie, Neosho
Rockwell Ridpath,	Webster Grove, St. Louis, *Mo.*
Wallace Rynerson,	Tecumseh, Shawnee
David Fred Shipman,	Chetopa, Labette
Francis Eugene Sullivan,	Greeley, Anderson
Howard McCutcheon Thomas,	Fort Scott, Bourbon
Leslie Adam Wilsey,	Chapman, Dickinson

PRINTING

Harry Coxen,	Manhattan, Riley
Thomas Stephen James,	Riley, Riley
Matthew Jones,	Lyndon, Osage
Paul Stoufer,	Liberal, Seward

HOME ECONOMICS

Name	Post-office and county (or state)
Emma Florence Acton,	Ames, Cloud
Gertrude May Anderson,	Topeka, Shawnee
Dulce Atkins,	Manhattan, Riley
Reina May Baldwin,	Manhattan, Riley
Ethel May Balmer,	Hiawatha, Brown
Lillian Elsie Barnum,	Glasco, Cloud
Elsie Mae Blaylock,	Smith Center, Smith
Marie Anita Boyle,	Spivey, Kingman
Eliza Burkdoll,	Ottawa, Franklin
Frances Elizabeth Carl,	Long Island, Phillips
Florence Belle Cragg,	Manhattan, Riley
Verral Janice Craven,	Manhattan, Riley
Pearl Cross,	Wichita, Sedgwick
Grace Lydia Currie,	Manhattan, Riley
Wilma Louise Davis,	Manhattan, Riley
Marie Dewey,	Manhattan, Riley
Mary Virginia Dodd,	Langdon, Reno
Valeda Edith Downing,	Stafford, Stafford
Edith Gertrude Evans,	Manhattan, Riley
Nellie Marion Evans,	Manhattan, Riley
Grace Mildred Fisher,	Cedar Vale, Chautauqua
Anna May Fowler,	Barnes, Washington
Esther Elizabeth Fowler,	Winfield, Cowley
Eleanor Gillespie,	Towanda, Butler
Gladys Gist,	Manhattan, Riley
Mary Ellen Glenn,	Waverly, Coffey
Dove Gravette,	Manhattan, Riley
Edith Lucile Gray,	Kansas City, Wyandotte
Gladys Greenwood,	Hill City, Graham
Elizabeth Hamilton,	Manhattan, Riley
Esther Jane Hammerli,	Oak Hill, Clay
Verda Harris,	Manhattan, Riley
Ruth Howells Harvey,	Council Grove, Morris
Ethel Rairnia Hebrew,	Manhattan, Riley
Grace Hole,	Manhattan, Riley
Hattie Texalena Hooks,	Topeka, Shawnee
Esther Lydia Hostetler,	Manhattan, Riley
Nora Melissa Hott,	Hiawatha, Brown
Meda Flora Howell,	North Topeka, Shawnee
Garnet Hutto,	Manhattan, Riley
Katherine Ruth Hutto,	Manhattan, Riley
Louise Jacobs,	Council Grove, Morris
Vera Louise Jennison,	Farnsworth, Lane
Blanche Jones,	Louisburg, Miami
Florence Justin,	Manhattan, Riley
Jessie Blanche Kiser,	Manhattan, Riley
Fern Koger,	Manhattan, Riley
Katharine Mermet Laing,	Manhattan, Riley
Mabel Lorraine Leuszler,	Linn, Washington
Elizabeth Fern Limbocker,	Manhattan, Riley
Mary Isabel Love,	Holton, Jackson
Grace Isabel Luthye,	Silver Lake, Shawnee
Esther Grace Lyons,	Manhattan, Riley
Helen McClanahan,	Manhattan, Riley
Bess McCormick,	Manhattan, Riley
Jennet McKee,	Richland, Shawnee
Mary McNamara,	Manhattan, Riley
Bertha Mae Marty,	Manhattan, Riley

Name	Post-office and county (or state)
Sarah Janet Marty,	Manhattan, Riley
Mary Mayhew,	Belpre, Edwards
Hazel Lucile Mead,	Beloit, Mitchell
Bodie Eleanor Mickelson,	Lyndon, Osage
May Miles,	Garden City, Finney
Anna Lora Miller,	Manhattan, Riley
Cecil Elizabeth Miller,	Manhattan, Riley
Helen Joyce Moore,	Manhattan, Riley
Edith Mildred Morse,	Abilene, Dickinson
Helen Morse,	Lebo, Coffey
Zella Munsell,	Manhattan, Riley
Ninetta Neusbaum,	Manhattan, Riley
Ethel Elverna Newkirk,	Geneseo, Rice
Margaret Norris,	Raymond, Rice
Lettie Maybelle Noyce,	Stockton, Rooks
Martha Lois Noyes,	Manhattan, Riley
Susan Rufina Paddock,	Blue Mound, Linn
Gertrude Emeline Palmer,	Hays, Ellis
Pauline Parkhurst,	Kinsley, Edwards
Lenora Paul,	Jamestown, Cloud
Thurza Elizabeth Pitman,	Manhattan, Riley
Barbara Polson,*	Fredonia, Wilson
Izil Isabelle Polson,	Fredonia, Wilson
Evelyn Marie Potter,	Barnes, Washington
Geneva Rankin,	Waverly, Coffey
Etta Fay Reid,	Elmont, Shawnee
Blanche Jane Reynolds,	Erie, Neosho
Cassie Richards,	Manhattan, Riley
Clara Louise Robbins,	Colony, Anderson
Georgia Edna Roberts,	Morrill, Brown
(Mrs.) Marguerite James Schattenburg,	Riley, Riley
Emily Adelle Scheer,	Sabetha, Brown
Dorothy Schloh,	Natoma, Osborne
(Mrs.) Kate White Schooley,	Kingman, Kingman
Anna Winifred Searl,	Morland, Graham
Jennie Ellen Shoup,	Udall, (Sumner)
Mabel Sitterley,	Manhattan, Riley
Lillian Sparks,	Wichita, Sedgwick
Edna Isabel St. John,	Wamego, Pottawatomie
Frieda Matilda Stuewe,	Alma, Wabaunsee
Madeline Swentzell,	Wichita, Sedgwick
Pearl Ellice Tackett,	Yates Center, Woodson
Bertha Turner,	Liberal, Seward
Louise Chester Walbridge,	Russell, Russell
Claudia Belle Wells,	Barnes, Washington
Leona White,	Beloit, Mitchell
Vera Isabelle Whitmore,	Manhattan, Riley
Eleanor Oziet Wilburn,	Kansas City, Wyandotte
Nellie Mae Williamson,	Ashton, Sumner
Marjorie Willis,	Manhattan, Riley
Gertrude Wunder,	Valley Falls, Jefferson
Grace Helen Zeigler,	Junction City, Geary

GENERAL SCIENCE

John William Allen,	Norwich, Kingman
Mildred Bills,	Manhattan, Riley
Bulah Blair,	Savonburg, Allen
Vernon Everett Bundy,	Aztec, *New Mexico*

* Died in May, 1912.

Name	Post-office and county (or state)
Hazel Cross,	Wichita, Sedgwick
Frank Runyan Cunningham,	Manhattan, Riley
Samuel Maurice Faidley,	Manhattan, Riley
Edward Benjamin Fritz,	Manhattan, Riley
Ethan McKee Gill,	Lyndon, Osage
Ivy Green,	Manhattan, Riley
Lloyd Earnest Grossman,	Cullison, Pratt
Charles Axtell Hunter,	Blue Rapids, Marshall
Mary Alberta Johnson,	El Dorado, Butler
Eva Kell,	Manhattan, Riley
May Belle Landis,	Kiowa, Barber
Warren Washington McKeeman,	Manhattan, Riley
Gerald Scott McNamara,	Manhattan, Riley
Fred Weymouth Milner,	Hartford, Lyon
Edgar Leon Noel,	Glasco, Cloud
Paul Emil Peterson,	Manhattan, Riley
Walter Francis Smith,	Mankato, Jewell
Fred Stevenson,	Salina, Saline
Harlan Randolph Sumner,	Lane, Franklin
Harlan Clare Thompson,	Leonardville, Riley
Max Thurman,	Atoona, Wilson
James Leroy Tomlinson,	Corning, Nemaha
Hazel Joy Tweedy,	Manhattan, Riley
Lyle Herbert Vallette,	Salina, Saline
Eunice Willey,	Manhattan, Riley
Eugenia Williston,	Chicago, *Illinois*
Rhea Chapman Winans,	Manhattan, Riley
Hachiro Yuasa,	*Tokyo, Japan*

INDUSTRIAL JOURNALISM

Ernest Baird,	Minneapolis, Ottawa
Dorain Paul Ricord,	Esbon, Jewell
Justin Lee Roberts,	La Harpe, Allen
Erma Breneman,	Manhattan, Riley
George Thomas Williams,	Kansas City, Wyandotte

SUBFRESHMAN—SECOND YEAR

Harold Quantic Abell,	Riley, Riley
Wendell Edward Abell,	Riley, Riley
Ruth Adams,	Manhattan, Riley
Charles Raymond Albright,	Overbrook, Osage
Edith Alsop,	Wakefield, Clay
Eva Emma Anderson,	Beattie, Marshall
Marien Thomas Anderson,	Garfield, Pawnee
Harry Tappen Baird,	Herington, Dickinson
Robert Irwin Baker,	Manhattan, Riley
Lester Ford Barnes,	Fontana, Miami
Estella Annie Barnum,	Simpson, Cloud
H. B. Bayer,	Toronto, Woodson
Marcia Beaman,	Macksville, Pratt
Ary Berry,	Topeka, Shawnee
Henry Elton Bixler,	Manhattan, Riley
Myrtle Blythe,	White City, Morris
George Adam Bolz,	North Topeka, Shawnee
Elisha Lynd Boothe,	Caney, Montgomery
Ralph Hardy Bowman,	Pawnee Rock, (Pawnee)
Charles Henry Bradley,	Sedan, Chautauqua

