Kansas State Agricultural College

CATALOGUE

FIFTY-THIRD SESSION
1915-1916

ANNOUNCEMENTS
1916-1917

MANHATTAN

THE KANSAS INDUSTRIALIST, VOL. XLII, NO. 41.

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KANSAS STATE PRINTING PLANT.
W. R. SMITH, State Printer.
TOPEKA. 1916.

The Board of Administration

THE HON. ED. T. HACKNEY, *President*..... Term expires 1917
Wellington, Sumner county.

THE HON. E. W. HOCH..... Term expires 1919
Marion, Marion county.

THE HON. (MRS.) CORA G. LEWIS..... Term expires 1917
Kinsley, Edwards county.

LEE HARRISON, *Secretary*.
Topeka, Shawnee county.

Administrative Officers

President	HENRY JACKSON WATERS
Dean of the Division of Agriculture and Director of the Agricultural Experiment Station	WILLIAM M. JARDINE
Dean of the Division of Mechanic Arts and Director of the Engineering Experiment Station	ANDREY A. POTTER
Dean of the Division of General Science..	J. T. WILLARD
Dean of the Division of Home Economics..	MRS. MARY P. VAN ZILE
Dean of the College.....	CLARK M. BRINK
Dean of the Division of College Extension,	E. C. JOHNSON
Director of the Summer School.....	E. L. HOLTON
Principal of the School of Agriculture....	H. L. KENT
Registrar	MISS JESSIE MCD. MACHIR
Financial Secretary and Purchasing Agent,	JAS. T. LARDNER
Librarian	ARTHUR B. SMITH
Custodian	G. F. WAGNER

1916

JULY

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The College Calendar

1916.

Sept. 16, Saturday.—Meeting of assigners with Committee on Schedule at three p. m.
Sept. 18, Monday.—Faculty meeting at nine a. m.
Sept. 18, Monday.—Meeting of assigners with Deans at ten a. m.
Sept. 18, Monday.—Assignment of students begins at one-thirty p. m.
Sept. 18, Monday.—Admission of new students at one-thirty p. m.
Sept. 20, Wednesday.—Assignment of students closes at five p. m.
Sept. 20, Wednesday.—Short course for housekeepers begins.
Sept. 21, Thursday.—All classes meet according to schedule.
Sept. 21, Thursday.—Opening convocation, nine a. m. to ten a. m.
Oct. 14, Saturday.—Scholarship deficiency reports due.
Oct. 14, Saturday.—Examinations to remove conditions.
Oct. 14, Saturday.—Incompletes made up by this date.
Nov. 4, Saturday.—Scholarship deficiency reports due.
Nov. 30, to Dec. 2, Thursday to Saturday.—Thanksgiving vacation.
Dec. 15, Friday.—Examinations end for students graduating December 20.
Dec. 20, Wednesday.—Graduation exercises for December section of class of 1916.
Dec. 15 to 22, Friday to Friday.—Examinations at close of term.
Dec. 22, Friday.—Fall term closes at eleven a. m.

1917.

Jan. 8, Monday.—Assignment of students begins at eight a. m.
Jan. 8, Monday.—Admission of new students at eight a. m.
Jan. 9, Tuesday.—Assignment of students closes at five p. m.
Jan. 9, Tuesday.—Short courses in agriculture and dairying begin.
Jan. 9, Tuesday.—Short courses in mechanic arts begin.
Jan. 10, Wednesday.—All classes meet according to schedule.
Jan. 27, Saturday.—Scholarship deficiency reports due.
Jan. 27, Saturday.—Incompletes must be made up by this date.
Feb. 3, Saturday.—Examinations to remove conditions.
Feb. 17, Saturday.—Scholarship deficiency reports due.
Feb. 22, Thursday.—Holiday, Washington's Birthday.
Mar. 21, Wednesday.—Short courses in agriculture and dairying close.
Mar. 21, Wednesday.—Short courses in mechanic arts close.
Mar. 28 to 30, Friday to Friday.—Examinations at close of term.
Mar. 30, Friday.—Winter term closes at eleven a. m.

Apr. 3, Tuesday.—Assignment of students begins at eight a. m.
Apr. 3, Tuesday.—Admission of new students at eight a. m.
Apr. 4, Wednesday.—Assignment of students closes at five p. m.
Apr. 5, Thursday.—All classes meet according to schedule.
Apr. 21, Saturday.—Scholarship deficiency reports due.
Apr. 21, Saturday.—Incompletes must be made up by this date.
Apr. 28, Saturday.—Examinations to remove conditions.
May 12, Saturday.—Scholarship deficiency reports due.
May 30, Wednesday.—Holiday, Decoration Day.
June 11 to 16, Monday to Saturday.—Examinations for Seniors.
June 13 to 20, Wednesday to Wednesday.—Examinations at close of term.
June 17 to 21, Sunday to Thursday.—Exercises of Commencement Week.

June 21, Thursday.—Assignment of students for Summer School.
June 21 to August 2, Thursday to Thursday.—Summer School in session.
Sept. 17, Monday.—Assignment of students begins at one-thirty p. m.
Sept. 17, Monday.—Admission of new students at one-thirty p. m.
Sept. 19, Wednesday.—Assignment of students closes at five p. m.
Sept. 20, Thursday.—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. A fee of one dollar is charged those who enroll after the time set for close of assignments unless a good excuse is offered.

Standing Committees of the Faculty

ADMISSION: Jessie McD. Machir, J. V. Cortelyou, B. L. Remick, Bessie W. Birdsall, E. V. Floyd, E. H. Reisner, I. V. Iles, P. S. Welch, S. L. Simmering.

ADVANCED CREDIT: *College.*—R. R. Price, W. H. Andrews, L. E. Call, R. A. Seaton, H. H. King, J. R. Macarthur, G. A. Dean, W. A. Cochel, Jen L. Cox, J. T. Willard.
School of Agriculture: H. L. Kent, E. L. Holton, Ada Rice, E. V. James, W. T. Stratton.

ASSIGNMENT: Jessie McD. Machir, L. A. Fitz, R. A. Seaton, W. H. Andrews, Jen L. Cox, A. E. White.

ATHLETICS: President Waters, J. O. Hamilton, G. S. Lowman, John R. Bender, M. F. Ahearn, H. E. Porter, J. V. Cortelyou.

CATALOGUE: J. V. Cortelyou, H. F. Roberts, J. R. Macarthur.

COLLEGE RULES: R. R. Price, J. T. Willard, J. E. Kammeyer, J. D. Walters.

"COLLEGE STUDIES": A. A. Potter, J. O. Hamilton, L. E. Call, H. F. Roberts, A. B. Smith.

DEBATE: J. R. Macarthur, J. G. Emerson, J. E. Kammeyer.

DISCIPLINE: Albert Dickens, L. A. Fitz, L. E. Conrad.

GRADUATE STUDY: W. M. Jardine, J. V. Cortelyou, A. A. Potter, H. F. Roberts, Mary P. Van Zile.

PLACES OF MEETING: C. M. Brink, J. E. Kammeyer, J. T. Willard.

PUBLIC EXERCISES: J. E. Kammeyer, J. V. Cortelyou, A. E. Wesbrook.

SCHEDULE OF CLASSES: J. T. Willard, A. E. White.

STUDENT AFFAIRS: J. O. Hamilton, H. H. King, E. L. Holton, Mary P. Van Zile, W. M. Jardine.

STUDENT ASSEMBLY: J. E. Kammeyer.

STUDENT HEALTH: L. E. Conrad, L. D. Bushnell, L. W. Goss.

Officers of Instruction and Administration

PRESIDENT

HENRY JACKSON WATERS, B. S. A., LL. D.,

President of the College.

B. S. A., University of Missouri, 1886; LL. D., New Hampshire State College, 1913; 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, International Dry-farming Congress, 1913-1914; Special Commissioner to the Philippine Islands, 1914; President, American Society for the Promotion of Agricultural Science, 1913-1914; President, Kansas State Agricultural College, 1909—.

Office* A 30; Res. 2 Park Road.

PROFESSORS

JOHN DANIEL WALTERS, M. S., A. D.,

Professor of Architecture and Drawing.

M. S., Kansas State Agricultural College, 1883; A. D., ibid., 1908; 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; Professor of Industrial Art and Design, ibid., 1885-1904; Professor of Architecture and Drawing, ibid., 1904—.

Office E 56; Res. 809 N. Eleventh St.

JULIUS TERRASS WILLARD, D. Sc.,

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

B. S., Kansas State Agricultural College, 1883; M. S., ibid., 1886; D. Sc., ibid., 1908; Assistant in Chemistry, ibid., 1883-1887; 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—; Dean of the Division of General Science, ibid., 1909—; Chemist, Engineering Experiment Station, ibid., 1910—.

Office C 30; Res. 1725 Poyntz Ave.

BENJAMIN LUCE REMICK, PH. M.,

Professor of Mathematics.

Ph. B., Cornell College (Iowa), 1889; Ph. M., ibid., 1892; Instructor, Cornell College Academy, 1889-1892; 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 the 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.

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* Buildings are designated by letters, as follows:

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

HERBERT FULLER ROBERTS, M. S.,

Professor of Botany.

A. B., University of Kansas, 1891; LL. B., Northwestern University Law School (Chicago), 1893; M. S., Kansas State Agricultural College, 1898; 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; 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.

ALBERT DICKENS, M. S.,

Professor of Horticulture.

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

Office H 30; Res. 509 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; A. M., University of Rochester, 1893; Ph. D., New York University, 1894; 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; 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 61; Res. 9 Park Road.

RALPH RAY PRICE, A. M.,

Professor of History and Civics.

A. B., Baker University, 1896; A. M., University of Kansas, 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., LL. D.,

Professor of Economics.

A. B., Central Wesleyan College, 1886; A. M., ibid., 1889; Instructor, Public Schools of Missouri, 1886-1893; 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; LL. D., Kansas City University, 1912; Professor of Economics, Kansas State Agricultural College, 1904—.

Office A 52; Res. 1419 Humboldt St.

JOHN VANZANDT CORTELYOU, PH. D.,

Professor of German.

A. B., University of Nebraska, 1897; A. M., ibid., 1901; Ph. D., University of Heidelberg, 1904; Assistant Principal, Humboldt (Nebraska) High School, 1897-1898; Principal, ibid., 1898-1899; Graduate Student, University of Nebraska, 1899-1901; Graduate Student, University of Heidelberg, 1901-1904; Research Work, British Museum (London) and Bibliotheque Nationale (Paris), Summer, 1903; President, Kansas Association of Teachers of German, 1912-1915; Professor of German, Kansas State Agricultural College, 1904—.

Office N 59; Res. 5 Park Road.

FRANCIS SIEGEL SCHOENLEBER, D. V. S., M. S. A.,

Professor of Veterinary Medicine.

B. S. A., Iowa State College, 1885; M. S. A., ibid., 1887; D. V. S., Chicago Veterinary College, 1890; Assistant in Agriculture, Iowa State College, 1885-1888; Associate Editor, *Orange Judd Farmer*, Chicago, 1888-1890; 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. 805 Houston St.

JOHN ORR HAMILTON, B. S.,

Professor of Physics.

B. S., University of Chicago, 1900; Student, Monmouth College, 1888-1890; Superintendent, Roseville (Illinois) Public Schools, 1894-1898; 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; in Charge of Electrical Engineering, ibid., January 1, 1913-1914; Professor of Physics, ibid., 1908—.

Office C 57; Res. 6 Park Road.

MARY PIERCE VAN ZILE,

Dean of the Division of Home Economics; Professor of Domestic Science.

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; Member, University of Illinois High School Council, 1905-1908; Professor of Domestic Science, Kansas State Agricultural College, 1908; Dean of Women, ibid., 1908-1913; Dean of the Division of Home Economics, 1913—.

Office L 30; Res. 1322 Fremont St.

LOWELL EDWIN CONRAD, M. S.,

Professor of Civil Engineering.

B. S., Cornell College (Iowa) 1904; C. E., ibid., 1906; M. S., Lehigh University, 1908; 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; Inspector and Instrument Man on Sewer Construction, Centralia, Illinois, 1904; Assistant Engineer on Construction, Gulf Terminus of the Tehuantepec Route, Mexico, 1905-1906; Instructor and Graduate Student in Civil Engineering, Lehigh University, 1906-1908; Assistant Professor of Civil Engineering, Kansas State Agricultural College, 1908-1909; Professor of Civil Engineering, ibid., 1909—.

Office E 32; Res. 317 N. Seventeenth St.

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—.

EDWIN LEE HOLTON,[6] A. B.,

Professor of Education; Director of the Summer School.

Graduate, Indiana State Normal School, 1900; Principal, Township Consolidated Schools, Madison County, Indiana, 1900-1902; A. B., University of Indiana, 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, 1910-1913; Director of the Summer School, ibid., 1910; Professor of Education, ibid., 1913—.
Office A 32; Res. 217 Park Road.

ANDREY ABRAHAM POTTER, S. B.,

Dean of the Division of Mechanic Arts; Director of Engineering Experiment Station; Professor of Steam and Gas Engineering.

S. B., Massachusetts Institute of Technology, 1903; with Experimental Steam Turbine Department, General Electric Company, Schenectady, New York, 1903-1905; Graduate Student, Columbia University, Summer Session, 1908; with General Electric Company, Lynn, Massachusetts, Summer, 1913; Assistant Professor of Mechanical Engineering, Kansas State Agricultural College, 1905-1910; Professor of Steam and Gas Engineering, ibid., 1910—; in Charge of Mechanical Engineering, ibid., 1910—; Acting Dean of the Division of Engineering, and Acting Director of Engineering Experiment Station, ibid., 1913 - April, 1914; Dean of the Division of Mechanic Arts, and Director of the Engineering Experiment Station, April, 1914—.
Office E 30; Res. 1328 Fremont St.

ROY ANDREW SEATON, M. S.,

Professor of Applied Mechanics and Machine Design.

B. S., Kansas State Agricultural College, 1904; M. S., ibid., 1910; Assistant in Mathematics, ibid., 1904-1906; Assistant Professor, ibid., 1906; Graduate Student, University of Wisconsin, Summer, 1908; Instructor in Mechanical Engineering, Kansas State Agricultural College, 1907-1909; Assistant Professor of Mechanical Engineering, ibid., 1909-1910; Graduate Student, Massachusetts Institute of Technology, 1910-1911; S. B., ibid., 1911; in Turbine Drafting Department, General Electric Company, Lynn, Massachusetts, 1911-1912; Professor of Applied Mechanics and Hydraulics, Kansas State Agricultural College, 1910-1914; Professor of Applied Mechanics and Machine Design, ibid., 1914—.
Office S 61; Res. 722 Humboldt St.

WILLIAM M. JARDINE, B. S. A.,

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

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, 1910-1913; Instructor in Field Crops, Graduate School of Agriculture, Michigan Agricultural College, 1912; Acting Dean of the Division of Agriculture, and Acting Director of the Agricultural Experiment Station, Kansas State Agricultural College, January 1 - September 1, 1913; Dean of the Division of Agriculture, and Director of the Agricultural Experiment Station, ibid., 1913—.
Office Ag 34; Res. 1020 Houston St.

JAMES WILLIAM SEARSON,[5] A. M.,

Professor of the English Language.

A. B., University of Nebraska, 1896; Fellow in History, ibid., 1896-1898; A. M., ibid., 1899; Principal, Weeping Water (Nebraska) High School, 1894-1895; Instructor and Lecturer in State and County Teachers' Institutes, 1895—; Superintendent, Wahoo (Nebraska) Schools, 1899-1905; Professor of English and Rhetoric, Nebraska State Normal School (Peru), 1905-1910; Lecturer in Summer School, University of Utah, 1914; Associate Professor of English, Kansas State Agricultural College, 1910-1911; Professor of the English Language, ibid., 1911—.
Office K 27; Res. 1320 Fremont St.

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5. Absent on leave, March 25, 1916, to March 25, 1917.

6. Absent on leave, year 1916-1917.

OLLIE EZEKIEL REED, M. S.,

Professor of Dairy Husbandry.

B. S. in Agriculture, University of Missouri, 1908; M. S., ibid., 1910; Assistant in Dairy Husbandry, ibid., 1908-1909; Instructor in Milk Production, Purdue University, 1909-1910; 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. 321 N. Sixteenth 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. 319 N. Sixteenth St.

ARTHUR BOURNE SMITH, PH. B., B. L. S.,

Librarian.