Name	Post-office and county (or state)
Wellington Tufts Brink,	Manhattan, Riley
Wesley Gordon Bruce,	Manhattan, Riley
Clem Brunker,	Manhattan, Riley
Maud Ina Burket,	Marysville, Marshall
John Raymond Burns,	Hoyt, Jackson
Elford Webster Burt,	Hallet, Hodgeman
Orville Burtis,	Fredonia, Wilson
Wilma Burtis,	Fredonia, Wilson
William Edwin Burwell,	Jarbalo, Leavenworth
Albert Clarence Bux,	Meriden, Jefferson
David Loring Cahill,	Lucas, Osborne
William Cecil Calvert,	Leavenworth, Leavenworth
Frank Swartz Campbell,	Dwight, Morris
George Rigg Campbell,	Fulton, Bourbon
Wah Kai Chang,	*Honolulu, Hawaii*
Clarence Burton Chapman,	Manhattan, Riley
Kim Ak Ching,	*Honolulu, Hawaii*
Bung Chew Choy,	*Honolulu, Hawaii*
Forrest Edwards Clark,	Riley, Riley
Walter Colburn,	Riley, Riley
Charles Henry Colman,	Emporia, Lyon
John Collister,	Manhattan, Riley
Charles Elwood Connor,	Manhattan, Riley
Alice Janet Counter,	Haworth, Republic
Robert Ellis Curtis,	Manhattan, Riley
Edwin Danielson,	Clyde, Cloud
Earl Edward Davis,	Dunavant, Jefferson
Gertrude Davis,	Manhattan, Riley
Mary Augusta Davies,	Green, Clay
George Ernest Denman,	Manhattan, Riley
Frank Detweiler,	Summerfield, Marshall
Glen Devier,	Eureka, Greenwood
Lester Henry Drayer,	Manhattan, Riley
Stella Rose Drayer,	Manhattan, Riley
Mary Rebecca Dunlap,	Eureka, Greenwood
Ruth Amy Faidley,	Manhattan, Riley
Clarence Fickel,	Manhattan, Riley
Claude Fletcher,	Hiawatha, Brown
Edward Frank,	Manhattan, Riley
Sidney Freeland,	Kingman, Kingman
Walter Freeman,	Paola, Miami
Frank Harmon Freeto,	Manhattan, Riley
Robert Everett Freeto,	Manhattan, Riley
William Henry George,	Hiawatha, Brown
Ivan Starr Glenn,	Lecompton, Douglas
Eva Grandfield,	Wichita, Sedgwick
Brooks Wallace Graves,	Inman, McPherson
Albert William Griffeth,	Barnard, Lincoln
Minnie Agnes Gugenham,	May Day, Riley
Paul Gwin,	Morrowville, Washington
Esther Gygax,	Osborne, Osborne
Preston Hale,	Eminence, Finney
Frederick Hartwig,	Goodland, Sherman
Isaac Wesley Hehn,	Marion, Marion
Willis Ray Hemphill,	Belleville, Republic
Chester Leland Hendershot,	Darlow, Reno
Robert Hendrickson,	Topeka, Shawnee
George Herren,	Studley, Sheridan
Homer Arthur Herrick,	Colony, Anderson
Clarence Joseph Hildebrand,	Montezuma, Gray
Ross Louis Hixon,	Manhattan, Riley

Name	Post-office and county (or state)
Bertha Belle Hole,	Manhattan, Riley
Henry Horak,	Munden, Republic
Alma Alice Houser,	Grainfield, Gove
Ralph Parkinson Howell,	Morganville, Clay
Marvin Edward Humphrey,	Scandia, Republic
Ruth Roba Hunt,	Bigelow, Marshall
Herbert Lavine Huston,	Manhattan, Riley
Homer Elijah Ira,	Saint John, Stafford
Jackson Isbell,	Salina, Saline
Loyd Vernon Jacques,	Hiawatha, Brown
Elmer Jantz,	Larned, Pawnee
Elmer Johnson,	Lawrence, Douglas
Marguerite Johnson,	Manhattan, Riley
Howard Rodney Joslin,	Manhattan, Riley
Orvan Emery Josserand,	Colusa, Gray
Ethel Keller,	Chapman, Dickinson
Ethel Agnes Kernohan,	Beverly, Lincoln
William Pearl Kidd,	Mayetta, Jackson
John Kiene,	Valencia, Shawnee
Paul King,	Potwin, Butler
Elmer Glen Kirkwood,	Larned, Pawnee
Talbot Roy Knowles,	Wichita, Sedgwick
Lillian Antoinette Lathrop,	Manhattan, Riley
Bertha Blanche Lauger,	Manhattan, Riley
Lawrence Lykins Lauver,	Paola, Miami
King William Lay,	Eskridge, Wabaunsee
Paul Revier Lemly,	Ramona, Marion
Mildred Alice Matilda Levine,	Marysville, Marshall
Alvin Lightburne,	Kansas City, *Missouri*
Charles Elmer Lineback,	Colony, Anderson
John Linn, Jr.,	Manhattan, Riley
Adelbert Dudley Little,	Manhattan, Riley
Thomas Robert Loban,	Manhattan, Riley
Pang Kong Lum,	*Honolulu, Hawaii*
Mayme McCluskey,	Junction City, Geary
Grace Wing McCollough,	Chanute, Neosho
Mary Truthful McCollough,	Chanute, Neosho
Irene Margaret McElroy,	Manhattan, Riley
William Lewis McKeage,	Hoyt, Jackson
Elsie Bernice Markscheffel,	Manhattan, Riley
Eugene Roy Martin,	Utopia, Greenwood
Sadie Minda Marvin,	Emporia, Lyon
Norman Colman Mason,	New Ulysses, Stevens
Ralph Maughlin,	Sylvia, Reno
George Mawhirter,	Auburn, Shawnee
Ralph Waldo May,	Williamstown, Jefferson
Edna Mekemson,	Redding, *Iowa*
Arthur Mendenhall,	Burden, Cowley
Lavisa Elvina Millard,	Manhattan, Riley
Charlie Miller,	Garfield, Pawnee
Earl Miller,	Manhattan, Riley
Edna Willis Monroe,	Ottawa, Franklin
Free Moore,	Pratt, Pratt
Foster Morton,	Green, Clay
Frederick Myers,	Smith Center, Smith
Richard Baldwin Myers,	Jeffersonville, Clark
Lawrence Mastin Nabours,	Manhattan, Riley
Raymond Reed Neiswender,	Manhattan, Riley
Vivian Neiswender,	North Topeka, Shawnee
Guy Niemyer,	Baker, Brown
Lewis Maxwell Norris,	Raymond, Rice

Name	Post-office and county (or state)
Marie Thelma Ober,	Salina, Saline
Harold Casper Orf,	Pierceville, Finney
Fred Rathbone Oshant,	Hays, Ellis
Edward John Otto,	Riley, Riley
Edwin Harold Patterson,	Manhattan, Riley
John Pearson,	Parsons, Labette
Earl Mason Peck,	Berryton, Shawnee
Annette Perry,	Manhattan, Riley
Mamie Grace Peterson,	Manhattan, Riley
Gladys Marie Phillips,	Manhattan, (Pottawatomie)
Howard Phillips,	Hutchinson, Reno
George Langdon Pierce,	Washington, Washington
Alma Luella Pile,	Arkalon, Seward
Eugene Frank Pile,	Manhattan, Riley
Earl Vernie Plush,	Penalosa, Kingman
Frank Albert Plush,	Penalosa, Kingman
Mary Elizabeth Polson,	Fredonia, Wilson
Jesse Emmons Pribble,	Montezuma, Gray
Gourney Prier,	Marion, Marion
Grover Putnam,	Delavan, Morris
Vincent Quigley,	Blaine, Pottawatomie
Charles Quinn,	Dwight, Geary
Will Roark,	Manhattan, Riley
Earl Roberts,	Coffeyville, Montgomery
Howard Robertson,	Manhattan, Riley
Daniel Julius Roenigk,	Morganville, Clay
Oscar Rushing,	Manhattan, Riley
Edward Russell,	McPherson, McPherson
Glenn Salisbury,	Hays, Ellis
Isaac Good Schlotterbeck,	Marion, Marion
George William Schneider,	Logan, Phillips
Alta May Seal,	Macksville, Pawnee
John Charles Searl,	Morland, Graham
Ursula Susie Senn,	Lasita, Riley
Nellie Amelia Simnitt,	Winkler, Riley
Charles Lorn Sletz,	Great Bend, Barton
Allen Thurman Smith,	La Cygne, (Maimi)
Cameron Smith,	Wakefield, Clay
Florence Hazel Smith,	Manhattan, Riley
Amanda Mary Spaniol,	Manhattan, Riley
Clarence Stadel,	Hoyt, Jackson
Jesse Stagg,	Manhattan, Riley
Bell Marie Stanton,	Washington, Washington
Amelia Cora Still,	Manhattan, Riley
Marie Story,	Manhattan, Riley
Carl Christopher Straub,	Manhattan, Riley
Hartwell Sullivan,	Bazaar, Chase
Neal Leroy Sullivan,	Cedar Vale, Chautauqua
Kate Elizabeth Sumners,	Riley, Riley
Mary Louetta Taylor,	Manhattan, Riley
William Fuller Taylor,	Aptdo 232, *Mexico*
Harold Hubert Theiss,	Hutchinson, Reno
Charles Leroy Thomas,	Fredonia, Wilson
Charles Reuben Tillotson,	Manhattan, Riley
Gertrude Tillotson,	Manhattan, Riley
Robert Guy Tonkin,	Abilene, Dickinson
Alexander Unruh,	Pawnee Rock, Barton
George Lin Uselman,	Coldwater, Comanche
William Lafayette Van Dusen, Jr.,	Cuyamaioya, Hidalgo, *Mexico*
Guy Van Marter,	Grinnell, Gove
Edith Mary Walsh,	Manhattan, Riley

Name	Post-office and county (or state)
Alice Marguerite Webster,	Manhattan, Riley
Cletus Jay Weygandt,	Keats, Riley
Charles Edgar White,	Caney, Montgomery
Ray Whitenack,	Herington, Dickinson
Dietrich Wiebe,	Lehigh, Marion
Clarence Burton Williams,	Bigelow, Marshall
Earl Williams,	Baldwin, Douglas
Bessie Ellen Wilson,	Ogden, Riley
Chester Ellsworth Wilson,	Monrovia, *California*
Aletha Brady Wolfe,	Manhattan, Riley
Bertha Effie Wreath,	Manhattan, Riley
Albert Mun Yim,	*Honolulu, Hawaii*
Lester L. Zieber,	Pawnee Rock, Barton
Adrian Walter Zieglasch,	Junction City, Geary

SUBFRESHMAN—FIRST YEAR

Myrtle Elnora Aeilts,	Inman, McPherson
Florence Alexander,	Bucklin, Ford
Malcolm Llewellyn Alsop,	Wakefield, Clay
William Asendorf,	Garden Plain, Sedgwick
Madge Gladys Austin,	Isabel, Barber
Blanche Baird,	Valencia, Shawnee
Lowell Edwin Baldwin,	Garnett, Anderson
Malvina Maude Baldridge,	Manhattan, Riley
Charles Byron Barnes,	Cawker City, Mitchell
Oliver Barnes,	Penokee, Graham
Henry Barrett,	Pratt, Pratt
Theodore Alphonse Barsalou,	Goldberg, *Idaho*
Fred Harold Bayer,	Yates Center, Woodson
Theodore Lawrence Bayer,	Yates Center, Woodson
Esther Grace Bayless,	Riley, Riley
Gustaf Ruben Beck,	Smolan, Saline
Genevieve Gertrude Beecher,	Barnes, Washington
Ollie Isaac Begnoche,	Aurora, Cloud
Minna Eliza Bentley,	Dwight, Morris
Elsie Kathrina Bergstrom,	May Day, Riley
Marjorie Berryman,	Maplehill, Wabaunsee
Earl Roy Best,	Bennington, Ottawa
Albert Herman Bircher,	Kanoplis, Ellsworth
Dee Daniel Bird,	Great Bend, Barton
James Blunt,	Greeley, Anderson
Joseph Bogue,	Glasco, Cloud
Forrest Fleet Booker,	Beloit, Mitchell
Ada Boyd,	Glen Elder, Mitchell
Albert Bradburg,	Minneapolis, Ottawa
Arthur Hayes Brewer,	Dresden, Decatur
Earl Briney,	Abilene, Dickinson
Zada Agnes Brooks,	Tescott, Ottawa
Loyd William Broome,	Caney, Montgomery
Earnest Otto Brown,	Manhattan, Riley
John David Brown,	Dinas, Wallace
Lora Kathyrn Brown,	Dwight, Morris
Arthur Browne,	Burdett, Pawnee
Richard Hoag Browne,	Burdett, Pawnee
Genevieve Bruce,	Manhattan, Riley
Paul David Buchanan,	Chanute, Neosho
Ralph Buell,	Sunnyside, Wichita
Doris Arbelle Burkhead,	Beloit, Mitchell
Evertt Milton Burkhead,	Beloit, Mitchell

Name	Post-office and county (or state)
Louise Lillian Burt,	Zeandale, Riley
Noel Adrian Burt,	Hallet, Hodgeman
Ruth Burtch,	Athol, Smith
Levena Minnesota Cammack,	Manhattan, Riley
Earl Windsor Campbell,	Great Bend, Barton
James Carle,	Gretna, Phillips
Esther Carlson,	Riley, Riley
Herbin Carlson,	Falun, Saline
Arthur Leslie Chambers,	Norcatur, Decatur
Nile Orren Chantry,	Clyde, Cloud
Edmund Ramsey Chastian,	De Graff, Butler
Ruth Idella Chittenden,	Linn, Washington
Frank Stanley Christian,	Maplehill, Wabaunsee
Guy Harrison Christian,	Maplehill, Wabaunsee
Champ Clayton Clark,	Westphalia, Anderson
Melvil Cleland,	Manhattan, Riley
Robert Earl Cleland,	Alma, Wabaunsee
Robert Arthur Clements,	Mertilla, Gray
Miller Livingston Coe,	Manhattan, Riley
Grace Coen,	Saint John, Stafford
Joseph Phillip Collins,	Overbrook, Osage
William Thorn Compton,	Ray, Pawnee
Sarah Alda Conrow,	Manhattan, Riley
William McCarty Cook,	Leavenworth, Leavenworth
Harold Robert Cozine,	Linn, Washington
Vern Allen Cozine,	Linn, Washington
Lee Maxey Crabbs,	Arlington, Reno
Verne Abner Craven,	Erie, Neosho
Madge Ellen Crawford,	Paola, Miami
George Milton Crider,	Tonganoxie, Leavenworth
Clare Crissman,	Saint John, Stafford
Walter Crotts,	Woodsdale, Stevens
William Lester Croxton,	Powhattan, Brown
Simon Edward Croyle,	New Cambria, Saline
Charles Elbert Curtis,	Manhattan, Riley
Clifford Dalton,	Wichita, Sedgwick
Della Edythe Daniel,	Manhattan, Riley
Earl James Daniel,	Clinton, Douglas
George Frank Daniel,	Manhattan, Riley
Hazel Fay Daniel,	Manhattan, Riley
Price Davies,	Arkalon, Seward
Albert Ephraim Davis,	Redfield, Bourbon
Clarence Clyde Davis,	Manhattan, Riley
Franklin Dane Davis,	Saint George, Pottawatomie
Oscar Davis,	Altamont, Labette
Stuart Reynolds Davis,	Oakhill, Clay
John Tompkins Davison,	Saint John, Stafford
George Harbord De Baum,	Bushong, Lyon
Domenico Vincent Andrew Della-Volpe,	Manhattan, Riley
Helen Detweiler,	Summerfield, Marshall
Howard Arden DeWees,	Salina, Saline
LeRoy Bradley De Weese,	Nashville, Kingman
Joseph LeRoy DeWyke,	Manhattan, Riley
Frank Luke Dignan,	Seneca, Nemaha
Klara Dillingham,	Morland, Graham
Robert Albert Dillon,	Hope, Dickinson
Alba Clarence Dodd,	Linn, Washington
Harry Gorden Drummond,	Elmdale, Chase
Clarence Milton Dueker,	Woodbine, Dickinson
Merton Edward Dull,	Westphalia, Anderson

Name	Post-office and county (or state)
Alma Edith Dusenberry,	Ionia, Jewell
Ruben Elmer Dye,	Longton, Chautauqua
Willard Leslie Eastham,	Humboldt, Allen
George Eresail Edgerton,	White City, Morris
John Frederic Eggerman,	Manchester, *Oklahoma*
Carl Elsasser,	Wakefield, Clay
James Clup Elsea,	Lake City, Barber
Hostetter Engle,	Abilene, Dickinson
Carl Charles Fawl,	Silver Lake, Shawnee
Hazel Marie Fawl,	Silver Lake, Shawnee
Rowena Fessenden,	Clifton, Washington
Esther Fieser,	Norwich, Kingman
Lynn Fletcher,	Hiawatha, Brown
Raymond Henry Flick,	Agenda, Republic
Thomas Rolla Fox,	Winfield, Cowley
John Edward Franz,	Rozel, Pawnee
John Henry Franz,	Hepler, Crawford
Vernon Frank Fritz,	Valencia, Shawnee
George Drake Gamble,	Holton, Jackson
Marie Antoinette Goodman,	Dwight, Morris
Jennie Marie Goodsheller,	McPherson, McPherson
Edward Gregory,	Morland, Graham
Mary Louise Gregory,	Manhattan, Riley
Glen Griffeth,	Uniontown, Bourbon
Karl Davis Grothe,	Wichita, Sedgwick
Frank Harold Gulick,	Winfield, Cowley
Laura Anna Gustafson,	Stockdale, Riley
Charles Hackney,	Clay Center, Clay
William Witt Haggard,	Topeka, Shawnee
Ina Ilo Hall,	Eudora, Douglas
Rexford Nathan Harrington,	Beloit, Mitchell
Earl Raymond Harrouff,	Inman, McPherson
Mose Harvey,	Wallula, Leavenworth
Floyd Hawkins,	Marysville, Marshall
Edwin August Hayen,	Marion, Marion
Theodosia Hays,	Manhattan, Riley
William DeWitt Hearne,	Seneca, Nemaha
Alice Hebrew,	Manhattan, Riley
Samuel Ray Heller,	Chapman, Dickinson
Roy Allen Hellwig,	Fredonia, Wilson
Erma Adam Hepler,	Manhattan, Riley
Chester Herrick,	Colony, Anderson
Reuben Earl Hixon,	Manhattan, Riley
Edna Leatha Hoke,	Manhattan, Riley
Merton Anderson Hoke,	Manhattan, Riley
William Hollis,	Overbrook, Osage
Lodewyk Christoffel Hondius,	Manhattan, Riley
Dalton Ray Hooton,	Garnett, Anderson
Dick Hopper,	Manhattan, Riley
Richard Quay Hornbuckle,	Douglass, *Wyoming*
Claude Howard,	Manhattan, Riley
Lon Victor Howell,	Morganville, Clay
Arthur Huckstep,	Lewis, Edwards
Ralph Hull,	Hoisington, Barton
Albert Glen Hunt,	Bigelow, Marshall
Lester Charles Hunt,	Manhattan, Riley
Ralph Edward Hunter,	Palmer, Washington
Howard Huston,	Manhattan, Riley
Glen Louis Immer,	Mullinville, Kiowa
Vern Ingraham,	Manhattan, Riley

Name	Post-office and county (or state)
Edwin Gilbert Jacobson,	Roswell, *New Mexico*
John Rufus Jacobson,	Roswell, *New Mexico*
Samuel James,	Riley, Riley
Lillian Janicke,	Washington, Washington
Adolph Lawrence Jantz,	Larned, Pawnee
Edward Ladislav Jelinek,	Bluff City, Harper
Frank Jenkins,	Leonardville, Riley
Stephen Edgar Jester,	Marysville, Marshall
Esther Bessie Johnson,	Peabody, Marion
Harry Edward Johnson,	Manhattan, Riley
Huldah Dorothy Johnson,	Marquette, McPherson
John Oscar Johnson,	Dwight, Morris
Mattie Ruth Johnson,	Peabody, Marion
Myron Johnson,	Lenexa, Johnson
Raymond James Jolly,	Manhattan, Riley
Esther Jones,	Manhattan, Riley
Inez Joslin,	Lincoln, Lincoln
Norma Kathrens,	Arlington, Atchison
Frank Keiser,	Caney, Montgomery
Ralph Ray Keller,	Manhattan, Riley
Leland Perry Kennedy,	Lenexa, Johnson
Robert Kerr,	Kinsley, Edwards
Roy Dewey Kersey,	Bushong, Wabaunsee
Harry Timothy Kimball,	Fall River, Greenwood
Paul Kitchen,	Burlingame, Osage
Leroy Forest Krienhagen,	Independence, Montgomery
Charley Lane,	Williams, *Arizona*
Anton Hamilton Larson,	Scandia, Republic
Walter Robert Leighton,	Wathena, Doniphan
Nathan Thaddeus Lemert,	Severance, Doniphan
Jacob Regier Lohrenz,	Moundridge, (Harvey)
Lyla Edith Lundberg,	Manhattan, Riley
John William McClayland,	Fall River, Greenwood
Harlie McColm,	Piedmont, Greenwood
Cecil Lyman McFadden,	Stafford, Stafford
Doris Lena McKee,	Manhattan, Riley
Mary Elizabeth McKinlay,	New Albany, Wilson
Harold Clarence McKinney,	Dresden, Decatur
Bessie Olive McMillan,	Home, Marshall
Elsie Faye McSparrin,	Gem, Thomas
Halcy Myrtle McSparrin,	Gem, Thomas
Marie Bassett Maelzer,	Patterson, *Idaho*
Marretta Marriage,	Mullinville, Kiowa
Harold William Marshall,	Lawrence, Douglas
Lethe Marshall,	Manhattan, Riley
Samuel Marshall,	Manhattan, Riley
Nellie May Martin,	Columbus, Cherokee
George Mason,	Morganville, Clay
Carl Ivar Mattson,	Manhattan, Riley
Edna Sadie May,	Auburn, (Wabaunsee)
Esther Josephine May,	Auburn, (Wabaunsee)
Franz Benedict Mayer,	Newton, Harvey
Virgie May Meairs,	Waverly, Coffey
Edwin James Meyer,	Clifton, Washington
Dale Arthur Miles,	Emporia, Lyon
Frank Harry Miles,	La Grange, *Illinois*
Jesse Benedict Miller,	Langdon, Reno
Katherine Miller,	Abbyville, Reno
Grayce Ella Mitchell,	Elmont, Shawnee
Donald Monroe,	Fredonia, Wilson