Ph. B., Wesleyan University, 1900; B. L. S., University of Illinois, 1902; 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; Library Assistant, University of Illinois, 1900-1902; Assistant Editor, *Cumulative Book Index United States Catalogue, and Reader's 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 Accession 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. R. F. D. 2.

WILLIAM ADAMS LIPPINCOTT,[6] A. B., B. S.,

Professor of Poultry Husbandry.

A. B., Illinois College, 1903; B. S., Iowa State College, 1911; Secretary, Young Men's Christian Association, Chicago, 1903-1904; Student, Chicago Theological Seminary, 1904-1906; Poultry Farming, 1906; Student, Cornell University, 1906-1907; Superintendent of Pountry 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; Assistant Professor of Animal Husbandry, in Charge of Poultry, ibid., 1911; President, Kansas Branch of American Poultry Association, 1913-1914; Professor of Poultry Husbandry, Kansas State Agricultural College, 1912—.
Office Ag 38; Res. 321 N. Eighteenth St.

WILBER ANDREW COCHEL, A. B., B. S.,

Professor of Animal Husbandry.

A. B., University of Missouri, 1897; B. S., ibid., 1905; Assistant in Agronomy Department, St. Louis World's Fair, 1903; in Charge of Holsteins in Dairy Test, ibid., 1904; Fellow 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 Ag 8; Res. 209 N. Fourteenth St.

LELAND DAVID BUSHNELL,[2] B. S.,

Professor 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., 1911-1912; Professor of Bacteriology, ibid., 1912—.
Office V 54; Res. 1414 Humboldt St.

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2. Absent on leave, year 1915-1916.

6. Absent on leave, year 1916-1917.

BESSIE WEBB BIRDSALL,

Professor of Domestic Art.

Student, Drexel Institute, Philadelphia, Pennsylvania, 1900-1901; Instructor in Domestic Art, Hill School, Florence, Massachusetts, 1901-1902; Graduate, Normal Domestic Art Course, Drexel Institute, 1903; Head of Department of Domestic Art, Winthrop State Normal and Industrial College, Rock Hill, South Carolina, 1903-1912; Instructor in Domestic Art, Vacation School, Buffalo, New York, Summer, 1906; Graduate Student, Teachers' College, Columbia University, Summers, 1911, 1912; Professor of Domestic Art, Kansas State Agricultural College, 1912—.

Office L 55; Res. 1205 Bluemont Ave.

ROY ALISON HILL,[3] Second Lieutenant, Seventh United States Infantry,

Professor of Military Science and Tactics; Commandant of Cadets.

Cadet, United States Military Academy, 1904-1908; Second Lieutenant, Seventh United States Infantry, 1908—; Professor of Military Science and Tactics, Commandant of Cadets, Kansas State Agricultural College, February 15, 1913-1915.

Office N 27; Res. 113 S. Eighth St.

LELAND EVERETT CALL, M. S.,

Professor of Agronomy.

B. S. (Agr.), Ohio State University, 1906; M. S., ibid., 1912; 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., 1911-1913; Graduate Student, Ohio State University, 1912; Professor of Agronomy, Kansas State Agricultural College, 1913—.

Office Ag 58; Res. 225 N. Fourteenth St.

GEORGE ADAM DEAN, M. S.,

Professor of Entomology.

B. S., Kansas State Agricultural College, 1895; M. S., ibid., 1905; State Teacher's Certificate, Kansas State Normal School, 1898; Principal, Highland Park (Topeka) Public School, 1898-1902; Assistant in Entomology, Kansas State Agricultural College, 1902-1905; Instructor in Entomology, ibid., 1905-1907; Assistant Professor of Entomology, ibid., 1907-1912; Associate Professor of Entomology, ibid., 1912-1913; Professor of Entomology, ibid., 1913—.

Office F 52; Res. 327 N. Seventeenth St.

ROBERT KIRKLAND NABOURS, PH. D.,

Professor of Zoölogy; Curator of the Natural History Museum.

Ed. B., School of Education, University of Chicago, 1905; Ph. D., ibid., 1911; 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; Assistant Professor of Zoölogy, Kansas State Agricultural College, 1911-1913; Professor of Zoölogy, ibid., 1913—.

Office F 54; Res. 303 N. Sixteenth St.

LEONARD WHITTLESEY GOSS, D. V. M.,

Professor of Pathology.

D. V. M., Ohio State University, 1905; Assistant in Veterinary Science, Kansas State Agricultural College, 1905-1907; Graduate Student, University of Michigan, Summer, 1906; Instructor in Veterinary Science, Kansas State Agricultural College, 1907-1909; Graduate Student, Tieraerztliche Hochschule, Berlin, Germany, 1911-1912; Graduate Student, University of Berlin, 1912; Assistant Professor of Veterinary Medicine, Kansas State Agricultural College, 1909-1913; Professor of Pathology, ibid., December 1, 1913—.

Office V 58; Res. 723 Houston St.

RALPH RALPH DYKSTRA, D. V. M.,

Professor of Surgery.

D. V. M., Iowa State College, 1905; Registered Pharmacist in Iowa, 1900; 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, 1911-1913; Professor of Surgery, ibid., December 1, 1913—.

Office V 31; Res. 607 Houston St.

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3. Detail expired, October, 1915.

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

Professor of Highway Engineering; State Engineer, Division of College Extension.

B. S. in C. E., University of Missouri, 1907; Student, Bucknell University, 1899-1902; Chainman, United States Coal and Coke Company (West Virginia); Transitman, Pennsylvania Railroad Company (Pennsylvania) and Pere Marquette Railroad Company (Michigan); Assistant Engineer, Chicago and Alton Railroad Company (Missouri); Assistant State Highway Engineer, Illinois State Highway Commission; Highway Engineer, Division of College Extension, Kansas State Agricultural College, 1909-1911; State Engineer, ibid., 1911—; Professor of Highway Engineering, ibid., 1914—.

Office A 36; Res. 1010 Vattier St.

MARGARET HELEN HAGGART, A. M.,

Professor of Domestic Science.

B. S., Kansas State Agricultural College, 1905; A. M., Columbia University, 1914; Instructor, Topeka Public Schools, 1897-1903; Instructor, Private School of Domestic Science, Topeka, 1905-1906; Pupil Dietitian, Johns Hopkins Hospital, 1906; Professor of Home Economics, New Mexico College of Agriculture and Mechanic Arts, 1906-1910; Instructor in Dietetics, Johns Hopkins Hospital, 1910-1911; Instructor in Home Economics, Colorado Agricultural College, 1911-1913; Diploma in the Teaching of Household Arts, Teachers' College, Columbia University, 1914; Professor of Domestic Science, Kansas State Agricultural College, 1914—.

Office L 43; Res. 1645 Fairchild Ave.

CLARENCE ERLE REID, B. S. in E. E.,

Professor of Electrical Engineering.

B. S. in E. E., Purdue University, 1902; Student, Rose Polytechnic Institute, 1894-1896; Instructor in Indiana Public Schools, 1896-1898; Principal, Star City (Indiana) High School, 1898-1900; in Testing Department, Bullock Electrical Manufacturing Company, Summer, 1901; Instructor in Electrical Engineering, Purdue University, 1902-1903; Research Assistant, Laboratory of National Bureau of Standards, Washington, D. C., 1903-1905; Instructor in Electrical Engineering, George Washington University, 1904-1905; Assistant Professor of Electrical Engineering, Case School of Applied Science, 1905-1909; Professor of Electrical Engineering, Mississippi Agricultural and Mechanical College, 1909-1914; Professor of Electrical Engineering, Kansas State Agricultural College, 1914—.

Office C 33; Res. 421 N. Sixteenth St.

EDWARD NORRIS WENTWORTH, M. S.,

Professor of Animal Breeding.

B. S. A., Iowa State College, 1907; M. S., ibid., 1909; Fellow in Animal Husbandry, ibid., 1907; Instructor in Animal Husbandry, ibid., 1908; Assistant Professor of Animal Husbandry, ibid., 1909-1910; Associate Professor of Animal Husbandry, ibid., 1911-1913; Assistant Superintendent of Cattle, Iowa State Fair, 1904-1912; Associate Editor, *Breeders' Gazette,* 1913-1914; Professor of Animal Breeding, Kansas State Agricultural College, 1914—.

Office Ag 15 A; Res. 1421 Humboldt St.

FRANCES LANGDON BROWN, A. B., B. S.,

Director of Home Economics, Division of College Extension.

B. S., Kansas State Agricultural College, 1909; A. B., Kansas State Normal School, 1913; Graduate, Kansas State Normal School, 1898 and 1906; Instructor, Smith Center Public Schools, 1898-1899; Instructor, Madison City Schools, 1899-1900; Instructor, Shorey Public Schools, 1901-1902; Instructor, Topeka City Schools, 1902-1908; Student, State Manual Training Normal School, 1908; Lecturer on Domestic Science, Division of College Extension, Kansas State Agricultural College, 1909-1914; Director of Home Economics, Division of College Extension, ibid., 1914—.

Office A 35; Res. 514 N. Ninth St.

EDWARD CARL JOHNSON, A. M.,

Dean of the Division and Superintendent of Institutes and Demonstrations, Division of College Extension.

A. B., University of Minnesota, 1906; Student Assistant in Botany, ibid., 1905-1906; Instructor in Botany, ibid., 1906-1907; A. M., ibid., 1907; Assistant Plant Pathologist, United States Department of Agriculture, 1907; Plant Pathologist, in Charge of Cereal Disease Work, ibid., 1908-1912; Graduate Student, George Washington University, 1910-1911; Superintendent of Institutes and Demonstrations, Division of College Extension, Kansas State Agricultural College, 1912—; Dean of Division of College Extension, ibid., 1915—.

Office A 33; Res. 4 Park Road.

MICHAEL FRANCIS AHEARN, M. S.,

Professor of Landscape Gardening.

B. S., Massachusetts Agricultural College, 1904; M. S., Kansas State Agricultural College, 1913; Assistant in Horticulture, ibid., 1904-1909; Head Coach in Athletics, ibid., 1905-1911; Instructor in Horticulture, ibid., 1909-1911; Assistant Professor of Floriculture, ibid., 1911-1913; Associate Professor of Horticulture, ibid., 1913-1915; Professor of Landscape Gardening, ibid., 1915—.

Office H 32; Res. 507 Laramie St.

NELSON ANTRIM CRAWFORD, JR., A. M.,

Professor of Industrial Journalism; Superintendent of Printing.

A. B., State University of Iowa, 1910; A. M., University of Kansas, 1914; in Newspaper Work, 1906-1909; Undergraduate Assistant in English, State University of Iowa, 1909-1910; Graduate Student, University of Kansas, 1913-1914; Assistant in English, Kansas State Agricultural College, 1910-1911; Assistant in the English Language, ibid., 1911-1912; Instructor in the English Language, ibid., 1912-1913; President, Kansas Association of Teachers of English, 1913-1914; Instructor, Kansas Teachers' Institutes, 1912—; Assistant Professor of the English Language, Kansas State Agricultural College, 1913-1915; in Charge of Industrial Journalism, ibid., April 1, 1914-1915; Superintendent of Printing, ibid., July 1, 1915—; Professor of Industrial Journalism, ibid., 1915—.

Office K 52; Res. 221 N. Juliette Ave.

JOHN RHEINOLD BENDER, A. M., LL. B.,

Head Coach and Director of Intercollegiate Athletics.

A. B., University of Nebraska, 1905; Physical and Athletic Director, Spearfish (South Dakota) State Normal School, 1905-1906; Graduate Physical Director, Chautauqua Lake (New York) School of Physical Education, 1906; Physical and Athletic Director, Washington State College, 1906-1908; A. M., ibid., 1907; Basket Ball Coach, Spokane (Washington) Athletic Club, 1908-1909; Graduate Student, University of Chicago, Summer, 1909; Physical and Athletic Director, Haskell Institute, 1909-1910; Admission to the Bar, State of Missouri, 1912; Athletic Director and Graduate Manager of Associated Student Activities, Washington State College, 1912-1915; Graduate, Summer School for Athletic Coaches, University of Illinois, 1915; Head Coach and Director of Intercollegiate Athletics, Kansas State Agricultural College, 1915—.

Office N 34; Res. 609 N. Ninth St.

WILLIAM ALONZO ETHERTON, M. ARCH.,

Professor of Rural Architecture.

B. S. in Architectural Engineering, University of Illinois, 1904; M. Arch., ibid., 1914; Graduate, Southern Illinois State Normal School, 1897; Superintendent, Carterville (Illinois) City Schools, 1897-1900; Contractors' Superintendent on Government Buildings, 1905-1908; Architect for Oklahoma State Board of Agriculture, and Professor of Architectural Engineering, Oklahoma Agricultural and Mechanical College, 1908-1911; Student, Massachusetts Institute of Technology, 1912; Architect in Charge of Farm Structures, United States Department of Agriculture, 1913-1915; Professor of Rural Architecture, Kansas State Agricultural College, 1915—.

Office E 58; Res. 512 N. Ninth St.

LAURANCE OLDHAM MATHEWS, First Lieutenant Fourth U. S. Infantry,

Professor of Military Science and Tactics; Commandant of Cadets.

Student, Kentucky State College, 1895-1896; Student, Bordentown Military Institute, 1896-1897; Instructor, United States Army Post Schools, Fort Leavenworth, 1900-1901; Second Lieutenant, Twenty-eighth United States Infantry, February, 1901 - May, 1906; First Lieutenant, Sixth United States Infantry, May to September, 1906; First Lieutenant, Second United States Infantry, September, 1906 - September, 1915; First Lieutenant, Fourth United States Infantry, 1915—; Professor of Military Science and Tactics and Commandant of Cadets, Kansas State Agricultural College, 1915—.

Office N 29; Res. 325 Leavenworth St.

ARTHUR EDGAR WESBROOK, A. B., B. MUS.,

Director of Music; Professor of Voice.

A. B., Albion College, 1910; B. Mus., ibid., 1911; Organizer and Conductor of Choral Society and Teacher of Vocal Music, Boise, Idaho, 1911-1914; Vice Pupil of Jans Helder, Chicago, Summer, 1912; Voice Pupil of Lemuel Kilby, Chicago, Summer, 1913; Voice Pupil of Chas. H. Bennett, Boston, Massachusetts, 1914; Pupil in Conducting, with Wallace Goodrich, ibid., 1914; Instrumentation Pupil of Louis Elson, ibid., 1914; Voice Pupil of Thomas N. MacBurney, Chicago, 1915; Pupil in Coaching, with Sidney Arno Dietrich, ibid., 1915; Director of Music and Professor of Voice, Kansas State Agricultural College, 1915—.

Office M 30; Res. 1719 Laramie St.

JOHN ROBERTSON MACARTHUR, PH. D.,

Professor of the English Language.

A. B., University of Manitoba, 1892; Graduate Student, ibid., 1892-1893; Instructor in Modern Languages, Manitoba College, 1893-1897; Acting Professor of French, ibid., 1897-1898; Graduate Student, University of Chicago, 1899-1903; Ph. D., ibid., 1903; Professor of English, New Mexico Agricultural College, 1903-1910; Agent of International Committee, Young Men's Christian Association, Ellis Island, New York, 1910-1911; Dean of the College, New Mexico Agricultural College, 1911-1913; Professor of English, ibid., 1911-1913; Educational Secretary, Young Men's Christian Association, Sacramento, California, 1913-1914; Associate Professor of the English Language, Kansas State Agricultural College, 1914 - April 1, 1916; Professor of the English Language, ibid., April 1, 1916—.

Office K 27; Res. 923 Osage St.

ASSOCIATE PROFESSORS

HARRY LLEWELLYN KENT, B. S.,

Principal of School of Agriculture; Associate Professor of Education.

A. B., Kansas State Normal School, 1912; B. S., Kansas State Agricultural College, 1913; 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 School, 1909-1911; Student, Cornell University, Summer, 1910; Director of Instruction by Correspondence, Division of College Extension, Kansas State Agricultural College, 1911-1913; Student, University of Chicago, Summer, 1914; Principal of School of Agriculture, and Associate Professor of Education, Kansas State Agricultural College, 1913—.

Office G 29 and 30; Res. 321 Delaware Ave.

WILLIAM HIDDLESON ANDREWS, A. B.,

Associate Professor of Mathematics.

A. B., University of Chicago, 1900; Principal, Beloit High School, 1897-1898; Superintendent, Blue Rapids City Schools, 1901-1905; Instructor in Mathematics, Leavenworth High School, 1905-1906; Graduate Student, University of Chicago, Summer, 1911; High School Visitor, 1914-1915; Assistant in Mathematics, Kansas State Agricultural College, 1906-1907; Assistant Professor of Mathematics, ibid., 1907 - December 1, 1913, Principal of Subfreshman Department, ibid., 1910-1913; Associate Professor of Mathematics, ibid., December 1, 1913—.