Name	Post-office and county (or state)
Gladys Reginia Monroe,	Fredonia, Wilson
William Henry Moore,	Tribune, Greeley
William Perry Moore,	Acres, Clark
John Wilson Morrill,	Lebanon, Smith
Leo Clifford Moser,	Courtland, Republic
Walter Mosier,	Maple City, Cowley
George Griffin Moss,	Richland, Shawnee
Opie Mowrey,	Luray, Osborne
Roy Gilbert Mull,	Caney, Montgomery
Curt Muller,	Nekoma, Rush
Carrie Ada Neusbaum,	Manhattan, Riley
Leroy Newcomb,	Morrowville, Washington
Everett Clare Newell,	Stafford, Stafford
Eunice Nicolay,	Manhattan, Riley
Grace Evelyn Nicoll,	Minneola, Clark
Henry Otis Niehaus,	Whiting, Jackson
Ralph Oldweiler,	Mayetta, Jackson
Millie Sophia Oltmanns,	Halstead, Harvey
Arthur Clarence Oman,	Leonardville, Riley
Charles Thomas Orange,	Galesburg, Neosho
William Byron Orange,	Galesburg, Neosho
R. D. Orban,	Manhattan, Riley
Edward Chaney Orwig,	Independence, Montgomery
Ora Lee Osburn,	Peck, Sumner
Amos John Maynard Ostlind,	McPherson, McPherson
Walter John Ott,	Greenleaf, Washington
Lorenzo Ray Parker,	Linn, Washington
Edith Parkhurst,	Kinsley, Edwards
Lawrence Corney Parrick,	Manhattan, Riley
Charles Gaberal Passmore,	Talmo, Republic
Anna Lillian Patton,	Dighton, Lane
Roy August Pautz,	Abilene, Dickinson
Elsie Jeannette Peterson,	Parker, Linn
Essie Leah Peterson,	Parker, Linn
Perrie Richmond Pitts,	Manhattan, Riley
Augusta Antonie Pivonke,	Timken, Rush
Leslie Plumb,	Milwaukee, *Wisconsin*
Olive Clara Potter,	New Albany, Wilson
Eyleen Genevieve Pringle,	Eskridge, Wabaunsee
Robert Wilcox Pringle,	Eskridge, Wabaunsee
William Robert Pryor,	Fredonia, Wilson
Blanche Lulla Purinton,	Banner, Trego
Ray Marrion Purinton,	Banner, Trego
Hubert Jesse Radcliffe,	Farrisville, Ellsworth
Mary Hazel Radke,	Saint John, Stafford
Thomas Floyd Ratcliff,	Dexter, Cowley
Calvin Carl Reed,	Sterling, Rice
Raymond Gilfillan Reeve,	Garden City, Finney
Aaron William Reitz,	Olathe, Johnson
Grace Christena Reitz,	Olathe, Johnson
Nell Magdalena Reitz,	Olathe, Johnson
Robert Hall Rexroad,	Darlow, Reno
(Mrs.) Iva May Rhodes,	Manhattan, Riley
Ralph Joseph Richards,	Manhattan, Riley
Walter Calven Rider,	Elmdale, Chase
Fulton Ring,	Canton, McPherson
John Rioth, Jr.,	Wilsey, Morris
Lloyd Leland Robison,	Yates Center, Woodson
Mary Eloise Robison,	Yates Center, Woodson
Carl Otto Roda,	Paradise, Russell

Name	Post-office and county (or state)
William Herman Roda,	Paradise, Russell
Harold Roller,	Topeka, Shawnee
Minnie Esther Rudeen,	Riley, Riley
Orvid Vance Russell,	New Albany, (Elk)
Menno Harm Saathoff,	Wymore, *Nebraska*
Edmond Barstow Sayler,	Saint John, Stafford
August Earnest Schattenburg,	Manhattan, Riley
Hugh Howard Scherer,	Saint John, Stafford
Elias Scheufler,	Great Bend, Barton
Margaret Ursula Schneider,	Logan, Phillips
Samuel Waldo Schneider,	Logan, Phillips
Ralph Schooley,	Eudora, Douglas
Irene Marinda Schoonover,	Arrington, Atchison
Elbie Alfred Schroeder,	Lebanon, Smith
Frank Arnold Schwarz,	Manhattan, Riley
Lee Asthin Scott,	Westphalia, Anderson
Guy Seidle,	Eureka, Greenwood
Bladen Sharon,	Waverly, Coffey
Clarence Roy Sheets,	Topeka, Shawnee
Henry Herzer Sherer,	Mullinville, Kiowa
Everett Gladstone Shimmin,	Manhattan, Riley
Robert Kane Shimmin,	Manhattan, Riley
David Loyd Signor,	Manhattan, Riley
Clarence Newton Simcox,	Canton, McPherson
Nora Marguerite Simonson,	Manhattan, Riley
Charles Warren Smith,	Manhattan, Riley
Loyd Hudson Smith,	Lawrence, Douglas
Fred Griswold Smith,	Rago, Kingman
Mollie Manerva Smith,	Westphalia, Anderson
William Whitney Smith,	Westphalia, Anderson
Clifford Chaise Spatts	Tecumseh, Shawnee
Georgia Crystal Spellman,	Gypsum, Saline
Frank William Stafford,	Glenwood, Osborne
Nettie Emma Diana Stafford,	Bloomington, Osborne
Dorothea Marie Stagg,	Manhattan, Riley
Maude Jewell Stephenson,	Manhattan, Riley
Ernest Boyd Stewart,	Morganville, Clay
Velda Elizabeth Stewart,	Morganville, Clay
Edna Lizette Stonebraker,	Junction City, Geary
Esther Elizabeth Stonge,	Riley, Riley
Anna Rosaline Straka,	McPherson, McPherson
Iva Viola Strebel,	Alton, Osborne
Lauretta Victoria Sumners,	Manhattan, Riley
Francis Edgar Sweet,	Manhattan, Riley
Joseph Burton Sweet,	Manhattan, Riley
Clifford Levern Swenson,	Lindsborg, McPherson
Mary Fidelia Taylor,	Newton, Harvey
Jessie Viola Tecter,	Canton, McPherson
Allen Charles Theiss,	Hutchinson, Reno
Eleanor Thomas,	Manhattan, Riley
Nellie Opal Thompson,	Gypsum, (McPherson)
Raymond Floyd Timmerman,	Vesper, Lincoln
Albert Clinton Townsend,	Burlington, Coffey
Zelma Mable Turner,	Seneca, Nemaha
Anna Van De Riet,	Downs, Osborne
Chester Arthur Van Dusen,	Cuyamaloya, *Mexico*
Harry Fred Vaupel,	New Cambria, Saline
Ora Leroy Vawter,	Beverly, Lincoln
Lois Mary Waite,	Rydal, Republic
Joseph Kelly Walker,	Lincoln, Lincoln

Name	Post-office and county (or state)
Viola Elva Wallace,	Abilene, Dickinson
Erma May Watson,	Downs, Osborne
Miles Robert Watt,	Walton, Harvey
Thomas Edgar Welch,	Emporia, Lyon
Ida Margaret Wilke,	McPherson, McPherson
Alice Letitia Williams,	Silvan Grove, Lincoln
John Matthews Williams,	Kansas City, Wyandotte
Lee Scott Williams,	Sylvan Grove, Lincoln
Chauncy Witcraft,	Fairfax, *Oklahoma*
Carey Ray Witham,	Manhattan, Riley
Harry Palmer Witham,	Manhattan, Riley
Jesse Marsden Witham,	Manhattan, Riley
George Fred Woelk,	Russell, Russell
Elsie Wolfenbarger,	Winkler, Riley
Corwin Sleagle Wolgamott,	Roswell, *New Mexico*
Benjamin Wyman,	Hutchinson, Reno
Daisy Ernestine York,	Coldwater, Comanche
James Carl Yost,	Vassar, Osage
Herman Henry Zimmerman,	Belle Plaine, Sumner
Louis Albert Zimmerman,	Belle Plaine, Sumner

SPECIAL

Karl Ahlborn,	Smith Center, Smith
William Walton Allen,	Butler, Bates
Ruth Ellen Anderson,	Beattie, Marshall
Mamie Arnold,	Cottonwood Falls, Chase
Margaret Lewis Barrows,	Atchison, Atchison
Clara May Batchelor,	Manhattan, Riley
Grace Olive Campbell,	Louisville, Pottawatomie
(Mrs.) Mary Charlesworth,	Manhattan, Riley
Susie Philomena Conroy,	Manhattan, Riley
(Mrs.) Laura Cook,	Ottawa, Franklin
Gertrude Cordts,	Manhattan, Riley
Oska Lagrand Cox,	Tonganoxie, Leavenworth
Pitney Will Crippen,	Nickerson, Reno
Olive Marie Culver,	Rose, Woodson
Clyde Davis,	Manhattan, Riley
Harry Deiman,	Manhattan, Riley
Elizabeth Dempewolf,	Frankfort, Marshall
Evelyn Amy Denman,	Manhattan, Riley
Arthur Douglas,	Manhattan, Riley
Maggie Ellis,	Westmoreland, Pottawatomie
Paul Englund,	Falun, Saline
Walter Fairall,	Kansas City, Wyandotte
Louise Fielding,	Manhattan, Riley
Claude Edward Finch,	Selkirk, Greeley
Daisy Boswell Floyd,	Manhattan, Riley
Ray Edwin Gilman,	Manhattan, Riley
Edward Green,	Mankato, Jewell
John Hancock,	Menlo, Thomas
Anna Margaret Hickert,	Lenora, Norton
Marie Josephine Hickert,	Lenora, Norton
Besse Maie Hildreth,	Altamont, Labette
Karl William Hofer,	Manhattan, Riley
John Horringan,	Manhattan, Riley
Esta Jane Hungerford,	Soldier, Jackson
Marguerite Johnson,	Garden City, Finney
Emily Caroline Kappelman,	Linn, Washington

Name	Post-office and county (or state)
Anna Evans Keyes,	Mankato, Jewell
Mayo Kingsbury,	Oswego, Labette
Flora Cornelia Knight,	Manhattan, Riley
John La Mont,	Manhattan, Riley
Charles Gurwell Leham,	Manhattan, Riley
Velda Lewis,	Downs, Osborne
Kathleen Lyons,	Manhattan, Riley
Rachel McCoy,	Manhattan, (Pottawatomie)
Samuel Valentine Mallory,	Manhattan, Riley
Alvin Marshall,	Manhattan, Riley
Mabel Mayhew,	Belpre, Edwards
Eugene Ralph Meier,	Atchison, Atchison
Frank Clark Merrick,	Hamilton, Greenwood
Harold Gibson Miller,	Ada, Ottawa
Clinton Hawthorn Morgan,	Hays, Ellis
Hortense Myers,	Kansas City, *Missouri*
Junia Edith Nelson,	Wamego, Pottawatomie
Winifred Louise Neusbaum,	Manhattan, Riley
Arthur Clough Nichols,	Topeka, Shawnee
Lenora Barbara Nicolay,	Manhattan, Riley
La Roy Noyes,	Manhattan, Riley
John Osburn,	Peck, Sumner
Eva Pearl Ott,	Concordia, Cloud
Wilmer Manton Parker,	Morrill, Brown
Phoebe Elva Phillips,	Manhattan, Riley
Eva May Pringle,	Olsburg, Pottawatomie
Norah Roark,	Manhattan, Riley
Lulu Belle Roby,	Eureka, Greenwood
Paul Emerson Schauer,	Mapleton, Bourbon
Iva Mae Sell,	Stockton, Rooks
(Mrs.) Gladys Wells Sidey,	Atchison, Atchison
Mary Eunice Smyth,	Downs, Osborne
John Stover,	Manhattan, Riley
Edna Stromquist,	Lindsborg, McPherson
Margaret Antonette Tompkins,	Limon, *Colorado*
(Mrs.) Ida Schneider Thompson,	Manhattan, Riley
Frances Mae Train,	Blue Rapids, Marshall
(Mrs.) Fern Turner,	Ogallah, Trego
Fayette Tweedy,	Manhattan, Riley
Glenn Ira Voyles,	Agra, Phillips
Issachar Warfield,	Jerusalem, *Ohio*
George Henry Thomas Washburn,	Ottawa, Franklin
(Mrs.) W. E. Watkins,	Kansas City, Wyandotte
Mabel Weedman,	Ottawa, Franklin
Clarence George Wellington,	Salina, Saline
(Mrs.) Pet Wilcox,	Hubbell, *Nebraska*
Kathryn Jane Wilson,	Valley Falls, Jefferson
Roy Montgomery Winfrey,	Buckner, *Missouri*
Lois Wilson,	Manhattan, Riley