Office A 64; Res. 630 Moro St.

HERBERT HIRAM KING, A. M.,

Associate Professor of Chemistry; Associate Chemist in Engineering Experiment Station.

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, 1909-1914; Associate Professor of Chemistry, ibid., 1914—; Assistant Chemist, Engineering Experiment Station, ibid., 1910-1914; Associate Chemist, Engineering Experiment Station, ibid., 1914—.

Office C 56; Res. 916 Humboldt St.

CHARLES OSCAR SWANSON, M. AGR.,

Associate Professor of Agricultural Chemistry; Associate Chemist in Agricultural Experiment Station.

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, 1906-1914; Associate Chemist in Agricultural Experiment Station, ibid., 1914—; Assistant Professor of Agricultural Chemistry, ibid., 1909-1914; Associate Professor of Agricultural Chemistry, ibid., 1914—.

Office C 6; Res. 931 Bluemont Ave.

HARRY BRUCE WALKER,[4] B. S. in C. E.,

Associate Professor of Irrigation and Drainage Engineering; Drainage and Irrigation Engineer, Division of College Extension.

B. S. in C. E., Iowa State College, 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; Drainage and Irrigation Engineer, Division of College Extension, Kansas State Agricultural College, 1910—; Associate Professor of Irrigation and Drainage Engineering, ibid., 1914—.

Office A 32 C; Res. 1011 Osage St.

ALFRED EVERETT WHITE, M. S.,

Associate Professor of Mathematics.

B. S., Purdue University, 1904; Principal, Lapel (Indiana) High School, 1904-1906; Instructor, Shortridge High School, Indianapolis, Indiana, 1906-1907; Principal, Connersville (Indiana) High School, 1907-1909; Graduate Student, University of Chicago, Summer, 1905; Graduate Student, University of Indiana, Summer, 1908; M. S., Purdue University, 1909; Assistant in Mathematics, Kansas State Agricultural College, 1909-1910; Instructor in Mathematics, ibid., 1910-1912; Assistant Professor of Mathematics, ibid., 1912-1914; Associate Professor of Mathematics, ibid., 1914—.

Office A 72; Res. 1731 Fairchild Ave.

WALTER WILLIAM CARLSON, B. S.,

Associate Professor of Shop Practice; Superintendent of Shops.

B. S., Kansas State Agricultural College, 1908; Apprentice in Machine Shops, ibid., 1903-1904; 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., 1911-1912; Foreman of Machine Shop, ibid., 1910-1912; Superintendent of Shops, ibid., 1912—; Assistant Professor of Shop Methods and Practice, ibid., 1912-1914; Associate Professor of Shop Practice, ibid., 1914—.

Office S 62; Res. 1130 Bluemont Ave.

EDWARD HARTMAN REISNER, PH. D.,

Associate Professor of Education.

B. E., Cumberland Valley State Normal School, Shippensburg, Pennsylvania, 1901; A. B., Yale University, 1908; Larned Fellow, ibid., 1908-1909; A. M., ibid., 1909; Graduate Student, Columbia University, 1909-1911; Ph. D., ibid., 1914; Secretary, National Society for the Promotion of Industrial Education, 1910-1911; Professor of Philosophy and Education, Washburn College, 1911 - November 1, 1913; Assistant Professor of Education, Kansas State Agricultural College, November 1, 1913-1914; Acting Director of the Summer School, ibid., June 15, 1916—; Associate Professor of Education, ibid., 1914—.

Office A 66; Res. 1801 Leavenworth St.

SAMUEL CECIL SALMON, B. S.,

Associate Professor of Farm Crops.

B. S., South Dakota Agricultural and Mechanical College, 1907; Special Agent, United States Department of Agriculture, 1908-1910; Plant Physiologist, ibid., 1911-1913; Assistant Professor of Farm Crops, Kansas State Agricultural College, October 1, 1913-1915; Associate Professor of Farm Crops, ibid., 1915—.

Office Ag 82; Res. 1630 Leavenworth St.

IVOR VICTOR ILES, A. M.,

Associate Professor of 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 Unviersity, 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, 1911-1914; Assistant Professor of History and Civics, ibid., 1914-1915; Associate Professor of History and Civics, ibid., 1915—.

Office F 4; Res. 1621 Anderson Ave.

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4. In coöperation with the United States Department of Agriculture.

JAMES BURGESS FITCH, B. S.,

Associate Professor of Dairy Husbandry.

B. S., Purdue University School of Agriculture, 1910; in Charge of Milk Supply, Children's Aid Association, Indianapolis, Indiana, Summer, 1910; Assistant in Dairy Husbandry, Kansas State Agricultural College, 1910-1912; Instructor in Dairy Husbandry, ibid., 1912-1914; Assistant Professor of Dairy Husbandry, ibid., 1914-1915; Associate Professor of Dairy Husbandry, ibid., 1915—.

Office D 30; Res. 1605 Humboldt St.

HALLAM WALKER DAVIS, A. M.,

Associate Professor of the English Language.

A. B., University of Indiana, 1909; Principal, Poseyville (Indiana) High School, 1905-1907; Superintendent, Fort Branch (Indiana) Public Schools, 1909-1913; Graduate Student, Columbia University, Summers, 1910-1913; A. M., ibid., 1913; Instructor in the English Language, Kansas State Agricultural College, 1913-1914; Assistant Professor of the English Language, ibid., 1914-1915; Associate Professor of the English Language, ibid., 1915—.

Office A 53; Res. 532 N. Fourteenth St.

GEORGE KELLER HELDER,[1]

Superintendent, Fort Hays Branch Agricultural 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 - January 1, 1913; Superintendent, ibid., January 1, 1913 - April 15, 1916.

GEORGE SHERWOOD HINE, B. S. A.,

State Dairy Commissioner.

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, 1910-1912; State Dairy Commissioner, 1912—.

Office X 26; Res. 307 N. Sixteenth St.

WALTER HORACE BURR,

Director of Rural Service, Division of College Extension.

Student, Knox College, Galesburg, Illinois, 1897-1902; Student, University of California, 1904-1905; Student, Pacific Theological Seminary, 1904-1905; Instructor in Expression, ibid., 1904-1905; Assistant Director of Rural Service, Division of College Extension, Kansas State Agricultural College, May 15, 1914-1915; Director of Rural Service, Division of College Extension, ibid., July 1, 1915—.

Office A 37; Res. 105 S. Juliette Ave.

CHARLES ROZELL WEEKS, B. S., B. ED.,

Superintendent, Fort Hays Branch Agricultural Experiment Station.

B. S., University of Nebraska, 1907; B. Ed., Peru (Nebraska) State Normal School, 1912; Rural School Teacher, 1897-1900; High School Principal, 1902-1905; Student Assistant in Dairy Husbandry, University of Nebraska, 1906-1907; Superintendent, Fairmont (Nebraska) City Schools, 1907-1909; Professor of Agriculture, Peru (Nebraska) State Normal School, 1909-1912; Instructor in Agriculture, Nebraska Normal Institutes, Summers, 1910-1912; Professor of Agriculture, Farm Inspector, and Director of Extension Work, Winthrop Normal and Industrial College, Rock Hill, South Carolina, 1912-1916; Superintendent, Fort Hays Branch Agricultural Experiment Station, Kansas State Agricultural College, March 15, 1916—.

Office and Res. Hays, Kansas.

1. Resigned.

ASSISTANT PROFESSORS

ROBERT HENRY BROWN, B. M.,

Assistant Professor of Music; Conductor of Orchestra.

B. M., Kansas Conservatory of Music, 1893; B. S., Kansas State Agricultural College, 1898; Graduate Student in Violin, with Bernard Listemann, 1898; Graduate Student in Violin, with Herbert Butler, Chicago, 1899; Graduate Student in Organ and Theory, with Dr. Louis Falk, Arthur Dunham, and Edward Kreiser, 1898-1899; Graduate Student in Conducting and Instrumentation, with Adolph Weidig, 1899; Instructor in Violin and Band Instruments, Kansas State Agricultural College, 1900-1905; Assistant Professor of Music and Conductor of Orchestra, ibid., 1905—.

Office M 29; Res. 331 N. Seventeenth St.

GEORGE EBEN BRAY, M. E.,

Industrial Engineer, Division of College Extension.

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., 1910-1912; Industrial Engineer, Division of College Extension, ibid., 1912—.

Office A 5; Res. 817 Osage St.

WILMER ESLA DAVIS, A. B.,

Assistant Professor of Botany.

A. B., University of Illinois, 1903; Graduate, Ohio Normal University, 1894; Public School Work, 1894-1900; 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. 1209 Vattier St.

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; Graduate Student, University of Michigan, Summer, 1910; Assistant Professor of Veterinary Medicine, Kansas State Agricultural College, 1910.

Office V 32; Res. 800 Poyntz Ave.

CHARLES WILBUR McCAMPBELL, B. S., D. V. M.,

Assistant Professor of Animal Husbandry.

B. S., Kansas State Agricultural College, 1906; Graduate Student, ibid., 1906-1907; D. V. M., ibid., 1910; Assistant in Animal Husbandry, ibid., 1910-1912; Secretary, Kansas State Live Stock Registry Board, 1912—; Assistant Professor of Animal Husbandry, Kansas State Agricultural College, 1912—.

Office Ag 5; Res. 800 Laramie St.

GEORGE OGDEN GREENE, M. S.,

Specialist in Horticulture, Division of College Extension.

B. S., Kansas State Agricultural College, 1900; Assistant in Horticulture. ibid., 1901-1903; M. S., ibid., 1902; Assistant in Horticulture, Massachusetts Agricultural College, 1903-1905; with Worley and Greene, Merchants, 1905-1910; Specialist in Horticulture, Division of College Extension, Kansas State Agricultural College, 1912—.

Office A 36; Res. 915 Fremont St.

ALVIN SCOTT NEALE, B. S. A.,

Assistant Superintendent of Institutes and Specialist in Dairy Husbandry, Division of College Extension.

B. S. A., Ohio State University, 1904; Superintendent of Farm, ibid., 1903-1904; Agricultural Correspondent, Scripps-McRea League of Newspapers, 1904-1907; Dairy Lecturer, Agricultural Extension Department, Ohio State University, 1908-1913; Specialist in Dairy Husbandry, Division of College Extension, Kansas State Agricultural College, January 1, 1913—; Assistant Superintendent of Farmers' Institutes, Division of College Extension, ibid., 1913—.

Office A 34; Res. 1646 Fairchild Ave.

PORTER JOSEPH NEWMAN, M. S.,

Assistant Professor of Chemistry.

B. S., Franklin College, 1908; M. S., ibid., 1910; Assistant in Chemistry, ibid., 1907-1908; Assistant Chemist, Indianapolis Board of Health, 1907-1908; Graduate Student, University of Chicago, Summers, 1909, and 1915; Assistant in Chemistry, Kansas State Agricultural College, 1909-1910; Instructor in Chemistry, ibid., 1910-1913; Assistant Professor of Chemistry, Kansas State Agricultural College, 1913—.

Office C 64; Res. 914 Leavenworth St.

JOSIAH SIMSON HUGHES, M. S.,

Assistant Professor of Chemistry.

B. S., Ohio Wesleyan University, 1908; M. S., ibid., 1909; Instructor, ibid., 1908-1909; Fellow, Ohio State University, 1909-1910; A. M., ibid., 1910; Assistant in Chemistry, Kansas State Agricultural College, 1910-1912; Instructor in Chemistry, ibid., 1912-1913; Assistant Professor of Chemistry, ibid., 1913—.

Office C 41; Res. 607 Vattier St.

GRACE EMILY DERBY, A. B.,

Assistant 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, 1911-1913; Assistant Librarian, ibid., 1913—.

Office F 32; Res. 1633 Fairchild Ave.

RAY IAMS THROCKMORTON, B. S.,

Assistant Professor of Soils.

B. S., Pennsylvania State College, 1911; Assistant in Soil Survey (in coöperation with the United States Department of Agriculture), Kansas State Agricultural College, July, 1911-1912; Assistant in Soils, ibid., February, 1912-1913; Assistant Professor of Soils, ibid., 1913—.

Office Ag 60; Res. 1615 Anderson Ave.

JAMES EDWARD ACKERT, PH. D.,

Assistant Professor of Zoölogy; Parasitologist in Agricultural Experiment Station.

A. B., University of Illinois, 1909; A. M., ibid., 1911; Ph. D., ibid., 1913; Graduate, Northern Illinois State Normal School, 1903; Principal, Algonquin (Illinois) High School, 1903-1907; Graduate Assistant in Zoölogy, University of Illinois, 1909-1911; Fellow in Zoölogy, ibid., 1911-1913; Graduate Student, University of Illinois, Summer, 1910; Graduate Student, Biological Station of University of Colorado, Tolland, Colorado, Summer, 1910; Graduate Student (Collector), Marine Biological Station, San Diego, California, Summer, 1911; Professor of Vertebrate Zoölogy and Physiology, Illinois State Normal University, Summer, 1913; Instructor in Zoölogy, University of Washington (one month), 1913; Assistant Professor of Zoölogy, and Parasitologist in Agricultural Experiment Station, Kansas State Agricultural College, 1913—.

Office F 58; Res. 1422 Poyntz Ave.

HOWARD W. BRUBAKER, PH. D.,

Assistant Professor of Chemistry.

B. S., Carleton College, 1899; Ph. D., University of Pennsylvania, 1904; Professor of Chemistry, Whitman College, 1904-1911; Honorary Fellow, Cornell University, 1911-1912; Instructor in Physical Chemistry and Electrochemistry, Carnegie Institute of Technology, 1912-1913; Assistant Professor of Chemistry, Kansas State Agricultural College, 1913—.

Office W 27; Res. 1116 Fremont St.

JOHN WALTER GOOD, PH. D.,

Assistant Professor of English Literature.

A. B., Erskine College, Duewest, South Carolina, 1902; A. M., ibid., 1904; Ph. D., University of Illinois, 1913; Graduate, Erskine Theological Seminary, 1904; Graduate, Pittsburg (Pennsylvania) Theological Seminary, 1905; Pastor, First United Presbyterian Church, Corsicana, Texas, 1905-1906; Pastor, United Presbyterian Church, Birmingham, Michigan, 1906-1908; Superintendent of Public Schools, Albion, Illinois, 1908-1910; Scholar and Fellow in Graduate School, University of Illinois, 1910-1913; Assistant Professor of English Literature, Kansas State Agricultural College, 1913—.

Office A 58; Res. 807 Osage St.

INA FOOTE COWLES,[2] B. S.,

Assistant Professor of 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; Graduate Student, Stout Institute, Menomonie, Wisconsin, Summer, 1913; Instructor in Domestic Art, Kansas State Agricultural College, 1909-1914; Assistant Professor of Domestic Art, ibid., 1914—.

Office L 56; Res. 1026 Houston St.

RAYMOND GARFIELD TAYLOR,[6] A. M.,

Assistant Professor of History and Civics.

A. B., University of Kansas, 1907; A. M., University of Chicago, 1915; Student in Law Office, Summers, 1905-1908; Principal and Instructor in History, Hiawatha High School, 1907-1910; Graduate Student, University of Kansas, Summer, 1909; Graduate Student, University of Chicago, Summers, 1911, 1914, and 1915; Instructor in History and Civics, Kansas State Agricultural College, 1910-1914; Assistant Professor of History and Civics, ibid., 1914—.

Office F 4; Res. 1610 Leavenworth St.

EUSTACE VIVIAN FLOYD, B. S.,

Assistant Professor of Physics.

B. S., 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, 1911-1914; Assistant Professor of Physics, ibid., 1914—.

Office C 57; Res. 514 N. Manhattan Ave.

HARRISON ELEAZER PORTER, B. S.,

Assistant Professor of Mathematics.

B. S., Kansas State Agricultural College, 1907; with Engineering Department, Santa Fe Railway, Summer, 1907; Graduate Student, Harvard University, Summer, 1910; Graduate Student, Columbia University, Summer, 1911; Assistant in Mathematics, Kansas State Agricultural College, 1908-1912; Instructor in Mathematics, ibid., 1912-1914; Assistant Professor of Mathematics, ibid., 1914—.

Office A 70; Res. 1024 Houston St.

WILLIAM TIMOTHY STRATTON, A. M.,

Assistant Professor of Mathematics.

A. B., University of Indiana, 1906; A. M., University of Indiana, 1913; Superintendent, Oneida (Illinois) Public Schools, 1906-1907; Principal, McCray-Dewey Academy, Troy, Illinois, 1907-1910; Instructor, Kansas Teachers' Institutes, 1911-1913; Assistant in Mathematics, Kansas State Agricultural College, 1910-1912; Instructor in Mathematics, Kansas State Agricultural College, 1912-1914; Assistant Professor of Mathematics, ibid., 1914—.

Office G 33; Res. 1020 Vattier St.

OLIVER WILLIAM HUNTER, M. S.,

Assistant Professor of Bacteriology.

B. S., Kansas State Agricultural College, 1909; M. S., University of Wisconsin, 1911; Student Assistant and Graduate Student in Bacteriology, ibid., 1909-1910; Assistant in Bacteriology, Kansas State Agricultural College, 1911-1912; Instructor in Bacteriology, ibid., 1912-1914; Assistant Professor of Bacteriology, ibid., 1914—.

Office V 52; Res. 901 Osage St.

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2. Absent on leave, year 1915-1916.

6. Absent on leave, year 1916-1917.

MARY THERESA HARMAN, PH. D.,

Assistant Professor of Zoölogy.

A. B., University of Indiana, 1907; A. M., ibid., 1909; Ph. D., ibid., 1912; Student Assistant in Botany and Zoölogy, Indiana State Normal School, 1903-1904; Graduate, ibid., 1904; Teaching Fellow, Biological Station, University of Indiana, Summer, 1905; Instructor in Embryology and Histology, ibid., Summers, 1906-1909, 1911, 1912; Instructor in Zoölogy, Pennsylvania State College, 1907-1910; Teaching Fellow in Zoölogy, University of Indiana, 1910-1912; Instructor in Zoölogy, Kansas State Agricultural College, 1912-1914; Assistant Professor of Zoölogy, ibid., 1914—.
Office F 61; Res. 1408 Fairchild Ave.

CLAUDE M. VESTAL, B. S. A.,

Assistant Professor of Animal Husbandry.

B. S. A., Purdue University, 1911; Assistant in Agricultural Extension, ibid., 1911-1912; Instructor in Animal Husbandry, Kansas State Agricultural College, 1912-1914; Assistant Professor of Animal Husbandry, ibid., 1914—.
Office Ag 7; Res. 1809 Leavenworth St.

PAUL SMITH WELCH, PH. D.,

Assistant Professor of Entomology.

A. B., James Millikin University, 1910; A. M., University of Illinois, 1911; Ph. D., ibid., 1913; Assistant in Biology, James Millikin University, 1909-1910; Assistant Curator, William Barnes Lepidoptera Collection, 1906-1910; Fellow in Zoölogy, University of Illinois, 1911-1913; Instructor in Entomology, University of Michigan Biological Station, Summers, 1911, 1912, and 1913; Instructor in Entomology, and Assistant Entomologist in Agricultural Experiment Station, Kansas State Agricultural College, 1913-1914; Assistant Professor of Entomology, ibid., 1914—.
Office F 64; Res. 1621 Anderson Ave.

THOMAS POWELL HASLAM, M. S.,

Assistant Professor of Veterinary Medicine.

B. S., Kansas State Agricultural College, 1908; M. S., ibid., 1910; Assistant Instructor in Chemistry, University of Kansas, 1908-1909; Assistant in Veterinary Medicine, Agricultural Experiment Station, Kansas State Agricultural College, 1909-1914; Assistant Professor of Veterinary Medicine, ibid., 1914—.
Office V 2; Res. 623 N. Manhattan Ave.

GEORGE ELLSWORTH RABURN, M. S.,

Assistant Professor of Physics.

A. B., University of Michigan, 1907; M. S., ibid., 1913; Graduate, Kansas State Normal School, 1905; Graduate Student, University of Michigan, 1912-1913; Assistant in Physics, Kansas State Agricultural College, 1910-1914; Assistant Professor of Physics, ibid., 1914—.
Office C 61; Res. 1014 Bluemont Ave.

EDGAR LEMUEL TAGUE, A. M.,

Assistant Professor in Chemistry; Assistant in Protein Chemistry, Agricultural Experiment Station.

A. B., University of Kansas, 1908; A. M., ibid., 1909; Research Fellow in Chemistry, ibid., 1909-1910; Assistant Professor of Chemistry, ibid., 1910-1911; Professor of Chemistry, Washburn College, 1911-1914; Assistant Professor of Chemistry, Agricultural Experiment Station, Kansas State Agricultural College, 1914—.
Office C 3; Res. one block west of Campus.

WALDO ERNEST GRIMES, B. S.,

Assistant Professor of Farm Management.

B. S., Kansas State Agricultural College, 1913; Farm Foreman, ibid., 1913-1914; Graduate Student, Cornell University, Fall, 1914; Assistant Professor of Farm Management, Kansas State Agricultural College, January 1, 1915—.
Office Ag 60; Res. 1729 Fairchild Ave.

HARRY UMBERGER, B. S.,

Supervisor of Demonstrations, Division of College Extension.

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., 1907-1911; Assistant Professor in Charge of Coöperative Experiments, Kansas State Agricultural College, 1911-1912; Farmer, Chase County, Kansas, 1912-1915; Supervisor of Demonstrations, Division of College Extension, Kansas State Agricultural College, 1915—.

Office A 33; Res. 617 Houston St.

ADA RICE, M. S.,

Assistant Professor of the English Language; Assistant Principal of School of Agriculture.

B. S., Kansas State Agricultural College, 1895; Assistant in English, ibid., 1889-1905; 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; M. S., ibid., 1912; Instructor in the English Language, ibid., 1911-1915; Assistant Professor of the English Language, ibid., 1915—; Assistant Principal of the School of Agriculture, ibid., 1913—.

Office G 28; Res. 917 Osage St.

ESTELLA MAY BOOT, A. M.,

Assistant Professor of the English Language.

A. B., University of South Dakota, 1901; A. M., Northwestern University, 1909; Teacher in Public Schools, Hartley, Iowa, 1897-1898; Assistant in English and Latin, Cherokee (Iowa) High School, 1901-1906; Principal, ibid., 1906-1908; Graduate Student, State University of Iowa, Summers, 1905 and 1915; Instructor in Summer School and Institute, Cherokee County, Iowa, 1907-1908; Assistant in English, Kansas State Agricultural College, 1909-1911; Graduate Student, Columbia University, Summers, 1912 and 1913; Instructor in English, Kirksville (Missouri) State Normal School, Summer, 1914; Instructor in the English Language, Kansas State Agricultural College, 1911-1915; Assistant Professor of the English Language, ibid., 1915—.

Office K 58; Res. 910 Fremont St.

EDWIN CYRUS MILLER, PH. D.,

Assistant Professor of Botany.

A. B., Lebanon College, 1906; A. B., Yale University, 1907; Ph. D., ibid., 1910; Graduate Student, ibid., 1907-1910; Assistant in Botany, Kansas State Agricultural College, 1910-1911; Instructor in Botany, ibid., 1911-1915; Assistant Professor of Botany, ibid., 1915—.

Office H 56; Res. 830 Osage St.

ELDEN VALORIUS JAMES, A. M.,

Assistant Professor of History and Civics.

A. B., Marietta College, 1901; A. M., ibid., 1908; Principal, Caywood (Ohio) Public Schools, 1895-1897 and 1901-1902; 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; Instructor in History, Marietta College, Summers, 1902, 1903, 1908, 1910; 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, Barber County Normal Institute, 1912; Instructor in History and Civics, Kansas State Agricultural College, 1912-1915; Assistant Professor of History and Civics, ibid., 1915—.

Office F 1; Res. 621 Humboldt St.

JOSEPH HENRY MERRILL, PH. D.,

Assistant Professor of Entomology; Assistant Entomologist, Agricultural Experiment Station.

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; Ph. D., Massachusetts Agricultural College, 1914; Assistant Entomologist, Agricultural Experiment Station, Kansas State Agricultural College, 1912—; Instructor in Entomology, ibid., 1912-1915; Assistant Professor of Entomology, ibid., 1915—.

Office F 55; Res. 626 Moro St.

PERRY JOHN FREEMAN, B. S.,

Assistant Professor of Applied Mechanics and Machine Design.

B. S. in M. E., University of Illinois, 1907; Instructor in Mechanical Engineering, University of Pennsylvania, 1907-1910; Instructor in Machine Construction, and in Charge of Mechanical Engineering Department Shop Laboratories, University of Illinois, 1910-1912; Foreman and Assistant Manager in the Regulator Department, H. Mueller Manufacturing Company, Decatur, Illinois, 1912; Erector of Locomotive Cranes, Browning Engineering Company, Cleveland, Ohio, 1912; Mechanical Engineer, Gullett Cotton Gin Company, Amite, Louisiana, 1913-1914; Instructor in Applied Mechanics, Kansas State Agricultural College, February 1, 1914-1915; Assistant Professor of Applied Mechanics and Machine Design, ibid., 1915—.

Office E 8A; Res. 1610 Fairview Ave.

SIEBELT LUKE SIMMERING, M. S.,

Assistant Professor of Steam and Gas Engineering.

B. S., University of Colorado, 1910; M. S., University of Illinois, 1913; Student Assistant in Physics, University of Colorado, 1908-1909; Assistant Instructor in Shop Practice, ibid., 1909-1910; Instructor and Graduate Student of Mechanical Engineering, ibid., 1910-1912; Graduate Fellow in Mechanical Engineering, University of Illinois, 1912-1913; Instructor in Industrial Engineering, Pennsylvania State College, 1913-1914; Instructor in Steam and Gas Engineering, Kansas State Agricultural College, March 11, 1914-1915; Assistant Professor of Steam and Gas Engineering, ibid., 1915—.

Office S 55; Res. 106 S. Manhattan Ave.

FORREST FAYE FRAZIER, C. E.,

Assistant Professor of Civil Engineering.

C. E., Ohio State University, 1910; Student, Liberal Arts, Miami University, 1905-1907; Student, Engineering Course, Ohio State University, 1907-1910; 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, 1911-1914; Instructor in Civil Engineering, ibid., 1914-1915; Assistant Professor of Civil Engineering, ibid., 1915—.

Office E 55; Res. 915 Fremont St.

DAVID ERNEST LEWIS,[1] B. S.,

Assistant Professor of Horticulture.

B. S., Kansas State Agricultural College, 1910; Graduate Student, ibid., 1910-1911; Assistant in Horticulture, ibid., 1911-1914; Instructor in Horticulture, ibid., 1914-1915; Assistant Professor of Horticulture, ibid., 1915 - March 15, 1916.

RALPH KENNEY, B. S. A.,

Assistant Professor of Crops.

B. S. A., Ohio State University, 1912; Assistant in Agronomy, Kentucky State College of Agriculture, and Experiment Station, 1912 - December 31, 1913; Assistant in Farm Crops, Kansas State Agricultural College, January 1, 1914 - September 1, 1914; Instructor in Farm Crops, ibid., 1914-1915; Assistant Professor of Crops, ibid., 1915—.

Office Ag 82; Res. 504 Laramie St.

CLAUDE CARROLL CUNNINGHAM, B. S.,

Assistant Professor of Coöperative Experiments.

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 Coöperative Experiments, Kansas State Agricultural College, 1912-1915; Assistant Professor of Coöperative Experiments, ibid., 1915—.

Office Ag 59; Res. 1018 Laramie St.

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1. Resigned.

MYRON GARFIELD BURTON, A. B.,

Director of Home Study Service, Division of College Extension.

A. B., Muncie (Indiana) Normal Institute, 1913; Instructor, Washington Township Public School, Indiana, 1899-1902; Student, University of Indiana, 1902-1903, and Summers, 1903, 1904, 1905; Principal, Aroma (Indiana) Graded Schools, 1903-1904; Principal, White River Township Consolidated High School, Indiana, 1904-1910; Superintendent, Plano (Illinois) City Schools, 1910-1912; Editor-in-Chief, National Manual Training Publishing Company, 1911-1913; Director of Extension Department, Muncie (Indiana) Normal Institute, 1912-1915; Director of Home Study Service, Division of College Extension, Kansas State Agricultural College, 1915—.

Office A 34; Res. 1211 Laramie St.

ROBERT WARREN CONOVER, A. M.,

Assistant Professor of the English Language.

A. B., Wesleyan University, 1911; A. M., ibid., 1914; Student, Drew Theological Seminary, 1911-1912; Graduate Student, Columbia University, Summer, 1913; Graduate Student, University of Pennsylvania, Summer, 1915; Instructor in English, Pennsylvania State College, 1912-1915; Secretary of School of Liberal Arts, ibid., 1913-1915; Assistant Professor of the English Language, Kansas State Agricultural College, 1915—.

Office A 53; Res. 1709 Laramie St.

BLANCHE EARL ENYART, A. B.,

Assistant Professor of Physical Training for 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, 1913-1915; Graduate, Harvard University Summer School, 1915; Instructor in Physical Training, Kansas State Agricultural College, 1910-1913; Assistant Professor of Physical Training for Women, ibid., 1915—.

Office N 1; Res. 901 Osage St.

HELEN HAY HALM, B. S.,

Assistant Professor of Home Economics and Education.

B. S., Kansas State Agricultural College, 1908; B. S., Columbia University, 1915; Director of Domestic Science and Art Department, Corsicana (Texas) High School, 1908-1910; Director of Home Economics Department, Southwest Texas State Normal School, 1910-1913; Student, Columbia University, Summer, 1912; Director of Two-year Home Economics Department, Iowa State College, 1913-1914; Diploma in Household Arts, Teachers' College, Columbia University, 1915; Assistant Professor of Home Economics and Education, Kansas State Agricultural College, 1915—.

Office L 47; Res. 1612 Laramie St.

NOLA TREAT, B. S.,

Assistant Professor of Domestic Science; Director of Cafeteria.

B. S., Columbia University, 1915; Diploma in Home Economics, Rockford College, 1908; Assistant Director of Cafeteria, Young Women's Christian Association, Elgin, Illinois, 1908-1909; Director of Cafeteria, Emerson-Brantingham Company, Rockford, Illinois, 1909-1911; Director of Public School Lunch Rooms, Decatur, Illinois, 1911-1914; Diploma in Household Arts, Teachers' College, Columbia University, 1915; Assistant Professor of Domestic Science and Director of Cafeteria, Kansas State Agricultural College, 1915—.

Office K 29; Res 1612 Laramie St.

ASSOCIATES

CHESTER ALLEN ARTHUR UTT, M. S.,

Associate in Food Analysis.

B. S., Cornell College, 1903; M. S., ibid., 1909; Graduate Student, State University of Iowa, 1903-1904; Instructor, Keokuk (Iowa) High School, 1904-1907; Graduate Student, State University of Iowa, Summer, 1907; Graduate Student, Kansas State Agricultural College, 1913-1914; Assistant Chemist, Kansas State Board of Health, 1907-1914; Associate Food Analyst, ibid., 1914—; Assistant Chemist, Kansas State Dairy Commissioner, 1907-1914; Associate Chemist, ibid., 1914—; Assistant in Food Analysis, Kansas State Agricultural College, 1907-1914; Associate in Food Analysis, ibid., 1914—.

Office W 30; Res. 1805 Leavenworth St.

RAYMOND CLIFFORD WILEY, B. S.,

Associate in Feeding Stuffs and Fertilizer Analysis, Agricultural Experiment Station.

B. S., Oklahoma College of Agriculture and Mechanic Arts, 1905; Assistant Chemist, Maryland Agricultural Experiment Station, 1905-1908; Assistant Chemist, Agricultural Experiment Station, Kansas State Agricultural College, 1908-1914; Associate in Feedingstuffs and Fertilizer Analysis, Agricultural Experiment Station, ibid., 1914—.
Office W 30; Res. 711 Humboldt St.

ROBERT HAMILTON NEEDHAM, PH. C.

Associate in Stock Remedy Analysis, Agricultural Experiment Station.

Ph. C., University of Kansas, 1901; Professor of Pharmacy, Department of Medicine, Fort Worth University, 1905; Dean of School of Pharmacy, ibid., 1907; Assistant in Chemistry, Department of Medicine, ibid., 1908; Professor of Chemistry and Toxicology, Department of Medicine, ibid., 1909; Professor of Physiologic Chemistry and Toxicology and Lecturer on Pharmacology, Department of Medicine, Texas Christian University, 1914; Associate in Stock Remedy Analysis, Agricultural Experiment Station, Kansas State Agricultural College, May 1, 1915—.
Office W 30; Res. R. D. No. 1.