HOME ECONOMICS—SUMMER TERM

Clarinda Alexander,	Manhattan, Riley
Bertha Fern Baker,	Narka, Republic
Margaret Lewis Barrows,	Atchison, Atchison
Nannie Beisley,	Wamego, Pottawatomie
Cosby Lee Brown,	Kansas City, *Missouri*
(Mrs.) Mary Lewers Brown,	Twin Falls, *Idaho*
Ella Rebecca Chitty,	Frankfort, Marshall

Name	Post-office and county (or state)
Fern McClurg Cramer,	Lawrence, Douglas
Nellie Alice Crawford,	Lincoln, Lincoln
Foeman Esther Davis,	Hutchinson, Reno
Jessie Davis,	Manhattan, Riley
Jennie Davy,	Anthony, Harper
Olive De Hoff,	Mankato, Jewell
Cora De Vault,	Ocheltree, Johnson
Bertie Bee Dills,	Topeka, Shawnee
Myrtle Dougherty,	Manhattan, Riley
Ruth Lucile Foster,	Hiawatha, Brown
Josephine Lura Gilmore,	Manhattan, Riley
Bertha Hamilton,	Holton, Jackson
Effie Marial Hand,	Manhattan, Riley
Lola Garnett Hartwell,	Frankfort, Marshall
Mae Virgia Hildebrand,	Montezuma, Gray
Helen Marie Hockersmith,	Beloit, Mitchell
(Mrs.) Hattie Loomis,	Manhattan, Riley
Laura Belle Lyman,	Fairview, Brown
Helen McClanahan,	Manhattan, Riley
Mattie Anna McComb,	Alma, Wabaunsee
Clare McNish,	Morrowville, Washington
Harriet Evaline Mack,	Wilsey, Morris
Eleanor March,	Manhattan, Riley
Maude Marshall,	Dighton, Lane
Edna Marie Morton,	Oberlin, Decatur
Winifred Louise Neusbaum,	Manhattan, Riley
Fern Estella Phelps,	Wichita, Sedgwick
Phoebe Elva Phillips,	Manhattan, Riley
Clara Ann Randle,	Kansas City, Wyandotte
Norah Roark,	Manhattan, Riley
Mabel Gertrude Ruggels,	Beverly, Lincoln
Clara Louise Sachan,	Manhattan, Riley
Carol Smith,	Belleville, Republic
Vesta Smith,	Parsons, Labette
Pearl Bell Twyman,	Herington, Dickinson
Cora Lee Whaley,	Olivet, Coffey
Bessie Elizabeth Wiest,	Junction City, Geary
Pearl Bissell Wikoff,	Manhattan, Riley
Lucy Coleman Williams,	Manhattan, Riley
Olive Wohlford,	Harper, Harper

MANUAL TRAINING—SUMMER TERM

Elizabeth Apel,	Marion, Marion
Seth Babcock,	Mineapolis, Ottawa
Elmer Bull,	Manhattan, Riley
Floy Caldwell,	Manhattan, Riley
Myron Sabin Collins,	Manhattan, Riley
Navarre Edwards,	Russell, Russell
Esther Elizabeth Ericson,	Manhattan, Riley
Richard William Getty,	Downs, Osborne
George Benjamin Holmes,	Manhattan, Riley
Mollie Lindsey,	Wellington, Sumner
Avis Albertha Perry,	Chapman, Dickinson
Merle Charles Prunty,	Manhattan, Riley
John Stover,	Manhattan, Riley
Lizzie Wilson,	Manhattan, Riley

AGRICULTURE—SUMMER TERM

Name	Post-office and county (or state)
Isabella Arnott,	Blue Rapids, Marshall
Lawrence Brennan,	Maplehill, Wabaunsee
George Thayer Codding,	Westmoreland, Pottawatomie
Walter Amos Cook,	Baldwin, Douglas
Arthur Doryland,	Junction City, Geary
Victor Homer Florell,	Jamestown, Republic
John Lewis Hutchinson,	Pittsburg, Crawford
Charles Parke Lillard,	Bloomington, *Illinois*
Samuel Alvin Miller,	Lebanon, Smith
John Fletcher Reynolds,	Pratt, Pratt
John Festus Shafer,	Manhattan, Riley
Frances Odell Wilson,	Anthony, Harper

GENERAL SCIENCE—SUMMER TERM

Madeline Baird,	Manhattan, Riley
Marie Isabel Benne,	Morrowville, Washington
Alviso Franklin Briggs,	Coffeyville, Montgomery
Maye Hazel Burt,	Eureka, Greenwood
Frances Louise Wilt Case,	Kansas City, Wyandotte
Lulu Lucy Case,	Kansas City, Wyandotte
Ida Myrtle Crow,	Kinsley, Edwards
Mabel Maye Gonterman,	Manhattan, Riley
Herbert Gribble,	Manhattan, Riley
Ellen Marguerite Hickok,	Ulysses, Grant
Mary Steven Lane,	Chalk, Wabaunsee
Alma May Levengood,	Athol, Smith
Vina Margaret McCray,	Manhattan, Riley
Jessie Estelle McKinnie,	Beloit, Mitchell
Ralph Leroy Miller,	Eureka, Greenwood
Amelia Gertrude Pierson,	Manhattan, Riley
Benjamin Albert Pratt,	Spearville, Ford
Etta Reed,	Clay Center, Clay
Virgie Sherwood,	Manhattan, Riley
Matthew Castle Stromire,	Manhattan, Riley
May Symonds,	Peabody, Marion

HOME ECONOMICS SHORT COURSE

Verna Aeilts,	Inman, McPherson
Lydia Alleman,	Alleman, *Iowa*
Dorothy Allen,	Elmdale, Chase
Edna Marie Apitz,	Manhattan, Riley
Linda Arnold,	Long Island, Phillips
Lena Badgley,	Topeka, Shawnee
Freda Dorothea Bardwell,	Manhattan, Riley
Clara May Batchelor,	Manhattan, Riley
Edna May Beaulieu,	Sabetha, Nemaha
Katherine Anna Beck,	Gypsum, Saline
Helen Joy Bennie,	Effingham, Atchison
Jeannette Louise Bevan,	Concordia, Cloud
Ina Fern Bigger,	Topeka, Shawnee
Gladys Elizabeth Bolsinger,	Macksville, Stafford
Zada Agnes Brooks,	Tescott, Ottawa
Bernice Brown,	Holton, Jackson
Edna Marian Bush,	Burlingame, Osage

Name	Post-office and county (or state)
Julian Helen Caldwell,	Oswego, Labette
Ollie Anne Chambers,	Winfield, Cowley
(Mrs.) Mary Charlesworth,	Manhattan, Riley
Freda Clark,	McPherson, McPherson
Marion Clark,	Canton, McPherson
Tina Cole,	Moundridge, McPherson
Frank Colley,	Tulsa, *Oklahoma*
Alma Irene Comes,	Burrton, (Reno)
Ione Conner,	Manhattan, Riley
Emeline Mendell Cooper,	Russell, Russell
Myrtle Viola Cornell,	Larned, Pawnee
Mabel Croxton,	Manhattan, Riley
Hattie Belle Croyle,	New Cambria, Saline
Genevieve Cunningham,	Manhattan, Riley
Nellie Custer,	Manhattan, Riley
Ruby Custer,	Manhattan, Riley
Stella Darnell,	Buffalo, Wilson
Blanche Day,	Wichita, Sedgwick
Florence Collins Dayton,	Herington, Dickinson
Gladys Deaver,	Cassoday, Butler
Ruby Fae Deaver,	Cassoday, Butler
Ethel Demorest,	Ottawa, Franklin
Sarah Wallace Engberg,	McPherson, McPherson
Mildred Estep,	Kansas City, Wyandotte
Vivian Everhart,	Gypsum, Saline
Betty Fahring,	Abilene, Dickinson
Odalite Fahring,	Abilene, Dickinson
Tula Faubion,	Manhattan, Riley
Bess Fenton,	Junction City, Geary
Henrietta Ford,	Axtell, Marshall
Ada Leona Frack,	Corwin, Harper
Sarah Biena Gaeddert,	Butler, Reno
Lou Alibe Gibbens,	Nickerson, Reno
Grace Gordon,	Stafford, Stafford
Eva Grandfield,	Wichita, Sedgwick
Bessie Edna Greer,	Langdon, Reno
Ruth Amelia Hagstrang,	Lindsborg, McPherson
Edith Hammerli,	Oakhill, (Ottawa)
Ruth Ada Hancock,	Beverly, Lincoln
Bessie Cecil Hanna,	Las Animas, *Colorado*
Gertrude Harrison,	Manhattan, Riley
Mabel Lydia Hawkinson,	McPherson, McPherson
Martha Crane Hawley,	Herington, Dickinson
Lizzie Anne Heidebrecht,	Inman, McPherson
Helen Hesser,	La Cygne, Linn
Besse Maie Hildreth,	Altamont, Labette
Eva Hoefer,	Tampa, Marion
Mary Oda Hoy,	Long Island, Phillips
Edith May Humphrey,	Scandia, Republic
Margaret Hutchison,	Lincoln, Lincoln
Alice Victoria Ipsen,	Cleburne, Riley
Frances Jezek,	Alton, Osborne
Edith Johnson,	Kansas City, Wyandotte
Lillie Johnson,	Leonardville, Riley
Marguerite Johnson,	Garden City, Finney
Myrtle Irene Johnson,	Chanute, Neosho
Inez Joslin,	Lincoln, Lincoln
Ada Kirchner,	Osage City, Osage
Ella Kliewer,	Newton, Harvey
Dena Bertha Knoche,	Paola, Miami
Cora Korthanke,	Robinson, Brown

Name	Post-office and county (or state)
Katherine Landis,	Kiowa, Barber
Nellia May Lang,	Beverly, Lincoln
Minnie Lehman,	Alleman, *Iowa*
Bertha Florence Lemley,	Ramona, Marion
Velda Lewis,	Downs, Osborne
Henrietta Lheureux,	Concordia, Cloud
Hattie Limbocker,	Manhattan, Riley
Olga Lofgren,	Leonardville, Riley
Kathleen Lyons,	Manhattan, Riley
Catherine McClayland,	Fall River, Greenwood
Hazel McCormick,	Zeandale, Riley
Lenore McCormick,	Zeandale, Riley
Nelly Jane McCormick,	Claudell, Smith
Norma McCormick,	Nickerson, Reno
(Mrs.) Katherine McGuire,	Hutchinson, Reno
Myrtle McKee,	Home, Marshall
Maude McMillan,	Home, Marshall
Cleo McSpadden,	Topeka, Shawnee
Mattie Bess Mattox,	Cuba, *Missouri*
Ruth Maxey,	Pomona, Franklin
Myrtle Maxwell,	Robinson, Brown
May Miles,	Garden City, Finney
Mabel Clara Millard,	Manhattan, Riley
Viva Miller,	Lincoln, Lincoln
Minnie Moeller,	Richland, Shawnee
Alice Lee Monroe,	Fredonia, Wilson
(Mrs.) Ivan Moorhead,	Manhattan, Riley
Junia Edith Nelson,	Wamego, Pottawatomie
Linda Caroline Nelson,	Herington, Dickinson
Mabel Nelson,	Marquette, McPherson
Edna Grace Nevins,	Blue Rapids, Marshall
Esther Naomi Norton,	Manhattan, Riley
Vivian Nuzman,	Circleville, Jackson
(Mrs.) Guy Omer,	Mankato, Jewell
Eva Pearl Ott,	Concordia, Cloud
Nannie Caroline Patrick,	Lindsborg, McPherson
Esther Patten,	Strong, Chase
Lois Patterson,	Esbon, Jewell
(Mrs.) Florence Neece Pearce,	Netawaka, Jackson
Clara Pelster,	Jamestown, Cloud
Gladys Pollom,	North Topeka, Shawnee
Lena Porter,	Manhattan, Riley
Etta Posey,	Larned, Pawnee
Marie Rose Powers,	Manhattan, Riley
(Mrs.) Blanche Priddy,	Elmont, Shawnee
Ethel Ramsey,	Belvue, Pottawatomie
Gretchen Rankin,	Lawrence, Douglas
Lenah Rehfield,	Manhattan, Riley
Marie Rehfield,	Manhattan, Riley
Alta Cordelia Rice,	Delphos, (Cloud)
Mary Richert,	Moundridge, McPherson
Ethel Robbins,	Fairview, Brown
Ellena Florence Rooney,	Fairview, Brown
Verna Olga Russell,	New Albany, (Elk)
Bertha Salter,	Carmen, *Oklahoma*
Inez Schmitter,	Gypsum, Saline
Bonnie Lenora Schroeder,	Lebanon, Smith
Bessie Sedivy,	Blue Rapids, Marshall
Geneva Sharer,	Salina, Saline
Eva Sheridan,	Clements, Chase
Elizabeth Sherman,	Crawford, Rice

Name	Post-office and county (or state)
Bessie May Shockey,	Abilene, Dickinson
Florence Slocum,	Manhattan, Riley
Lydia Smerchek,	Irving, Marshall
Ruth Sommers,	Manhattan, Riley
Emma Strader,	Larned, Pawnee
Dena Strahm,	Sabetha, Nemaha
Edna Stromquist,	Lindsborg, McPherson
Bertha Stuart,	Morganville, Clay
Etta Stuart,	Manhattan, Riley
Madeline Swentsell,	Wichita, Sedgwick
Lena Tellin,	Hutchinson, Reno
Ruby Travis,	Manhattan, Riley
Bertha Turner,	Liberal, Seward
Wally Emma Ulbrich,	Newton, Harvey
Mabel Weedman,	Ottawa, Franklin
(Mrs.) Pet Wilcox,	Hubbell, *Nebraska*
Eva Williston,	Manhattan, Riley
Katherine Elizabeth Williston,	Manhattan, Riley
Lois Wilson,	Manhattan, Riley
Irene Smith Winfrey,	Manhattan, Riley
(Mrs.) R. W. Wiscombe,	Manhattan, Riley

FARMERS' SHORT COURSE—SECOND YEAR

Clarence Orvill Anderson,	Clifton, Washington
John August Anderson,	Ottawa, Franklin
Richard Anderson,	Randolph, Riley
Albert Neil Barr,	Westmoreland, Pottawatomie
Leonhard Bartel,	Hillsboro, Marion
Perry Beals,	Arcadia, Crawford
James Bicker,	Dunlap, Morris
Albert Herman Bircher,	Kanopolis, Ellsworth
Carl Broadbent,	Beloit, Mitchell
F. C. Brockelman,	Holton, Jackson
John Calderwood,	Sterling, Rice
T. L. Cavender,	Beloit, Mitchell
Albert Cedarholm,	Lindsborg, McPherson
Homer Christensen,	Jamestown, Cloud
Elmer Cook,	Abilene, Dickinson
Emer Crandell,	Burrton, Harvey
Pitney Will Crippen,	Nickerson, Reno
Vern Crumpacker,	McPherson, McPherson
John Christer Cusic,	Tecumseh, Shawnee
Arthur Davis,	Fairview, Brown
G. G. Dodrill,	Stockton, Rooks
Clyde Easter,	Abilene, Dickinson
John Eckart,	Paola, Miami
Jonathan Mason Ford,	Seneca, Nemaha
Gerhard Friesen,	Hillsboro, Marion
Roy William Fritts,	Topeka, Shawnee
Charles Clyde Gilkinson,	Kanopolis, Ellsworth
Franklin Ralph Greenawalt,	Princeton, Franklin
Albert Hansen,	Vesper, Lincoln
Albert Clarence Hansen,	Greenleaf, Washington
Garret Richard Harms,	Princeton, Franklin
Edward Haverty,	Hollenberg, Washington
Frank LeRoy Hollar,	Kansas City, Wyandotte
Earl Howell,	Macksville, Stafford

Name	Post-office and county (or state)
Archie Ingersoll,	Michigan Valley, Osage
Junior James,	Topeka, Shawnee
Ralph Jamison,	Sterling, Rice
Paul Kitchen,	Burlingame, Osage
Lars Larson,	Willis, Brown
Glen Leonard,	Lyons, Rice
Paul Lewelling,	Beaver City, *Nebraska*
Arthur William Loehr,	Alma, Wabaunsee
Edmond McClean,	Talmo, Republic
Bennie McFadden,	Stafford, Stafford
Lewis Macklin,	Burns, Marion
Leo Magrath,	Williamsburg, Franklin
Ira Marriage,	Mullinville, Kiowa
Armstrong Martin,	Lawrence, Douglas
Karl Meier,	Lincoln, Lincoln
Arne Theodore Melby,	Jamestown, Cloud
Ernest Myer,	Lincoln, Lincoln
Otto Ferdinand Myer,	Walnut, Crawford
L. L. Mills,	Marion, Marion
Percy Francis Morgan,	Potwin, Butler
Ruben Mouttet,	Hillsboro, Marion
Ward Myers,	Galva, McPherson
Jesse Vincent Nelson,	Chanute, Neosho
Leroy Newcomb,	Morrowville, Washington
Hugh Fredrick Nonken,	Burns, Marion
Charles Arthur Norman,	Latimer, Morris
Irvin Noyce,	Stockton, Rooks
Gust Olson,	Marquette, McPherson
Arthur Clarence Omen,	Leonardville, Riley
John Peters,	Penalosa, Kingman
Walter Peterson,	Vesper, Lincoln
Charles Lester Preston,	Burdett, Pawnee
William Robert Pryor,	Fredonia, Wilson
Jerry Quinn,	Salina, Saline
William Judson Railsback,	Langdon, Reno
Charles Abbot Ransom,	Otego, Jewell
Rosco Ritter,	Murdock, Kingman
Harry Salter,	Oakhill, Clay
Louis Schletzbaum,	Atchison, Atchison
Louis Schmitt,	Tipton, Mitchell
Willard Doris Smith,	Manhattan, Riley
George Soeken,	Claflin, Barton
Curtis Henry Strong,	Moran, Allen
Neal Leroy Sullivan,	Cedar Vale, Chautauqua
Walter Thackery,	Beloit, Mitchell
Howard Leo Thompson,	Sterling, Rice
Earl Tibbs,	Silver Lake, Shawnee
Raymond Tidd,	Neosho Falls, Woodson
Ferdinand Tremann,	Lincoln, Lincoln
Frank Turner,	Manhattan, Riley
Arthur Fred Wells,	Lewis, Edwards
Carl Jeremiah Wemmer,	Princeton, Franklin
Walter Wilson,	Carlton, Dickinson
Everett Withroder,	Plevna, Reno
Arthur Fred Wittorff,	Inman, McPherson
Ross Plummer Woolpert,	Topeka, Shawnee
Lewis Wrampe,	Yates Center, Woodson
Fred Zurbuchen,	Alta Vista, Wabaunsee

FARMERS' SHORT COURSE—FIRST YEAR

Name	Post-office and county (or state)
Emory Ellsworth Baird,	North Topeka, Shawnee
Arthur Banninger,	Washington, Washington
Berthold Allen Barnes,	Manhattan, Riley
Oscar Guy Bartlett,	Wellington, Sumner
Fred Bigham,	Ozawkie, Jefferson
Frank Lewis Bireline,	Lewis, Edwards
Edward Will Bisping,	Linn, Washington
Edward Leo Blaesi,	Abilene, Dickinson
George Blain,	Manhattan, Riley
Raymond Voter Blair,	Savonburg, Allen
Edward Henry Bock,	Pawnee City, *Nebraska*
Verner Allison Boone,	Eureka, Greenwood
Bert Allen Bourne,	Delphos, Ottawa
Nicholas Brinkman,	Olpe, Lyon
Clem Brunker,	Manhattan, Riley
Charles Walker Burk,	Clifton, Washington
George Leonard Burton,	Council Grove, Morris
Alva Leland Cade,	Vernon, Woodson
Walter Constantine Carlgren,	Concordia, Cloud
Lester Loid Cary,	Manhattan, Riley
William Henry Case,	Sterling, Rice
Emmett Chambers,	Arkansas City, Cowley
Justice Harvey Chase,	Solomon, Dickinson
Elias William Clam,	Le Roy, Coffey
James Mono Clogston,	Fall River, Elk
Lloyd James Cochran,	North Topeka, Shawnee
Lee Rudolph Cook,	Dillon, Dickinson
Norman Squire Cotton,	Horton, Brown
Ernest Tinder Crawford,	Labette, Labette
Richard Cunningham,	Harper, Harper
Albert Ephraim Davis,	Redfield, Bourbon
George Vernon Denbo,	Great Bend, Barton
Dietrick Dick,	Butler, Reno
George Edgerton,	White City, Morris
Roy Elmer Englund,	Falun, Saline
Homer Franklin Ewing,	Parsons, Neosho
Joseph Oliver Ewing,	Kanopolis, Ellsworth
Walter Louis Fair,	Webber, Jewell
Lex Faris,	Topeka, Shawnee
Leo Frances Fox,	Russell, Russell
Thomas Rolla Fox,	Winfield, Cowley
John Henry Franz,	Hepler, Crawford
Otto Fricke,	Yates Center, Woodson
Fenton Joseph Gilstrap,	Longton, Elk
Allan Swan Gould,	Merriam, Johnston
Harry Graham,	Webber, Jewell
Robert Gordon Grant,	Rosalia, Butler
Urban Montgomery Gratner,	Kinsley, Edwards
Brooks Wallace Graves,	Inman, McPherson
Harold Dwight Grimes,	Ottawa, Franklin
Karl Davis Grothe,	Wichita, Sedgwick
Frederick Ernest Haas,	Baldwin, Douglas
Warner Clarence Habluetzel,	Bala, Riley
Frank Emerson Hakes,	Clyde, Cloud
Vergil Clifford Hall,	Emporia, Lyon
Maurice Allen Hamer,	Lawrence, Douglas
Richard George Hanson,	Chanute, Neosho
Robert Hanson,	Jamestown, Cloud