DAISY DOROTHY ZEININGER, A. B.,

Instructor in Mathematics.

A. B., Fairmount College, 1900; Instructor, Ellsworth High School, 1900-1904; Graduate Student, University of Chicago, Summer, 1909; Research work in Mathematics, University of Minnesota, Summer, 1914; Assistant in Mathematics, Kansas State Agricultural College, 1904-1907; Instructor in Mathematics, ibid., 1907—.
Office G 28; Res. 601 Humboldt St.

ANNETTE LEONARD, A. B.,

Instructor in the English Language.

A. B., University of Kansas, 1906; Student, Wellesley College, 1897-1900; Instructor, Topeka City Schools, 1903-1904; Reference Library Assistant, University of Kansas, 1904-1905; Graduate Student, ibid., 1906; Assistant in English, Kansas State Agricultural College, 1907-1909; Graduate Student, University of Chicago, Summer, 1910; Instructor in English, Kansas State Agricultural College, 1909-1911; Instructor in the English Language, ibid., 1911—.
Office G 28; Res. 910 Fremont St.

WILLIAM LEONARD HOUSE,

Instructor in Wood Work; Foreman of Carpenter Shop.

Apprentice with J. Adams and Sons Company, Amherst, Massachusetts, 1863-1868; with the Newton Wagon Works, Batavia, Illinois; Foreman, Carpenter Shop, Atchison, Topeka and Santa Fé Railroad 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 29; Res. 608 Moro 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; Graduate Student, University of Chicago, Summers, 1911, 1912, and 1915; Instructor in Physics, Kansas State Agricultural College, 1911—.
Office C 61; Res. 1405 Anderson 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, 1909; Assistant in Architecture and Drawing, Kansas State Agricultural College, 1909-1911; Graduate Student, Chicago Art Institute, Summer, 1910; Student, Italy, Germany, and France, Summer, 1911; Student, Italy, Greece, and Egypt, 1913-1914; Instructor in Architecture and Drawing, Kansas State Agricultural College, 1911—.
Office A 55; Res. 624 Bluemont Ave.

THORNTON HAYES,

Instructor in Machine Tool Work; Foreman of 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, 1910-1912; Instructor in Machine Tool Work, Foreman of Machine Shop, ibid., 1912—.
Office S 31; Res. 1414 Fairchild Ave.

EDWARD GRANT,

Instructor in Molding; Foreman of Foundry.

Apprentice, with More and Dargie, Engineers, Millwrights, Iron and Brass Founders, Brechin, Forfarshire, Scotland, 1880-1886; with the Chicago Tire and Spring Company, Melrose Park, Illinois, 1887-1890; Foreman of Foundry, R. Beaumont and Son, Kankakee, Illinois, 1890-1897; with the David Bradley Manufacturing Company, Bradley, Illinois, 1897-1900; Foreman of Foundry, Burrell Manufacturing Company, ibid., 1900-1905; Foreman, North Star Iron Works, Hammond, Indiana, 1905-1908; Foreman, Burrell Manufacturing Company, Bradley, Illinois, 1908-1913; Instructor in Molding, Foreman of Foundry, Kansas State Agricultural College, January 7, 1913—.
Office S 42; Res. 1638 Osage St.

IDA ETHEL RIGNEY, B. S.,

Instructor in Domestic Science.

B. S., Kansas State Agricultural College, 1909; Dietitian, Ensworth Hospital, St. Joseph, Missouri, 1909-1910; Instructor, Wichita (Kansas) High School, 1910-1912; Assistant in Domestic Science, Kansas State Agricultural College, 1912-1913; Instructor in Domestic Science, ibid., 1913—.
Office L 35; Res. 1207 Poyntz Ave.

BERTHA GERICKE,[8]

Research Assistant in Library.

Graduate, Hoehere Toechterschule, Berlin, Germany, 1894; Private Pupil in Vocal Music, with Frau Dr. Levysohn, Berlin, 1894-1898; Instructor in German, Private Schools, Washington, D. C., 1907-1912; Private Pupil in Library Science, ibid., 1911-1912; Assistant in Library, Bureau of Plant Industry, United States Department of Agriculture, May, 1912 - February, 1913; Special Work in Library, ibid., August, 1913; Research Assistant in Library, Kansas State Agricultural College, 1913—.
Office F 27; Res. 1408 Fairchild Ave.

CHARLES WESLEY HOBBS, D. V. S.,

Instructor in Veterinary Medicine.

D. V. S., Western Veterinary College, Kansas City, Missouri, 1901; Private Practice, Kensington, 1901-1904; Private Practice, Smith Center, 1904-1913; Instructor in Veterinary Medicine, Kansas State Agricultural College, 1913—.
Office V 27; Res. 303 N. Sixteenth St.

CARL JOHN MERNER,[1] B. P. E.,

Instructor in Physical Education.

B. P. E., International Young Men's Christian Association College, Springfield, Massachusetts, 1912; Student, Iowa State Teachers' College, 1904-1906, 1907 - January 1, 1908, 1909-1910; Director of Physical Education, Gary (Indiana) Public Schools, 1912-1913; Instructor in Physical Education, Kansas State Agricultural College, 1913-1916.

CONSTANCE MIRIAM SYFORD, A. M.,

Instructor in the English Language.

A. B., University of Nebraska, 1909; Reader and Assistant in English Language and Literature, ibid., 1908-1910; Scholar in English Language and Literature, ibid., 1909-1910; Fellow in English Language and Literature, ibid., 1910-1911; A. M., ibid., 1911; Graduate Student and Scholar in English, Bryn Mawr College, 1911-1913; Instructor in the English Language, Kansas State Agricultural College, 1913—.
Office G 32; Res. 721 Poyntz Ave.

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1. Resigned.

8. Absent on leave, January 1 to September 1, 1916.

FRED CHARLES WINSHIP,[1] A. M.,

Instructor in the English Language.

B. L., Nebraska Wesleyan University, 1904; Student, University of Denver, 1898-1902; B. O., Ott School of Expression, Chicago, Illinois, 1905; Private Instructor in Elocution, Nebraska and Colorado, 1908-1910; A. M., University of Denver, 1910; Graduate Student, Nebraska Wesleyan University, 1911; Instructor in the English Language, Kansas State Agricultural College, 1913-1916.

PAGE BLEDSOE,[1] M. S.,

Instructor in Farm Crops.

A. B., Washington and Lee University, 1908; M. S., University of Wisconsin, 1913; Instructor in Farm Crops, Kansas State Agricultural College, September 6, 1913-1916.

GEORGE ELDON THOMPSON, B. S.,

Specialist in Soils and Crops; Division of College Extension.

B. S., Kansas State Agricultural College, 1910; Scientific Assistant, Division of Forage Crop Investigations, United States Department of Agriculture, 1910-1911; Superintendent of the United States Experiment Station, Chillicothe, Texas, 1912; District Demonstration Agent for Southwest Kansas, 1913; Field Superintendent of Substations, Kansas State Agricultural College, October 1, 1913-1916; Specialist in Soils and Crops, Division of College Extension, ibid., January 1, 1916—.

Office Ag 60; Res. 1615 Anderson Ave.

ARTHUR ROY FEHN, PH. B.,

Instructor in Mathematics.

Ph. B., Baldwin Wallace College, Berea, Ohio, 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, 1910, and 1913; Assistant in Mathematics, Kansas State Agricultural College, 1910-1913; Instructor in Mathematics, ibid., December 1, 1913—.

Office A 70; Res. 821 Humboldt St.

JOHN GROVER JACKLEY, D. V. M.,

Instructor in Bacteriology.

D. V. M., University of Pennsylvania, 1910; Research Assistant in Bacteriological Laboratory of Pennsylvania, State Live Stock Sanitary Board, Philadelphia, 1908-1909; Demonstrator and Instructor in Pathological Histology, University of Pennsylvania, 1910, 1911; Assistant in Bacteriology, Kansas State Agricultural College, 1911-1913; Instructor in Bacteriology, ibid., December 1, 1913—.

Office V 52; Res. 1625 Anderson Ave.

LOUIS HENRY LIMPER, A. M.,

Instructor in German.

A. B., Baldwin Wallace College, Berea, Ohio, 1907; A. M., University of Wisconsin, 1914; Instructor in German, Berea (Ohio) High School, 1907-1908; Instructor in English, Robert College, Constantinople, 1908-1911; Scholar in Modern Languages, Princeton University, 1911-1912; Graduate Student, University of Chicago, Summer, 1912; Instructor in French University of Denver, 1912-1913; Graduate Student, University of Wisconsin, Summer, 1913; Graduate Student and Assistant in German, ibid., 1913 - February 1, 1914; Instructor in German, Kansas State Agricultural College, February 1, 1914—.

Office N 61; Res. 412 Moro St.

INA EMMA HOLROYD, B. S.,

Instructor 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, 1900-1914; Instructor in Mathematics, ibid., 1914—.

Office G 28; Res. 1001 Moro St.

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1. Resigned.

JESSIE ANNABERTA REYNOLDS, A. B.,

Instructor 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; Graduate Student, University of Chicago, Summers, 1907 and 1910; Travel-study in Europe, Summers, 1909 and 1912; Graduate Student, Columbia University, Summer, 1914; Graduate Student, University of California, Summer, 1915; Assistant in History and Civics, Kansas State Agricultural College, 1906; Instructor in History and Civics, ibid., 1914—.

Office G 32; Res. 1205 Bluemont Ave.

CHARLES ERNEST MILLAR,[1] M. S.,

Instructor in Soils.

B. S., University of Illinois, 1909; M. S., ibid., 1911; Assistant in Chemistry, ibid., 1909-1910; Assistant Chemist, Illinois State Water Survey, 1910; Assistant in Chemistry, Kansas State Agricultural College, 1910; Assistant Chemist (Soil Analysis), Agricultural Experiment Station, Kansas State Agricultural College, 1911 - July 1, 1913; Assistant in Soils, ibid., July 1, 1913-1914; Instructor in Soils, ibid., 1914 - December 1, 1915.

FRANK CARL GUTSCHE, B. S.,

Instructor in Chemistry.

B. S., University of Minnesota, 1910; Night Chemist, Carver County Sugar Company, Chaska, Minnesota, Campaign of 1910; Graduate Student, University of Wisconsin, Summers, 1914 and 1915; Assistant in Chemistry, Kansas State Agricultural College, 1911-1914; Instructor in Chemistry, ibid., 1914—.

Office C 64; Res. 1215 Vattier St.

WALTER GOLDSBERRY ALLEE, B. S.,

Instructor in Physics.

B. S., Earlham College, 1903; Instructor, Parke County (Indiana) Public Schools, 1903-1905; Principal of Ward School and Director of Athletics, Rockville (Indiana) City Schools, 1905-1907; Instructor and Director of Athletics, Hammond (Indiana) High School, 1908-1911; Graduate Student, University of Chicago, Summers, 1911 and 1912; Instructor and Director of Athletics, Sioux City (Iowa) High School, 1911-1912; Assistant in Physics, Kansas State Agricultural College, 1912-1914; Instructor in Physics, ibid., 1914—.

Office C 36; Res. 911 N. Eleventh St.

MYRON RALPH BOWERMAN, M. E.,

Instructor in Mechanical Drawing and Machine Design.

B. S., Michigan Agricultural College, 1909; M. E., ibid., 1914; Draftsman, Western Electric Company, Summer, 1909; Assistant in Mechanical Engineering, Kansas State Agricultural College, 1909-1910; Draftsman, Capital Iron Works, Topeka, 1910-1911; Draftsman, Phillips, Long and Company, Chicago, Illinois, 1911; Draftsman, Hanke Iron Works, ibid., 1911-1912; Assistant in Mechanical Drawing and Machine Design, Kansas State Agricultural College, 1912-1914; Instructor in Mechanical Drawing and Machine Design, ibid., 1914—.

Office S 63; Res. 1117 Vattier St.

LOUISE FEWELL,

Instructor in Domestic Art.

Student, Winthrop Normal and Industrial College, Rock Hill, South Carolina, 1907-1911; Student, Teachers' College, Columbia University, 1911-1912; Assistant in Domestic Art, Kansas State Agricultural College, 1912-1914; Instructor in Domestic Art, ibid., 1914—.

Office L 65; Res. 1110 Vattier St.

WILLIAM HENRY SANDERS, B. S.,

Instructor in Farm Motors.

B. S., Kansas State Agricultural College, 1890; Carpenter, Lake Worth, Florida, 1890-1893; Engineer and Contractor, Reclamation Work, Palm Beach, Florida, 1893-1895, 1900-1902; Marine Steam and Gas Engineer, Lake Worth, Florida, 1895-1900; Foreman of Construction Work, West Palm Beach, Florida, 1902-1905; Marine Gas Engineer, Railway Extension, Miami, Florida, 1905-1906; in Dredging Work and Canal Construction, Florida, 1907-1912; Assistant in Power and Experimental Engineering, Kansas State Agricultural College, 1912 - March, 1914; Assistant in Farm Motors, ibid., March - September 1, 1914; Instructor in Farm Motors, ibid., 1914—.

Office E 3; Res. 826 Osage St.

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1. Resigned.

ROLLA WOODS MILLER,[1] A. B.,

Instructor in Chemistry.

A. B., Wabash College, 1913; Assistant in Chemistry, ibid., 1911-1913; Assistant in Chemistry, Kansas State Agricultural College, February 25, 1913-1914; Instructor in Chemistry, ibid., 1914 - December 1, 1915.

GRAYSON BELL McNAIR, B. S.,

Instructor in Electrical Engineering.

B. S., Purdue University, 1908; Assistant to Consulting Engineer, Louisville, Kentucky, 1908-1909; in Charge of Transformer Testing Department, Wagner Electric Manufacturing Company, St. Louis, Missouri, 1909-1913; Assistant in Mathematics, Kansas State Agricultural College, May 1 - July 1, 1913; Assistant in Electrical Engineering, ibid., July 1, 1913-1914; Instructor in Electrical Engineering, ibid., 1914—.
Office C 33; Res. 1324 Laramie St.

FREDERICK ALFRED WIRT, B. S.,

Instructor in Farm Mechanics.

B. S., University of Nebraska, 1913; Student Assistant in Applied Mechanics, ibid., 1912-1913; Assistant in Farm Mechanics, Kansas State Agricultural College, July 1, 1913-1914; Instructor in Farm Mechanics, ibid., 1914-1915; Instructor in Charge of Department of Farm Machinery, ibid., July 1, 1915—.
Office R 27; Res. 815 Poyntz Ave.

EMMA FLORA FECHT,

Instructor in Domestic Art.

Student, Kansas State Manual Training Normal School, Summers, 1905-1907; Supervisor of Sewing, Kansas City Public Schools, 1907-1910; Student Stout Institute, Summers, 1908-1910; Graduate, Bradley Polytechnic Institute, 1912; Assistant in Home Economics, State Normal School, Stevens Point, Wisconsin, 1912-1913; Assistant in Domestic Art, Kansas State Agricultural College, 1913-1914; Instructor in Domestic Art, ibid., 1914—.
Office L 65; Res. 203 Park Road.

RAY GATEWOOD, B. S.,

Instructor in Animal Husbandry.

B. S., Iowa State College, 1913; Assistant in Animal Husbandry, Kansas State Agricultural College, 1913-1914; Instructor in Animal Husbandry, ibid., 1914—.
Office Ag 13; Res. 1104 Vattier St.

ARAMINTA HOLMAN,

Instructor in Home Art.

Graduate, Kansas State Normal School, 1890; Instructor, Leavenworth Public Schools, 1891-1904; Principal, ibid., 1904-1909; Art Instructor, Leavenworth County Institute, 1901, 1904; Graduate, New York School of Fine and Applied Art, 1910; Instructor, ibid., 1910-1911; Instructor in Art, Kansas State Normal School, Summer, 1910, and Spring Term, 1913; Instructor in Art, State-Wide Institute, ibid., 1913; Assistant in Drawing, Kansas State Agricultural College, 1913-1914; Instructor in Drawing, ibid., 1914-1915; Instructor in Home Art, ibid., 1915—.
Office A 67; Res. 1612 Laramie St.

ETHEL HANNAH JONES, B. S.,

Instructor in Domestic Art.

B. S., Columbia University, 1913; Student, Smith College, 1906-1908; Graduate, Pratt Institute, 1910; Instructor, Scranton (Pennsylvania) Evening Technical High School, 1911-1912; Graduate, Teachers' College, Columbia University, 1913; Assistant in Domestic Art, Kansas State Agricultural College, 1913-1914; Instructor in Domestic Art, ibid., 1914—.
Office L 64; Res. 1408 Fairchild Ave.