Name	Post-office and county (or state)
Clyde Harding,	Manhattan, Riley
Albert Wellington Hargreaves,	Abilene, Dickinson
Benjamine Charles Harrison,	Riley, Riley
Reiner Edgar Hartwig,	Barneston, *Nebraska*
Adolff Fred Heine,	Luca, Russell
Chester Leland Hendershot,	Darlow, Reno
Roscoe Easter Hey,	Manhattan, Riley
Frederick Whan Hitchcock,	Belle Plaine, Sumner
Henry Carl Hitz,	Hudson, Stafford
Paul Hoaglin,	Manhattan, Riley
Thomas Corven Hobbs,	Langdon, Reno
Lodewyk Christoffel Hondius,	Manhattan, Riley
Edwin Nathaniel Hubbard,	Manhattan, Riley
James Hughes,	Topeka, Shawnee
Arthur Leslie Hutchinson,	Summerfield, Marshall
Oscar Ingebretsen,	Scandia, Republic
Walter Cyrus Joy,	Hays, Ellis
Carl Kayser,	Dunlap, Lyon
Allen Lauren Kelsey,	North Topeka, Shawnee
Myron Scott Kelsey,	North Topeka, Shawnee
Edward Louis Kesl,	Cuba, Republic
Frank Kiefer,	Harper, Harper
Mayo Kingsbury,	Oswego, Labette
Matthew Albert Kirkwood,	Kingsville, *Texas*
Howard Alfred Kissinger,	Ransomville, Franklin
E. L. Klepiner,	Conway, McPherson
Walter Raynold Krueger,	Marion, Marion
Austin Lancaster,	Union, *Iowa*
John Franklin Landis,	Topeka, Shawnee
Wilbur Austin Lawton,	Americus, Lyon
Luther Lewis,	Riley, Riley
Roy Lockard,	Dillon, Dickinson
Philip George Loesch,	Raymond, Rice
Allen Logan,	Kansas City, Wyandotte
Jacob Regier Lohrenz,	Moundridge, Harvey
George Maxwell Long,	Saint John, Stafford
Frank Clayton Luthye,	North Topeka, Shawnee
Homer McCandless,	Saint John, Stafford
John William McClayland,	Fall River, Greenwood
Harlie McColm,	Piedmont, Greenwood
William Colbertson McConnell,	Sabetha, Nemaha
Lee McKissick,	Minneola, Clark
Ralph McNergney,	Sabetha, Nemaha
Frank Martin,	Chanute, Neosho
Ralph Waldo May,	Williamstown, Jefferson
Edward James Myer,	Clifton, Washington
Peter Alois Moeder,	Claflin, Barton
George Washington Morrow,	Topeka, Shawnee
William Ernest Mueller,	Stafford, Stafford
Samuel Wesley Muenzenmayer,	Woodbine, Dickinson
Noah Musser,	Abilene, Dickinson
Harry George Myer,	Soldier, Jackson
Carl Willis Neill,	Saint John, Stafford
August Nels Nelson,	Girard, Crawford
Harvey Norman,	Piedmont, Greenwood
Ernest Fredof Olson,	Osage City, Osage
John Parley Oriston,	Hiawatha, Brown
Edward Paul O'Rourke,	Clay Center, Clay
Frank O'Sullivan,	Galena, Cherokee
Albert Victor Pacey,	Miltonvale, Cloud

Name	Post-office and county (or state)
Vern Leroy Pacey,	Miltonvale, Cloud
William Padfield,	Kingman, Kingman
Wilmer Manton Parker,	Morrill, Brown
Charles Gaberal Passmore,	Talmo, Republic
John Edward Peters,	Walton, Harvey
Isaac Kinsey Pierson,	McCune, Crawford
Olave Piper,	Douglass, Butler
Harold Glenn Poteet,	Bern, Nemaha
Paul Francis Pursell,	Paola, Miami
Archie Ross Quinnette,	Ames, Cloud
Thomas Lester Reed,	Circleville, Jackson
Gustav Regier,	White Water, Butler
Henry Reimer,	Inman, McPherson
Ellis Meritt Resler,	Chanute, Neosho
Dillar Errett Richardson,	Sterling, Rice
Jay Goldman,	Pollard, Rice
Lawrence Robert Ricklefs,	Troy, Doniphan
Thomas Winperd Rogers,	Seneca, Nemaha
Arvid Rosandu,	Lindsborg, McPherson
Averett Arnold Ruggles,	Beverly, Lincoln
Phil Joe Samuelson,	Frankfort, Marshall
Ralph Ray Sanders,	Osage City, (Lyon)
Orin Bruce Sanford,	Scottsville, Mitchell
Francis Schletzbaum,	Atchison, Atchison
Joseph Garey Schmitt,	Tipton, Mitchell
John Andrew Schoen,	Cawker City, Mitchell
Clarence Schwan,	Humboldt, *Nebraska*
Harry Seal,	Macksville, Pawnee
Guy Seidle,	Eureka, Greenwood
Charles Albert Seymour,	Rantoul, Franklin
Charles William Sharp,	Leavenworth, Leavenworth
Orton Shrader,	Enterprise, Dickinson
Vencil Ladislov Skubal,	Jennings, Decatur
David Smith,	Enterprise, Dickinson
Onno Soeken,	Claflin, Barton
Harry Robert Soice,	Kinsley, Edwards
Willie Edward Soice,	Kinsley, Edwards
Harvey Webb Staadt,	Ottawa, Franklin
Benjamin Harrison Stockton,	Concordia, Cloud
Frank Allen Stockwell,	Havensville, Pottawatomie
William Albert Stolfus,	Emporia, Lyon
Andrew Kropf Stoner,	Abilene, Dickinson
Edward William Stuewe,	Alma, Wabaunsee
John Godfrey Stutz,	Utica, Ness
John Horatis Tasker,	Tyro, Montgomery
Miller Thayer,	Fairview, Brown
Cecil Throndson,	Farlington, Crawford
Leo Matheny Torrence,	Arrington, Atchison
Charley Wesley Travis,	Manhattan, Riley
William John Tregemha,	Overbrook, Osage
James Lindley Truxal,	Hoisington, Barton
Harry Patchin Tull,	Jonesboro, *Arkansas*
John Tupper,	Lawrence, Douglas
Samuel Waldorf,	Leon, Butler
Walter William Walker,	Cunningham, Kingman
W. W. Ward,	Hays, Ellis
Caryl Watson,	Lincoln, Lincoln
Johnnie Donley Waugh,	Olivet, Osage
Fred Edward Webb,	Protection, Comanche
Eugene Welch,	Waterville, Marshall

Name	Post-office and county (or state)
Wendell Welch,	Waterville, Marshall
Henry Wendelburg,	Stafford, Stafford
Henry Sheldan Willcox,	Burlingame, Osage
William Henry Wills,	Lyons, Rice
Lake Cedric Wilson,	Whiting, Jackson
Martin William Wilson,	Lincoln, Lincoln
Edwin Preston Witherspoon,	Emporia, Lyon
Theodore Fred Witt,	Hudson, Stafford
Elting Wyne,	Dexter, *New Mexico*
Alvah Judson York,	Coldwater, Comanche

COMMERCIAL CREAMERY SHORT COURSE

W. G. Adams,	Newton, Harvey
William Albert Alexander,	Manhattan, Riley
Charles Barnes,	Manhattan, Riley
Harry Otto Colburn,	McCune, Crawford
Loyd Combs,	Manhattan, Riley
Floyd Cragg,	Manhattan, Riley
Percy Hacker,	Manhattan, Riley
John Vernon Joy,	Ensign, Gray
George Earle Kaufman,	Kingman, Kingman
W. C. Makinney,	Columbus, Cherokee
Alfred Palm,	Fall River, Greenwood
Will Roark,	Manhattan, Riley
Harold Alonzo Rogle,	Winona, Logan
Robert Edward Turner,	Manhattan, Riley

Summary of Students, 1911-1912.

	Agronomy	Horticulture	Animal Husbandry	Dairy Husbandry	Veterinary Medicine	Mechan. Engineering	Electrical Engineering	Civil Engineering	Architecture	Printing	Home Economics	General Science		Industrial Journalism		Miscellaneous		Total		Grand total
	Men.	Men.	Men.	Men.	Men.	Men.	Men.	Men.	Men.	Men.	Women.	Men.	Women.	Men.	Women.	Men.	Women.	Men.	Women.	
Graduate	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	24	20	24	20	44
Senior	18	11	29	11	19	9	19	11	3	1	92	29	8	1	.....	.....	.....	161	100	261
Junior	*30	6	34	2	9	19	24	20	14	1	103	24	3	.....	.....	.....	.....	183	105	288
Sophomore	63	15	47	10	14	25	31	25	12	2	174	34	7	2	.....	.....	.....	280	181	461
Freshman	46	8	32	5	9	26	38	11	11	4	110	22	10	4	1	.....	.....	216	121	337
Subfreshman 1st	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	155	108	155	108	261
Subfreshman 2d	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	259	58	259	58	317
Special	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	36	49	36	49	85
H. E. S. C	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	160	.....	160	160
F. S. C. 1st	.....	.....	..	..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	188	.....	188	.....	188
F. S. C. 2d	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	92	.....	92	.....	92
C. C. S. C	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	14	.....	14	.....	14
Summer Course	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	23	71	23	71	94
Totals	157	40	142	28	51	79	112	67	40	8	478	109	28	7	1	791	466	1631	973	2604
Counted twice	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	59	22	59	22	81
Net total	157	40	142	28	51	79	112	67	40	8	478	109	28	7	1	732	444	1572	951	2523

*One woman.

From Kansas	2,433	From Missouri	26
Arizona	2	Nebraska	10
Arkansas	2	New Hampshire	1
California	2	New Mexico	5
Colorado	3	New York	3
Georgia	1	Ohio	1
Hawaii	5	Oklahoma	9
Idaho	3	Scotland	1
Illinois	2	Texas	2
Iowa	4	Wisconsin	1
Japan	1	Wyoming	2
Mexico	4		
		Total	2,523

Record of Attendance, 1879-1912.

College Year	Home economics short course	Commercial creamery short course	Dairy short course	Farmers' short course	Apprentice	Special	Preparatory	Subfreshman	Freshman	Sophomore	Junior	Senior	Graduate	Counted twice	Total	Graduated
1878-79	.....	....	....	.....	....	1	.....	.....	89	89	16	12	....	....	207	9
1879-80	.....	....	....	.....	....	1	.....	.....	166	61	35	11	2	....	276	7
1880-81	.....	....	....	.....	....	6	.....	.....	178	48	24	9	2	....	267	8
1881-82	.....	....	....	.....	....	5	.....	.....	227	50	19	11	....	....	312	9
1882-83	.....	....	....	.....	....	4	.....	.....	241	60	30	12	....	....	347	12
1883-84	.....	....	....	.....	....	2	.....	.....	255	92	26	18	2	....	395	17
1884-85	.....	....	....	.....	....	2	.....	.....	271	71	36	16	5	....	401	14
1885-86	.....	....	....	.....	....	1	.....	.....	273	91	35	24	4	....	428	21
1886-87	.....	....	....	.....	....	....	.....	.....	303	100	44	24	10	....	481	21
1887-88	.....	....	....	.....	....	....	.....	.....	305	92	46	27	2	....	472	22
1888-89	.....	....	....	.....	....	....	.....	.....	266	103	41	28	7	....	445	25
1889-90	.....	....	....	.....	....	1	.....	.....	307	105	63	28	10	....	514	27
1890-91	.....	....	....	.....	....	....	.....	.....	343	135	50	53	12	....	593	52
1891-92	.....	....	....	.....	....	....	.....	.....	336	139	62	37	10	....	584	35
1892-93	.....	....	....	.....	....	....	.....	.....	339	110	66	43	29	....	587	39
1893-94	.....	....	....	.....	....	....	.....	.....	275	141	72	42	25	....	555	39
1894-95	.....	....	....	.....	....	5	.....	.....	276	108	89	64	30	....	572	57
1895-96	.....	....	....	.....	....	3	.....	.....	353	121	67	71	32	....	647	66
1896-97	.....	....	....	.....	....	6	67	.....	321	163	69	62	46	....	734	55
1897-98	.....	....	6	.....	9	15	77	.....	316	174	77	82	57	10	803	69
1898-99	.....	....	26	.....	35	40	110	.....	306	177	92	65	40	21	870	53
1899-00	24	....	57	47	50	32	162	.....	376	163	109	69	27	22	1094	58
1900-01	47	....	72	109	79	23	318	.....	348	183	80	74	40	52	1321	60
1901-02	41	....	66	125	87	19	298	.....	396	206	120	65	32	59	1396	52
1902-03	63	....	38	123	78	36	342	.....	471	229	141	86	24	57	1574	55
1903-04	51	....	16	122	72	33	443	.....	403	206	161	114	20	36	1605	102
1904-05	88	....	24	99	12	30	500	.....	289	198	122	117	26	43	1462	107
1905-06	92	....	28	118	....	46	598	.....	373	214	145	110	30	64	1690	96
1906-07	134	....	23	179	....	48	144	511	411	269	149	133	24	88	1937	119
1907-08	188	....	26	173	....	42	134	528	459	357	202	148	26	82	2192	116
1908-09	168	....	18	197	....	42	134	521	491	381	243	171	28	86	2308	138
1909-10	152	4	111	124	....	87	89	453	456	417	286	170	26	70	2305	145
1910-11	160	9	26	285	....	107	.....	364	533	412	288	248	34	59	2407	204
1911-12	160	14	....	280	....	85	.....	580	337	461	288	261	44	81	2523	....

Correspondence Courses

ELEMENTARY AGRICULTURE

Name	Post-office and county (or state)
A. B. Brothers,	Winfield, Cowley
H. H. Buckner,	Pratt, Pratt
Pearl Clymer,	Medicine Lodge, Barber
G. W. Curtis,	Topeka, Shawnee
I. H. Dulebohn,	Kearny, Kearny
Thos. L. Fell,	Kansas City, *Missouri*
Dora Foraker,	Pittsburg, Crawford
Ralph R. Gfeller,	Burns, Marion
Clifford Hazen,	Hollis, Cloud
George L. Hensley,	Lakin, Kearny
George G. Hindman,	Kansas City, *Missouri*
Chas. E. Hunt,	Elgin, *Illinois*
Gilford Ikenberry,	Quinter, Gove
Richard Ikenberry,	Quinter, Gove
Jesse D. Johnson,	Lowemont, Leavenworth
A. E. Karnes,	Scranton, Osage
Nettie E. Lawrence,	Waverly, Coffey
C. O. Oliver,	Council Grove, Morris
O. F. Owens,	Welda, Anderson
S. O. Perkins,	Russell, Russell
George H. Peterson,	Eskridge, Wabaunsee
J. W. Roller,	Weir, Cherokee
Stewart Spencer,	St. John, Stafford
C. F. Spillman,	Pretty Prairie, Reno
Chas. S. Sturtevant,	Topeka, Shawnee
Chas. S. Todd,	Wathena, Doniphan
E. H. Todd,	Salina, Saline
S. E. Veatch,	Hudson, Stafford
R. C. Walden,	Alma, Wabaunsee
G. M. Wilson,	Independence, Montgomery

ANIMAL BREEDING

H. A. Cowles,	Sibley, Douglas
H. J. Schwarz,	Lebanon, Smith

CONCRETE CONSTRUCTION

Roy McConnell,	Parsons, Labette
H. J. Schwarz,	Lebanon, Smith
W. P. Symns,	Troy, Doniphan

DAIRY MANUFACTURING

W. G. Adams,	Newton, Harvey
W. E. Bentley,	Pendennis, Lane
Aaron V. Dolton,	Topeka, Shawnee
E. F. Kilmer,	Belle Plaine, Sumner
J. Walter Mills,	Topeka, Shawnee
J. M. Pennington,	Atchison, Atchison
H. L. Phillipi,	Lawrence, Douglas
John B. Steinbrink,	Warm Springs, *Oregon*

ELEMENTARY WOODWORK

Name	Post-office and county (or state)
C. C. Cornelius,	Lane, Franklin

FARM BUILDINGS

J. E. Rogers,	Neal, Greenwood

FARM CROPS

A. B. Bengston,	Robinson, Brown
Thos. W. Bruner,	Oanica, Kearny
Harry W. Donaldson,	Topeka, Shawnee
G. R. King,	Glasco, Cloud
F. P. Williamson,	Zamboanga, *Philippine Islands*

FARM DAIRYING

W. E. Bentley,	Pendennis, Lane
Aaron V. Dolton,	Topeka, Shawnee
M. Arthur Levene,	Leavenworth, Leavenworth
John B. Steinbrink,	Warm Springs, *Oregon*

FARM DRAINAGE

Lindsay L. Criswell,	Wichita, Sedgwick
H. E. Gillette,	Ottawa, Franklin

FARM MECHANICS

Andrew Schwarz,	Lebanon, Smith
Ward J. Spencer,	St. John, Stafford

FARM MOTORS

George W. Byrns,	Cooper, *Iowa*

FLORICULTURE

Lottie M. King,	Glasco, Cloud

FORESTRY

Robert S. Crandall,	Newton, Harvey
E. W. Gregg,	Sedgwick, Harvey
Harry A. Poling,	Milwaukee, *Wisconsin*

FRUIT GROWING

Kepler Johnson,	Chanute, Neosho

LANDSCAPE GARDENING

R. E. Brown,	Whiting, Jackson
Robert S. Crandall,	Newton, Harvey
J. N. Dunbar,	Columbus, Cherokee
Frank H. Rose,	Weir City, Cherokee
W. M. Royall,	Junction City, Geary

POULTRY MANAGEMENT

J. W. Anders,	Liberal, Seward
Francisco Becerril,	Hermosilla, *Mexico*
Mrs. Louis V. Beebe,	Lenexa, Johnson
Mrs. Edward B. Chalk,	Lewis, Edwards
Mrs. Jessie H. Clarke,	Keats, Riley
E. P. Dominy,	Atwood, Rawlins
Mrs. Dradie Dunbar,	Columbus, Cherokee
Mrs. Ida Givens,	Silvia, Reno

Name	Post-office and county (or state)
Emil Kesl,	Cuba, Republic
Louis H. Klaumann,	Iola, Allen
Archie L. McAllister,	Newton, Harvey
J. Walter Mills,	Topeka, Shawnee
O. R. Parmalee,	Topeka, Shawnee
Hugh Steele,	Lawrence, Douglas
H. S. Terry,	Olathe, Johnson

SOILS

Hiram P. Blunt,	Cawker City, Mitchell
Thos. W. Bruner,	Oanica, Kearny
Pearl Clymer,	Medicine Lodge, Barber
Harry W. Donaldson,	Topeka, Shawnee
Frank J. Fisher,	Horton, Brown
J. E. Goss,	Hammon, *Oklahoma*
A. W. Griffeth,	Barnard, Lincoln
Gilford Ikenberry,	Quinter, Gove
Herman Regier,	Moundridge, Harvey
Cecil H. Smith,	Duncan, *Oklahoma*
D. L. Snyder,	Deming, *New Mexico*

STOCK FEEDING

Calvin Duvall,	Pomona, Franklin
W. E. Graham,	Bunkerhill, Russell
Grover E. Lee,	Pratt, Pratt
C. E. Payne,	Fontana, Miami
John B. Steinbrink,	Warm Springs, *Oregon*
Lee J. Talbott,	Kansas City, *Missouri*
Fred Tulloss,	Hay Springs, *Nebraska*
F. P. Williamson,	Zamboanga, *Philippine Islands.*
J. W. Wilson,	Vesper, Lincoln

COOKING

Mrs. Dradie Dunbar,	Columbus, Cherokee
Mrs. Olive Glasgow,	Courtland, Republic
Grace Graham,	Altoona, Wilson
Mrs. Maude Graham,	Bunkerhill, Russell
Alta C. Horney,	Fredonia, Wilson
Mrs. Isaac Horrell,	Baldwin, Douglas
Mettie Hulse,	Keats, Riley
Audria Hunger,	White City, Morris
Myrtle Jump,	Anthony, Harper
Elizabeth Kagarice,	Darlow, Reno
Mrs. Alan Laing,	Ames, Cloud
Mrs. O. L. Lennen,	Utica, Ness
Mrs. Ralph McKinnie,	Glen Elder, Mitchell
Ora B. Messenger,	Basil, Kingman
Anna E. Miller,	Syracuse, Hamilton
Gertrude C. Moylan,	Emmett, Pottawatomie
Mrs. Henry Paulsen,	Westmoreland, Pottawatomie
Florence Peck,	Roxbury, Saline
Mary Rhodes,	Maize, Sedgwick
Mrs. Frank Scott,	LeLoup, Franklin
Mrs. W. A. Stauffer,	Marion, Marion
Mrs. B. A. Stevens,	Vinland, Douglas
Mrs. J. S. Stover,	Lincoln, Lincoln
Mary Sullivan,	Wamego, Wabaunsee
Mrs. Lou Bain Thompson,	Elmdale, Shawnee
Mrs. C. C. Webb,	Highland, Doniphan

SEWING

Name	Post-office and county (or state)
Juliet Carpenter,	Lawrence, Douglas
Nellie Eastman,	Hymer, Chase
Jennie E. Graham,	Dunavant, Jefferson
Nora M. Hott,	Hiawatha, Brown
Mary McCracken,	Augusta, Butler
Louise Orgain,	Ballinger, *Texas*
Etta Reed,	Wakefield, Clay
Mary J. Rees,	Admire, Lyon
Bessie H. Shedd,	Augusta, Butler
Maude A. Traylor,	Lebo, Coffey
Mrs. G. M. Woodhead,	Lawrence, Douglas

VEGETABLE GARDENING

W. T. Burrell,	Topeka, Shawnee
John W. Lapham,	Chanute, Neosho

VOCATIONAL EDUCATION

Mrs. Ida Givens,	Sylvia, Reno
W. A. Hendershot,	Natoma, Osborne
S. V. Mallory,	Zeandale, Riley
P. H. Ross,	Jewell City, Jewell

INSECTS INJURIOUS TO FARM CROPS

Fred Eastman,	Matfield Green, Chase
Caroline E. Jaycox,	Elkhorn, Ellsworth

INSECTS INJURIOUS TO ORCHARD CROPS

Caroline E. Jaycox,	Elkhorn, Ellsworth

Correspondence Course Students—Summary

Elementary Agriculture	30
Cookery	26
Poultry Management	15
Sewing Course I	11
Stock Feeding	9
Farm Crops	5
Soils	11
Farm Dairying	4
Fruit Growing	1
Vegetable Gardening	2
Dairy Manufacturing	8
Landscape Gardening	5
Farm Drainage	2
Forestry	3
Insects Injurious to Farm Crops	2
Insects Injurious to Orchard Crops	1
Vocational Education	4
Concrete Construction	3
Elementary Woodwork	1
Farm Buildings	1
Animal Breeding	2
Farm Mechanics	2
Farm Motors	1
Floriculture	1
Total number of enrollments	150
Number enrolled in more than one course	13
Number of students enrolled	137

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