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1. Resigned.

WALTER EDWIN TOMSON, B. S.,

Instructor in Dairy Husbandry.

B. S., Kansas State Agricultural College, 1912; with Department of Dairy Husbandry, ibid., 1912-1913; Assistant in Dairy Husbandry, ibid., 1913-1914; Instructor in Dairy Husbandry, ibid., 1914—.
Office D 30; Res. 1524 Humboldt St.

LEO EDWARD MELCHERS, M. S.,

Instructor in Plant Pathology; Assistant Plant Pathologist, Agricultural Experiment Station.

B. S., Ohio State University, 1912; M. S., ibid., 1913; Student Assistant in Horticultural Extension Schools, ibid., 1911-1912; Assistant Botanist, Ohio Experiment Station, 1912-1913; Assistant Plant Pathologist, Agricultural Experiment Station, Kansas State Agricultural College, October 1, 1913; Instructor in Plant Pathology, ibid., 1914—.
Office H 56; Res. 900 Leavenworth St.

JAMES WILLIAM BENNER, D. V. M.,

Instructor in Veterinary Medicine.

D. V. M., Kansas State Agricultural College, 1911; Assistant Agronomist, American Steel and Wire Company, Chicago, Illinois, Summers, 1908, 1909, and 1910; Graduate Student, University of Kansas, 1912; Practice of Veterinary Medicine, 1911-1914; Assistant in Veterinary Medicine, Kansas State Agricultural College, March 1 - September 1, 1914; Instructor in Veterinary Medicine, ibid., 1914—.
Office V 32; Res. 930 Fremont St.

HOMER HALL,[1] A. M.,

Instructor in the English Language.

A. B., University of Illinois, 1912; Fellow in English, ibid., 1912-1913; A. M., ibid., 1913; Graduate, Northern Illinois State Normal School, 1908; Instructor in English, Rockford (Illinois) High School, 1913-1914; Instructor in the English Language, Kansas State Agricultural College, 1914 - December 31, 1915.

OTIS EARLE HALL,[4] A. B.,

Director of Junior Extension Service, Division of College Extension.

A. B., Wabash College, 1907; Student, Wabash College, and Instructor in Public Schools, 1898-1903; Principal, Fairbanks Township High School, Sullivan County, Indiana, 1903-1904; Ward Principal, Crawfordsville (Indiana) Public Schools, 1904-1905; Superintendent, New Market (Indiana) Public Schools, 1905-1906; Undergraduate Assistant in History, Wabash College, 1906-1907; County Superintendent of Schools, Montgomery County, Indiana, 1907-1914; Director of Junior Extension Service, Division of College Extension, and Coöperative Agent of United States Department of Agriculture, 1914—.
Office A 35; Res. 712 Poyntz Ave.

DANIEL EMMETT LYNCH,

Instructor in Forging; Foreman of Blacksmith Shop.

Apprentice in Blacksmithing, Hillsboro, Missouri, 1888-1892; Graduate, Bryant and Stratton Business College, St. Louis, Missouri, 1893; with Helmbacher Forge and Rolling Mill, ibid., 1893-1895; with James Frizzell and Company, Taylorville, Illinois, 1895-1896; Foreman of Blacksmith Shops, Taylorville Coal Company, ibid., 1896-1898; Foreman of Blacksmith shops, Blue Wing Mining Company, Carterville, Missouri, 1898-1900; Foreman of Blacksmith Shops, Webb City (Missouri) Carterville Foundry and Machine Works, 1900-1914; Instructor in Forging and Foreman of Blacksmith Shops, Kansas State Agricultural College, 1914—.
Office S 38; Res. 907 Leavenworth St.

OLIVE AMY SHEETS, M. S.,

Instructor in Domestic Science.

A. B., Ohio State University, 1908; B. S., ibid., 1910; M. S., University of Wisconsin, 1914; Instructor in Home Economics, Iowa State Teachers' College, 1912-1913; Instructor in Domestic Science, Kansas State Agricultural College, 1914—.
Office L. 35; Res. 421 N. Sixteenth St.

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1. Resigned.

4. In coöperation with the United States Department of Agriculture.

ROSS MADISON SHERWOOD,[4] B. S.,

Specialist in Poultry Husbandry, Division of College Extension.

B. S. in A. H., Iowa State College, 1910; Assistant in Poultry Husbandry, Ohio Agricultural Experiment Station, 1910-1912; Instructor in Poultry Husbandry, Iowa State College, 1912-1913; Assistant Professor of Poultry Husbandry, ibid., 1913-1914; Associate Professor of Poultry Husbandry, ibid., September 1 - November 1, 1914; Specialist in Poultry Husbandry, Division of College Extension, Kansas State Agricultural College, November 1, 1914—.

Office Ag 38; Res. 530 N. Fourteenth St.

ILO IVAN TAYLOR, B. S.,

Instructor in Applied Mechanics and Machine Design.

B. S. in C. E., Iowa State College, 1910; Superintendent, City Waterworks, Storm Lake, Iowa, 1903-1906; on Government Survey, Flathead Indian Reservation, Montana, Summer, 1908; Structural Steel Construction, Hart-Parr Company, Charles City, Iowa, Summer, 1909; Resident Engineer on Construction, Sewer System and Sewage Disposal Plant, Storm Lake, Iowa, 1910-1911; Assistant Engineer, Coon River Drainage District, Buena Vista County, Iowa, and County Engineer, Sac County, Iowa, 1911-1912; Instructor in Mathematics, Colorado School of Mines, 1912-1913; Instructor in Mechanical and Civil Engineering, ibid., 1913-1914; Topographer, Colorado Geological Survey, Summer, 1913; United States Government Land Office Survey, Idaho, Summer, 1914; Instructor in Applied Mechanics and Machine Design, Kansas State Agricultural College, September 21, 1914—.

Office E 8A; Res. 1105 Vattier St.

LEILA DUNTON, M. S.,

Instructor in Milling Industry.

B. S., Kansas State Agricultural College, 1910; M. S., ibid., 1912; Assistant in Milling Industry, ibid., 1912 - 1915; Instructor in Milling Industry, ibid., 1915—.

Office Ag 40; Res. 1638 Osage St.

JAMES WALKER McCOLLOCH, B. S.,

Instructor in Entomology; Assistant Entomologist, Agricultural Experiment Station.

B. S., Kansas State Agricultural College, 1912; Special Field Agent, Department of Entomology, ibid., 1910-1912; Assistant in Entomology, ibid., 1912-1915; Assistant Entomologist, Agricultural Experiment Station, ibid., 1912; Instructor in Entomology, ibid., 1915—.

Office F 64; Res. 905 Laramie St.

FRED SAWYER MERRILL, B. S.,

Instructor in Horticulture.

B. S., Massachusetts Agricultural College, 1912; Assistant in Horticulture, Extension Department, ibid., 1911-1912; Assistant to State Entomologist, Kansas State Entomological Commission, 1912-1913; Horticulturist, Division of College Extension, Kansas State Agricultural College, March 1 - May 15, 1913; Assistant in Horticulture, ibid., 1913-1915; Instructor in Horticulture, ibid., 1915—.

Office H 32; Res. 504 Laramie St.

BERTHA EDITH BUXTON, B. S.,

Instructor in Domestic Art.

B. S., Ohio State University, 1913; Student Assistant in Domestic Science and Art, ibid., 1912-1913; Assistant in Domestic Art, Kansas State Agricultural College, 1913-1915; Instructor in Domestic Art, ibid., 1915—.

Office L 64; Res. 8 Park Road.

JENNIE LYNN COX, B. S.,

Instructor in Domestic Science.

A. B., Fairmount College, 1903; Graduate Student, University of Chicago, Summer, 1903; Instructor, Fairmount College, 1903-1911; B. S., Kansas State Agricultural College, 1913; Assistant in Domestic Science, ibid., 1913-1915; Instructor in Domestic Science, ibid., 1915—.

Office L 42; Res. 724 Houston St.

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4. In coöperation with the United States Department of Agriculture.

MAYME DAVIS, B. S.,

Instructor in Domestic Science.

B. S., Ohio State University, 1913; Student, Mount Union College, Alliance, Ohio, 1905-1907; Teacher, Ohio Public Schools, 1907-1910; Assistant in Domestic Science, Kansas State Agricultural College, 1913-1915; Instructor in Domestic Science, ibid., 1915—.

Office L 42; Res. 723 Houston St.

ALICE EDNA SKINNER, B. S.,

Instructor in Domestic Science.

B. S., Kansas State Agricultural College, 1909; Assistant in Home Economics, Department of College Extension, ibid., 1910-1911; Instructor in Domestic Science, Fairbury (Nebraska) High School, 1911-1912; Graduate Student, Teachers' College, Columbia University, 1912-1913; Assistant in Domestic Science, Kansas State Agricultural College, 1913-1915; Instructor in Domestic Science, ibid., 1915—.

Office L 42; Res. 1408 Fairchild Ave.

WILLIAM RAY ALLEN, A. M.,

Instructor in Zoölogy.

A. B., University of Indiana, 1913; A. M., ibid., 1914; Instructor and Ward Principal, Hartford City (Indiana) Public Schools, 1907-1912; Student Assistant, University of Indiana, 1912-1913; Graduate Student, ibid., 1913; Teaching Fellow, Biological Station, ibid., Summer, 1913 and 1915; Assistant, Carnegie Station for Experimental Evolution, Cold Spring Harbor, Long Island, New York, 1914; Student, Marine Biological Laboratory, Woods Hole, Massachusetts, 1914; Assistant in Zoölogy, Kansas State Agricultural College, April 1, 1914-1915; Instructor in Zoölogy, ibid., 1915—.

Office F 62; Res. 1615 Anderson Ave.

PERCY LEIGH GAINEY, A. M.,

Instructor in Bacteriology; Soil Bacteriologist, Agricultural Experiment Station.

B. Agr., North Carolina College of Agriculture and Mechanic Arts, 1908; M. S., ibid., 1910; Assistant Bacteriologist, ibid., 1908-1910; Teaching Fellow, Henry Shaw School of Botany, Washington University, 1910-1911; A. M., ibid., 1911; Instructor in Botany, University of Missouri, 1911-1914; Soil Bacteriologist in Agricultural Experiment Station, Kansas State Agricultural College, 1914; Assistant in Bacteriology, ibid., 1914-1915; Instructor in Bacteriology, ibid., 1915—.

Office V 26; Res. 112 S. Twelfth St.

MALCOM SEWELL, M. S.,

Instructor in Soils.

B. S., Kansas State Agricultural College, 1912; M. S., Ohio State University, January 1, 1914; Superintendent, Garden City Branch Agricultural Experiment Station, March 1, 1914-1915; Instructor in Soils, Kansas State Agricultural College, December 1, 1915—.

Office Ag 60; Res. 617 Houston St.

JOHN DANIEL COOKE, A. M.,

Instructor in the English Language.

A. B., Leland Stanford Junior University, 1914; A. M., ibid., 1915; Teaching Assistant in Greek, ibid., 1913-1915; Instructor in the English Language, Kansas State Agricultural College, 1915—.

Office G 28; Res. 1709 Laramie St.

FANNY DUNLAP, PH. B., B. L. S.,

Head Cataloguer in Library.

Ph. B., State University of Iowa, 1905; Instructor, St. Louis Public Schools, 1906-1908, 1910-1911; Catalogue Assistant in Library, University of Illinois, 1912-1915; B. L. S., ibid., 1915; Head Cataloguer in Library, Kansas State Agricultural College, 1915—.

Office F 27; Res. 421 N. Sixteenth St.

JAMES GORDON EMERSON, J. D.,

Instructor in Charge of Public Speaking.

B. S., Iowa State College, 1912; Student, Harvard University Law School, 1912-1913; Graduate Student, University of California, Summer School, 1914; J. D., Leland Stanford, Junior, University School of Law, 1915; Instructor in Charge of Public Speaking, Kansas State Agricultural College, 1915—.

Office G 56; Res. 1615 Anderson Ave.

ISA ALLENE GREEN,[1]

Specialist in Home Economics, Division of College Extension.

Student, Northwestern Normal School, Alva, Oklahoma, 1907; Student, Kansas State Manual Training School, 1908-1910; Extension Student, ibid., 1914-1915; Student, Kansas State Agricultural College, Summer, 1915; Instructor, Fort Scott Public Schools, 1894-1902; Principal, Fort Scott High School, 1902-1908; Instructor in Home Economics, ibid., 1910-1915; Critic Teacher in Model School, Kansas State Manual Training School, 1908-1910; Instructor in Domestic Science, ibid., Summer, 1912; Instructor in Domestic Art, Kansas State Normal School, 1913; Specialist in Home Economics, Division of College Extension, Kansas State Agricultural College, September 1 to 10, 1915.

CARL SHERMAN HOAR, A. M.,

Instructor in Botany.

B. S., Dartmouth College, 1911; Graduate Student in Botany, Harvard University, 1911-1915; A. M., ibid., 1913; Assistant in Botany, ibid., 1911-1913; Student, Marine Biological Laboratory, Woods Hole, Massachusetts, Summers, 1912, 1913; Assistant in Botany, Radcliffe College, 1912-1915; Austin Teaching Fellow in Botany, Harvard University, 1913-1915; Instructor in Botany, Kansas State Agricultural College, 1915—.

Office H 57; Res. 1615 Anderson Ave.

LOULA ESDALE KENNEDY, A. B., R. N.,

Instructor in Domestic Science.

A. B., Goucher College, 1896; Graduate, Johns Hopkins Hospital Training School for Nurses, 1903; Registered Nurse in State of Maryland, 1905; Private Nursing, 1903-1907; Nurse-in-Charge, St. Anthony's Hospital, Dr. Grenfells Mission, Labrador, 1907-1910; Second Assistant Superintendent of Nurses, Johns Hopkins Hospital, 1911-1912; Educational Secretary, Tuberculosis League of Pittsburg, Pennsylvania, 1912-1913; Public Health Nursing, Clarksburg, West Virginia, 1913-1915; Student, Teachers' College, Columbia University, Summer, 1915; Instructor in Domestic Science, Kansas State Agricultural College, 1915—.

Office L 47; Res. 1408 Fairchild Ave.

THEODORE MACKLIN, B. S. A.,

Instructor in Rural Economics.

B. S. A., Iowa State College, 1911; Dairy Lecturer in Department of Agricultural Extension, ibid., 1911-1912; Graduate Student, ibid., 1912 - February, 1913; Graduate Student, University of Wisconsin, February, 1913-1915; Scholar in Agricultural Economics, ibid., 1913-1914; Fellow in Agricultural Economics, ibid., 1914-1915; Graduate Student, ibid., Summer, 1915; Instructor in Rural Economics, Kansas State Agricultural College, 1915—.

Office A 59A; Res. 517 N. Fourth St.

JOHN EARL SMITH, A. M.,

Instructor in Physics.

A. B., University of Indiana, 1912; Student Assistant, Marion (Indiana) Normal School, 1908-1909; Graduate, ibid., 1909; Principal, Burlington (Indiana) High School, 1909-1910; Instructor, Anderson (Indiana) High School, 1912-1913, 1914-1915; Assistant in Physics, University of Wisconsin, 1913-1914; Graduate Student, ibid., Summers, 1912, 1914, 1915; A. M., ibid., Summer, 1915; Instructor in Physics, Kansas State Agricultural College, 1915—.

Office C 39; Res. 831 Leavenworth St.

1. Resigned.

FRANCIS LAWRENCE SNOW,

Instructor in Industrial Journalism.

Special Student, University of Kansas, 1902-1903; Reporter on Rhodesia *Herald*, Salisbury, Rhodesia, South Africa, 1904; Assistant Editor, ibid., 1905; with King-Richardson Publishing Company, Chicago, 1906-1909; Reporter and Writer of Special Article for Topeka *State Journal*, 1909-1915; Editor, *Commercial Club Bulletin*, Topeka, 1914-1915; Instructor in Industrial Journalism, Kansas State Agricultural College, 1915—.

Office K 51; Res. 1001 Thurston St.

CARL POLLARD THOMPSON, B. S.,

Specialist in Animal Husbandry, Division of College Extension.

B. S., Kansas State Agricultural College, 1904; Farmer and Breeder of Pure-bred Livestock, 1904-1915; Specialist in Animal Husbandry, Division of College Extension, Kansas State Agricultural College, 1915—.

Office Ag 13A; Res. 804 Moro St.

ALICE MAY CARLEY,

Instructor in Voice.

Graduate, Conservatory of Music, Knox College, 1911; Graduate Student and Assistant Teacher of Singing, ibid., 1911-1912; Pupil of Pauline Waltmann Brandt, 1913-1916; Teacher of Singing, Salt Lake City, Utah, and Boise, Idaho, 1912-1916; Concert and Oratorio Artist, 1912-1916; Instructor in Voice, Kansas State Agricultural College, Jan. 1, 1916—.

Office M 51; Res. 1645 Fairchild Ave.

WINFIELD BURCHARD, M. A.,

Instructor in Chemistry.

B. A., Allegheny College, 1908; Instructor in Science, Bowling Green (Ohio) High School, 1908-1909; Instructor in Science, Waukesha (Wisconsin) High School, 1909-1910; Graduate Student, University of Wisconsin, 1910-1911; M. A., ibid., 1911; Graduate Student and Assistant in Chemistry, ibid., 1911-1914; Instructor in Chemistry, ibid., 1914-1916; Instructor in Chemistry, Kansas State Agricultural College, February 1, 1916—.

Office W 26; Res. 1709 Laramie St.

LEE RAYMOND DICE, PH. D.,

Instructor in Zoölogy; Assistant Zoölogist, Agricultural Experiment Station.

A. B., Leland Stanford, Junior, University, September, 1911; M. S., University of California, 1914; Ph. D., ibid., 1915; Student, Hopkins Marine Laboratory, Summer, 1911; Deputy Warden, Alaska Fisheries Service, United States Department of Commerce and Labor, 1911-1913; Graduate Student, Biological Laboratory, University of Montana, Summer, 1913; Instructor in Zoölogy and Assistant Zoölogist in Agricultural Experiment Station, Kansas State Agricultural College, February 1, 1916—.

Office F 54; Res. 1623 Anderson Ave.

THADDEUS HEDGES PARKS, B. S. A.,

Specialist in Entomology, Division of College Extension.

B. S. A., Ohio State University, 1909; with Bureau of Entomology, United States Department of Agriculture, 1909 - May, 1913; Extension Entomologist, University of Idaho, 1913-1915; Specialist in Entomology, Division of College Extension, Kansas State Agricultural College, March 15, 1916—.

Office A 33; Res. ———.

DON LAMAR BURK, A. M.,

Instructor in the English Language.

A. B., De Pauw University, 1914; A. M., ibid., 1915; Student, Indiana University, Summer, 1913; Assistant in Department of Public Speaking and Debate, De Pauw University, 1913-1914; Assistant Coach for High School and Intercollegiate Oratorical Contests, ibid., 1912-1914; Professor of Public Speaking, Drama, and Debate, Otterbein University, 1914-1915; Graduate Student, Columbia University, 1915 - March 25, 1916; Head of Department of American Literature, and Dramatic Coach, Thomas Davidson School, New York City, 1915 - March 25, 1916; Instructor in the English Language, Kansas State Agricultural College, March 25, 1916—.

Office A 53; Res. 532 N. Fourteenth St.

IRWIN T. BODE, B. S.,

Instructor and Research Assistant in Forestry, Fort Hays Branch Agricultural Experiment Station.

B. S., Iowa State College; Instructor and Research Assistant, Fort Hays Branch Agricultural Experiment Station, Kansas State Agricultural College, May 15, 1916—.
Office and Res., Hays, Kansas.

ROBERT KLINE BONNETT, B. S.,

Instructor in Farm Crops.

B. S., Kansas State Agricultural College, 1913; Assistant in Farm Crops, ibid., July 1, 1913-1916; Graduate Student, University of Wisconsin, 1915-1916; Instructor in Farm Crops, Kansas State Agricultural College, September 1, 1916—.
Office Ag 82; Res. ———.

ASSISTANTS

CHARLES YOST,

Assistant in Machine Shop.

Assistant in Heat and Power Department, Kansas State Agricultural College, 1902-1903; Operating Engineer for Lee Electric Light Company, Superior, Nebraska, 1904; 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 32; 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 26; Res. 926 Vattier St.

HUGH OLIVER,

Assistant in Heat and Power 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., 1912-1914; Assistant in Heat and Power Distribution, ibid., 1914—.
Office S 34; Res. 1126 Kearney St.

AMY ALENA ALLEN, B. S.,

Assistant in Printing.

B. S., Kansas State Agricultural College, 1904; Apprentice in Department of Printing, Kansas State Agricultural College, Summer, 1900; Student Assistant, ibid., 1901-1904; Proof-reader, Department of Printing, ibid., 1904-1909; Assistant in Printing, ibid., 1909—.
Office K 3; Res. 1452 Fairchild Ave.

JESSIE GULICK,

Assistant Cataloguer in Library.

Instructor, Kansas Public Schools, 1899-1901 and 1903-1905; Instructor, Virginia Public Schools, 1901-1903; Student Library School, University of Illinois, Summer, 1914; Chief Clerk, Division of College Extension, Kansas State Agricultural College, 1907-1909; Assistant in Library, ibid., 1909-1911; Assistant Cataloguer in Library, ibid., 1911—.
Office F 27; Res. 1622 Osage St.

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. 1331 Houston St.

ALANSON LOLA HALLSTED,[4] B. S.,

Assistant in Dry Farming, Fort Hays Branch Agricultural Experiment Station.

B. S., Kansas State Agricultural College, 1903; in 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 Voice.

B. S., Kansas State Agricultural College, 1907; Graduate Student in Music, ibid., 1907-1908; Student Assistant in Vocal Music, ibid., 1908-1909; Student, Cosmopolitan School of Music, Chicago, Summers, 1910 and 1912; Student, Columbia University, Summer, 1914; Assistant in Voice, Kansas State Agricultural College, 1910—.
Office M 58; Res. 1521 Leavenworth St.

ALBERT RICHARD LOSH, B. S.,

Assistant State Engineer, Division of College Extension.

B. S., Kansas State Agricultural College, 1910; Instructor in Bureau of Education, Philippine Islands, 1904-1907; Student, Philippine School of Arts and Trades, 1906; Graduate Student, Massachusetts Institute of Technology, 1914; Engineering Assistant, Office of Public Roads, United States Department of Agriculture, 1915; Assistant State Engineer, Division of College Extension, Kansas State Agricultural College, 1910—.
Office E 53; Res. 1018 Houston St.

BRUCE STEINHOFF WILSON, B. S.,

Assistant in Coöperative Experiments.

B. S., Kansas State Agricultural College, 1908; Farm Foreman, Kansas State Agricultural College, 1910-1911; Assistant in Agronomy and Foreman of Experimental Farm, ibid., 1911-1912; Assistant in Coöperative Experiments, ibid., 1912—.
Office Ag 59; Res. 520 N. Manhattan Ave.

BURR HOWEY OZMENT,

Band Leader.

Band-master, Baker University, 1900-1903; Band-master, University of Missouri, 1904-1910; Band Leader, Kansas State Agricultural College, 1911—.
Office N 54; Res. 913 Laramie St.

ASHER EULESTA LANGWORTHY, PH. C.,

Feeding-stuffs Inspector, Agricultural Experiment Station.

Ph. C., University of Kansas, 1901; in Commercial Work, 1901-1912; Feeding-stuffs Inspector, Agricultural Experiment Station, Kansas State Agricultural College, August 15. 1912—.
Office Ag 26; Res. 815 Poyntz Ave.

OLIVER MORRIS FRANKLIN, D. V. M.,

Assistant in Veterinary Medicine.

D. V. M., Kansas State Agricultural College, 1912; Assistant in Veterinary Medicine, ibid., 1912—.
Office V 2; Res. 1630 Houston St.

HELEN LOUISE GREEN,[2]

Assistant in Domestic Science.

Graduate Student in Household Economics, Simmons College, 1910-1912; Instructor of Evening Classes, North Bennett Street Industrial School, Boston, Massachusetts, 1911-1912; Graduate Student, Teachers' College, Columbia University, Summer, 1912; Assistant in Domestic Science, Kansas State Agricultural College, 1912—.

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2. Absent on leave, year 1915-1916.

4. In coöperation with the United States Department of Agriculture.

WALTER JACOB KING, B. S.,

Assistant Drainage Engineer, Division of College Extension.

B. S., Kansas State Agricultural College, 1909; Superintendent of Trades School, Kansas State Industrial Reformatory, Hutchinson, 1909-1912; Fellow in Engineering, Kansas State Agricultural College, 1912-1913; Assistant Engineer, Division of College Extension, ibid., 1913—.

Office E 53; Res. 614 Bluemont Ave.

HARLEY JAMES BOWER,[4] M. S.,

Lecturer on Soils, Division of College Extension.

B. S., Kansas State Agricultural College, 1910; Graduate Student and Assistant in Soils, Ohio State University, 1910-1912; M. S., ibid., 1912; Agronomist, Connecticut Experiment Station, 1912-1913; District Demonstration Agent, Southeastern Kansas Division of College Extension, Kansas State Agricultural College, February, 1913 - January 1, 1915; Lecturer on Soils, Division of College Extension, ibid., January 1, 1915—.

Office Ag 60; Res. 927 Humboldt St.

OLIVER CARLTON MILLER,

Feeding-stuffs Inspector, Agricultural Experiment Station.

With Operating and Auditing Departments, Chicago, Burlington and Quincy Railroad Company, 1892-1913; Feeding-stuffs Inspector, Agricultural Experiment Station, Kansas State Agricultural College, June 1, 1913—.

Office Ag 28; Res. 407 Leavenworth St.

JAMES PLUMMER POOLE, B. S.,

Assistant in Botany.

B. S., University of Maine, 1912; Instructor in Botany, Washburn College, 1912-1913; Assistant in Botany, Kansas State Agricultural College, August 1, 1913—.

Office H 57; Res. 501 Laramie St.

GRACE CUSHING AVERILL,

Assistant in Home Art.

Graduate, Wisconsin State Normal School, 1906; Graduate Student of Manual Arts, ibid., 1909-1910; Graduate Student and Student Assistant in Mechanical Drawing, Bradley Polytechnic Institute, Peoria, Illinois, 1910-1912; Instructor in Manual Arts, Anaheim (California) Public Schools, 1912-1913; Assistant in Drawing, Kansas State Agricultural College, 1913-1915; Assistant in Home Art, ibid., 1915—.

Office A 68; Res. 1407 Fairchild Ave.

WILLIAM HENRY BALL,

Assistant in Woodwork.

Student, Salt City Business College, Winters, 1904-1906; Apprentice Carpenter, 1902-1907; with Gauze and Minor, Haviland, Kansas, 1907-1909; with H. N. Duckworth, Pratt, Kansas, 1909-1911; Instructor in Manual Training, Pratt High School, 1911-1913; Assistant in Woodwork, Kansas State Agricultural College, 1913—.

Office S 29; Res. 1126 Pierre St.

ROBERT VERNON CHRISTIAN, D. V. M.,

Superintendent of Serum Production.

D. V. M., Kansas State Agricultural College, 1911; Assistant in Serum Work, ibid., 1911-1912; Superintendent of Serum Production, ibid., 1913—.

Office V 27; Res. 819 Bluemont Ave.

CLEMENS INKS FELPS, B. S.,

Assistant in Highway Engineering, Division of College Extension.

B. S., Kansas State Agricultural College, 1912; Assistant in Highway Engineering, Division of College Extension, Kansas State Agricultural College, 1913—.

Office E 53; Res. 515 N. Ninth St.

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4. In coöperation with the United States Department of Agriculture.

ROBERT GETTY,[4] B. S.A.,

Assistant in Forage Crops, Fort Hays Branch Agricultural Experiment Station.

B. S. A., University of Nebraska, 1913; Assistant in Forage Crops, Fort Hays Branch Agricultural Experiment Station, 1913—.
Office and Res., Hays, Kansas.

GRACE GLASGOW, M. S.,

Assistant in Bacteriology.

B. S., University of Illinois, 1912; M. S., ibid., 1912; Graduate Student, ibid., 1912-1913; Assistant in Bacteriology, Kansas State Agricultural College, 1913—.
Office V 54; Res. 203 Park Road.

EDITH ELIZABETH HAGUE, A. B.,

Assistant in Library.

A. B., University of Kansas, 1910; Graduate Student, Illinois Library School, 1912-1913; Assistant in Library, Kansas State Agricultural College, 1913—.
Office F 28; Res. 1030 Bluemont Ave.

ERWIN WILLIAM HENRY,

Assistant in Blacksmithing.

Apprentice to General Blacksmith, 1908-1813; Blacksmith, Blue Rapids Machine Shop, 1913; Assistant in Blacksmithing, Kansas State Agricultural College, 1913—.
Office S 38; Res. 1126 Yuma St.

FREDERIC ARTHUR KIENE,[4] B. S.,

Assistant in Cereal Crops, Fort Hays Branch Agricultural Experiment Station.

B. S., Kansas State Agricultural College, 1906; Newspaper Work and General Farming, 1906-1912; Assistant in Cereal Crops, Fort Hays Branch Agricultural Experiment Station, 1912—.
Office and Res., Hays, Kansas.

ERWIN JONES MONTAGUE, B. S.,

Assistant to Superintendent, Fort Hays Branch Agricultural Experiment Station.

B. S., Oregon Agricultural College, 1913; Assistant to Superintendent, Fort Hays Branch Agricultural Experiment Station, 1913—.
Office and Res., Hays, Kansas.

RAY V. MURPHY,[1] B. S.,

Assistant in Chemistry.

B. S., Illinois Wesleyan University, 1912; Undergraduate Instructor in Chemistry, ibid., 1910-1911; Soil, Water and Fertilizer Analyst, ibid., 1910-1912; Instructor in Science, Geneseo (Illinois) Collegiate Institute, Summer, 1912; Instructor in Science, Genoa (Illinois) High School, 1912 - February, 1913; Principal, Marengo (Illinois) High School, February to June, 1913; Graduate Student, University of Wisconsin, Summers, 1914 and 1915; Graduate Student, Kansas State Agricultural College, 1913; Assistant in Chemistry, ibid., 1913-1916.

CHESTER LEE WOODINGTON,

Assistant in Power Plant.

With Heat and Light Department, School for the Deaf, Olathe, 1903-1905; with Refrigeration Department Armour Packing Company, Kansas City, 1905-1910; Steam Fitter with Department of Heat and Power, Kansas State Agricultural College, 1910-1913; Assistant in Heat and Power, ibid., 1913-1914; Assistant in Power Plant, ibid., 1914—.
Office E 3; Res. 1317 Laramie St.

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1. Resigned.

4. In coöperation with the United States Department of Agriculture.

ANDREW MINIE PATERSON, B. S.,

Assistant in Animal Husbandry.

B. S., Kansas State Agricultural College, 1913; Graduate, School of Agriculture, University of Minnesota, 1910; Assistant in Animal Husbandry, Kansas State Agricultural College, October 1, 1913—.
Office Ag 13; Res. 1100 Bluemont Ave.

STANLEY ALBERT SMITH, B. S.,

Assistant in Architecture and Drawing.

B. S., Kansas State Agricultural College, 1913; in Agricultural Practice, Summers, 1913 and 1915; Assistant in Architecture and Drawing, Kansas State Agricultural College, October 1, 1913—.
Office A 80; Res. 812 Laramie St.

EDITH ELLEN JONES, B. S.,

Research Assistant to the Director of the Agricultural Experiment Station.

B. S., Kansas State Agricultural College, 1909; Secretary to Department of Agronomy, ibid., 1909 - October 15, 1913; Assistant to the Dean of the Division of Agriculture, ibid., October 15, 1913-1915; Research Assistant to the Director of the Agricultural Experiment Station, ibid., 1915—.
Office Ag 34; Res. 1224 Fremont St.

LEWELLYN GAINES HEPWORTH, B. S.,

Feeding-stuffs Inspector, Agricultural Experiment Station.

B. S., Kansas State Agricultural College, 1897; Teacher, Kansas Public Schools. Teacher's Life Certificate, 1900; in Loan and Real-estate Business, 1900-1904; in Seed and Grain Business, 1901-1909; Immigration Agent, 1909-1912; District Manager, Hartford Life Insurance Company, Topeka, 1913; Student, Washburn Law School, 1912-1913; Feeding-stuffs Inspector, Agricultural Experiment Station, Kansas State Agricultural College, October 27, 1903—.
Office Ag 26B; Res. 1211 Houston St.

HAROLD MORTON JONES, B. S.,

Deputy State Dairy Commissioner.

B. S., Purdue University, 1908; Manager of Indiana Creameries, 1908-1913; Deputy State Dairy Commissioner, November, 1913—.
Office X; Res. 1615 Anderson Ave.

REUBEN EDWARD WISEMAN, B. S.,

Assistant in Farm Mechanics.

B. S., Kansas State Agricultural College, 1913; Engineer, Garden City Branch Agricultural Experiment Station, July 1, 1913 - January 1, 1914; Assistant in Farm Mechanics, Kansas State Agricultural College, January 1, 1914—.
Office R 26; Res. R. R. No. 1.

FANCHON IDALINE EASTER,

Assistant in Piano.

Pupil of Rafael Navas, 1909-1913; Diploma, Institute of Musical Art, Wichita, 1911; Instructor in Piano, Institute of Musical Art, Wellington, 1912-1913; Concert Artist and Instructor in Music, 1913; Assistant in Music, Kansas State Agricultural College, January 20, 1914—.
Office M 52; Res. 1224 Fremont St.

LEWIS LEROY LEEPER,

Miller, Department of Milling Industry.

Assistant Miller, Kaw Mills, Topeka, 1907 and 1908; Head Miller, Dwight Mills, Graceville, Minnesota, 1909; Head Miller, Cozad Roller Mills, Cozad, Nebraska, 1910 and 1911; Head Miller and Superintendent, Denton Milling Company, Denton, Texas, 1912; Head Miller and Superintendent, Royal Milling Company, Milliken, Colorado, 1913; Miller, Department of Milling Industry, Kansas State Agricultural College, February 23, 1914—.
Office Ag 26; Res. 1206 Laramie St.

WILLIAM PATRICK HAYES, B. S.,

Assistant in Entomology.

B. S., Kansas State Agricultural College, 1913; Graduate Student Assistant in Entomology and Zoölogy, ibid., 1913-1914; Assistant in Entomology, ibid., April 1, 1914—.
Office F 59; Res. 911 Bluemont Ave.

JOHN C. SHUTT, B. S.,

Assistant in Steam and Gas Engineering.

B. S., Highland Park College, 1913; Instructor in Machine Shops, ibid., 1912-1913; with Des Moines (Iowa) Ice and Cold Storage Company, 1913-1914; Assistant in Steam and Gas Engineering, Kansas State Agricultural College, April 1, 1914—.
Office E 30; Res. 827 Poyntz Ave.

ETHEL VANDERWILT, B. S.,

Assistant in Animal Husbandry.

B. S., Kansas State Agricultural College, 1913; Special Assistant to the Dean of the Division of Agriculture, ibid., 1913-1914; Assistant in Animal Husbandry, ibid., April 1, 1914—.
Office Ag 8; Res. 1114 Houston St.

FLOYD PATTISON,

Assistant in Heat and Power.

B. S., Kansas State Agricultural College, 1912; Employee of Smith Gas Power Company, Lexington, Ohio, 1912-1913; Fellow in Steam and Gas Engineering, Kansas State Agricultural College, 1913 - June 15, 1914; Assistant in Heat and Power, ibid., June 15, 1914—.
Office E 3; Res. 515 Bluemont Ave.

PRESTON ESSEX McNALL, B. S.,

Assistant in Farm Management Studies, Division of College Extension.

B. S. in E. E., Kansas State Agricultural College, 1909; with Pacific Electric Company and Edison Electric Company, Los Angeles, California, 1909-1911; B. S. in Ag., Kansas State Agricultural College, 1913; Fellow in Soils, ibid., 1913-1914; Assistant in Farm Management Studies, Division of College Extension, ibid., 1914—.
Office A 36; Res. ———.

ALBERT WILLIAM BELLOMY, B. S.,

Assistant in Zoölogy; Assistant in Genetics, Agricultural Experiment Station.

B. S., Kansas State Agricultural College, 1914; Student Assistant in Zoölogy, ibid., 1912-1914; Assistant in Zoölogy, and Assistant in Genetics in Agricultural Experiment Station, ibid., 1914—.
Office F 55; Res. R. R. 8.

ALBERT GARLAND HOGAN, PH. D.,

Assistant in Animal Nutrition, Agricultural Experiment Station.

A. B., University of Missouri, 1907; B. S., ibid., 1909; A. M., University of Missouri, 1912; Ph. D., Yale University, 1914; Instructor in Chemistry, Northwest Missouri Normal School, 1909-1911; Fellow in Agricultural Chemistry, University of Missouri, 1911-1912; Fellow in Physiological Chemistry, Yale University, 1912-1913; Assistant in Physiological Chemistry, ibid., 1913-1914; Assistant in Animal Nutrition, Agricultural Experiment Station, Kansas State Agricultural College, July 15, 1914—.
Office C 3; Res. 1615 Anderson Ave.

REBECCA PAULINE BARTHOLOMEW,

Assistant in Domestic Science.

Student Teachers' College, Columbia University, 1907-1908, 1912-1914, and Summers, 1914 and 1915; Student, Valparaiso University, 1909; Assistant in Domestic Science, Kansas State Agricultural College, 1914—.
Office L 47; Res. 1224 Fremont St.

MARION PERCIVAL BROUGHTEN,[4] A. B., B. S.,

Institute Specialist in Home Economics, Division of College Extension.

A. B., Leland Stanford University, 1900; Student, Hopkins Seaside Laboratory, Summers, 1899, 1900; Instructor, California Public Schools, 1900; Instructor, Pueblo (Colorado) Public Schools, 1901-1903; Instructor, Private School, Denver, Colorado, 1903-1904; Principal, Georgetown (Colorado) High School, 1904-1905; Instructor, Marysville Public Schools, 1910-1912; B. S., Kansas State Agricultural College, 1914; Institute Specialist in Home Economics, Division of College Extension, ibid., 1914—.

Office A 35; Res. 203 Park Road.

LOUISE CALDWELL,[4] A. B.,

Specialist in Home Economics, Division of College Extension.

A. B., Kentucky College for Women, 1904; Primary Instructor, Lees Collegiate Institute, Jackson, Kentucky, 1904-1905; Student Dietitian, Newport (Rhode Island) Hospital, Summer, 1913; Graduate, Drexel Institute, Philadelphia, Pennsylvania, 1914; Instructor in Domestic Science, Presbyterian Deaconess Home, Philadelphia, Pennsylvania, 1913-1914; Specialist in Home Economics, Division of College Extension, Kansas State Agricultural College, 1914—.

Office A 36; Res. 224 N. Fourteenth St.

ELIZABETH HAMILTON DAVIS, A. B., B. L. S.,

Assistant Reference Librarian.

A. B., Illinois Woman's College, 1909; B. L. S., University of Illinois Library School, 1914; Graduate, Southern Illinois State Normal University, 1910; Student, University of Illinois Library School, 1910-1911; Temporary General Assistant, Oak Park (Illinois) Public Library, Summer, 1911; Assistant in Charge of Loan Department, Illinois State Normal University, 1911-1913; Temporary Catalogue Assistant, University of Illinois Library, Summer, 1914; Assistant Reference Librarian, Kansas State Agricultural College, 1914—.

Office F 35; Res. 421 N. Sixteenth St.

LYLE McFEATTERS DEAN, A. B.,

Assistant in Mathematics.

A. B., Park College, 1913; Graduate Student, Carnegie Institute of Technology, 1913-1914; Assistant in Mathematics, Kansas State Agricultural College, 1914—.

Office G 33; Res. 925 Bluemont Ave.

EUGENIA FAIRMAN,[1] B. M.,

Assistant in Piano.

B. S., Kansas State Agricultural College, 1910; B. M., School of Music, University of Nebraska, 1913; Private Instructor in Piano, Manhattan, 1913-1914; Pupil of Harold Henry, Chicago, Summer, 1915; Assistant in Music, Kansas State Agricultural College, 1914-1916.

MARION HARRISON,

Assistant in Domestic Art.

Graduate, Mechanics Institute, Rochester, New York, 1913; Student Assistant in Domestic Art, ibid., 1912; Instructor in Domestic Art, Young Women's Christian Association, New York City, 1913-1914; Instructor in Domestic Art, Vacation Schools, Rochester, New York, Summer, 1914; Assistant in Domestic Art, Kansas State Agricultural College, 1914—.

Office L 65; Res. 1415 Fairchild Ave.

FLORENCE HUNT,

Assistant in Domestic Art.

Graduate, Pratt Institute, 1910; Trade Designer, 1910-1914; Assistant in Domestic Art, Kansas State Agricultural College, 1914—.

Office L 64; Res. 1408 Fairchild Ave.

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1. Resigned.

4. In coöperation with the United States Department of Agriculture.

NELLIE IRENE McCLURG, A. B.,

Assistant in Domestic Science.

A. B., University of Illinois, 1912; Supervisor of Household Science, East Aurora (Illinois) Public Schools, 1912-1914; Assistant in Domestic Science, Kansas State Agricultural College, 1914—.
Office L 42; Res. 730 Houston St.

GRACE ADELLA PALMER,

Assistant in Domestic Art.

Graduate, Mechanics Institute, Rochester, New York, 1914; Student Assistant in Domestic Art, Evening School, ibid., 1913-1914; Assistant in Domestic Art, Kansas State Agricultural College, 1914—.
Office L 65; Res. 1415 Fairchild Ave.

NELLIE EVELYN REED, B. S.,

Assistant in Zoölogy.

B. S., Kansas State Agricultural College, 1914; Student Assistant in Zoölogy, ibid., 1913-1914; Graduate Student, University of Michigan, Summer, 1915; Assistant in Zoölogy, Kansas State Agricultural College, 1914—.
Office F 62; Res. 1018 Laramie St.

OTIS EVERETT STRODTMAN,[4] D. V. S.,

Deputy Inspector and College Representative, Marshall County Hog Cholera Eradication Project.

D. V. S., Kansas City Veterinary College, 1911; Dairy and Milk Inspector, Arkansas City, 1912-1913; Assistant in Marshall County Hog Cholera Eradication Project, Kansas State Agricultural College, 1914—.
Office and Res., Marysville, Kansas.

ERWIN MILTON TIFFANY, A. B.,

Assistant in Home Study Service, Division of College Extension.

A. B., Baker University, 1908; B. S., Kansas State Agricultural College, 1915; Student Assistant in Botany, Baker University, 1907-1908; Bookkeeper, C. A. Smith Lumber Company, Marshfield, Oregon, 1908-1909; Principal, Madras (Oregon) High School, 1909-1910; Farmer, 1910-1912; Student, Kansas State Agricultural College, 1912-1913; Principal, Great Bend High School, 1913-1914; Assistant in Home Study Service, Kansas State Agricultural College, 1914—.
Office A 5; Res. 931 Leavenworth St.

LUCILE WARNOCK, A. B.,

Assistant in Library.

A. B., Monmouth College, 1913; General Assistant in Public Library, Oskaloosa, Iowa, 1912; Student, University of Illinois Library School, 1913-1914; General Assistant in Library, Miama University, Summer, 1914; Assistant in Library, Kansas State Agricultural College, 1914—.
Office F 31; Res. 321 N. Sixteenth St.

EPHA ESTELLA MATHER,[4] B. S.,

Lecturer on Home Economics, Division of College Extension.

B. S., Kansas State Agricultural College, 1913; Instructor, Gove County Public Schools, 1899-1905; Student, Hays Branch State Normal School, 1905; County Superintendent of Schools, Gove County, 1905-1909; Instructor, Normal Institute, Gove County, 1908, 1909, 1911, 1912; Head of Domestic Science and Art Department, Polytechnic High School, San Diego, California, 1913-1914; Lecturer on Home Economics, Division of College Extension, Kansas State Agricultural College, September 15, 1914—.
Office A 35; Res. 1329 Anderson Ave.

WALTER LEROY LATSHAW, B. S.,

Assistant in Soil Analysis, Agricultural Experiment Station.

B. S., Pennsylvania State College, 1912; Chemist, Armour and Company, Chicago, Illinois, 1912-1914; Assistant in Soil Analysis, Agricultural Experiment Station, Kansas State Agricultural College, November 17, 1914—.
Office C 3; Res. 514 Leavenworth St.

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4. In coöperation with the United States Department of Agriculture.

JOSEPH CARL ROSS,[1]

Assistant in Power Plant.

Chief Engineer, Lebanon (Kentucky) Water Company, 1909, 1910; Engineer in charge, Tenth Street Station, Louisville (Kentucky) Light Company, 1911; Engineer, Mengel Box Company, Hickman, Kentucky, 1912; Machinist, Metropolitan Street Railway Company, Kansas City, Missouri, 1913-1914; Assistant in Power Plant, Kansas State Agricultural College, February 1 - October 1, 1915.

OLIVER HERMAN BROWN,

Assistant in Shop Practice.

Student in Mechanical Engineering, Iowa State College, 1902-1903; Special Apprentice, Walton and Company, Chariton, Iowa, and Standard Gas Company, Des Moines, Iowa, 1899-1901; Demonstrator, Altman-Taylor Thresher Company, 1901-1902; Pattern-maker and General Mechanic, Watkins Machine Company, Ames, Iowa, 1903-1904; Pattern-maker and Die-maker, Various Iowa Companies, 1904-1907; Draughtsman and Machinist, Des Moines, Iowa, 1907-1908; Proprietor of General Repair Shop, 1909-1910; with Manufacturing Concerns, Iowa, 1911-1914; Assistant in Shop Practice, Kansas State Agricultural College, July 1, 1915—.

Office S 32; Res. 1411 Poyntz Ave.

LOUIS COLEMAN WILLIAMS, B. S.,

Assistant to Superintendent of Institutes and Demonstrations, Division of College Extension.

B. S., Kansas State Agricultural College, 1912; Instructor in Agriculture, Tecumseh (Nebraska) High School, 1913-1915; Assistant to Superintendent of Institutes and Demonstrations, Division of College Extension, Kansas State Agricultural College, July 1, 1915—.

Office A 34; Res. 1110 Vattier St.

AVA PATRICIA ABERNETHY,

Assistant in Piano.

Graduate, Laurence Conservatory, Appleton, Wis., 1911; Graduate Student, ibid., 1911-1912; Pupil of Emil Liebling and Edgar A. Brazilton, Chicago, Ill., 1911-1912; Instructor in Piano, Evansville (Indiana) Conservatory of Music, 1912-1913; Instructor in Piano and Professional Accompanist, Lyceum Arts Conservatory, Chicago, Ill., 1913-1915; Assistant in Piano, Kansas State Agricultural College, 1915—.

Office M 53; Res. 624 Poyntz Ave.

ALBERT FOSTER BAIRD, B. S.,

Assistant in Physics.

B. S. in E. E., University of New Brunswick, Fredericton, Canada, 1914; Instructor in Physics and Electrical Engineering, ibid., 1914-1915; Assistant in Physics, Kansas State Agricultural College, 1915—.

Office C 61; Res. 600 Osage St.

JANE CAPE, B. S.,

Assistant in Domestic Science.

B. S., University of Wisconsin, 1914; Instructor in Chemistry, North Carolina State College, 1914-1915; Assistant in Domestic Science, Kansas State Agricultural College, 1915—.

Office L 34; Res. 1645 Fairchild Ave.

EDGAR VERMONT COLLINS, B. S.,

Assistant in Steam and Gas Engineering.

B. S. in Agricultural Engineering, Iowa State College, 1914; B. S. in Agronomy, ibid., 1914; Student in Agriculture, ibid., 1905-1908; Operator of Traction Engines, Summers, 1906-1912; General Farming, 1908-1912; Student in Agricultural Engineering, Iowa State College, 1912-1914; Assistant in Agricultural Engineering, ibid., 1914-1915; Assistant in Steam and Gas Engineering, Kansas State Agricultural College, 1915—.

Office E 31; Res. 1008 Pierre St.

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1. Resigned.

ARTHUR DORYLAND, B. S.,

Deputy State Dairy Commissioner.

B. S., Kansas State Agricultural College, 1914; Deputy State Dairy Commissioner, 1915—.

Office X; Res. 1615 Anderson Ave.

HUGH DURHAM, A. M.,

Assistant to the Dean of the Division of Agriculture.

Graduate, Kansas State Normal School, 1901; A. B., University of Kansas, 1909; Fellow in Education, ibid., 1909-1910; A. M., ibid., 1915; Student in Agriculture, Kansas State Agricultural College, 1914-1915; Rural Teacher, Jewell County, 1897-1899; Principal, Norton High School, 1901-1902; Principal, Randall High School, 1902-1903; County Superintendent, Jewell County, 1903-1907; Superintendent, Dodge City Schools, 1910-1912; Superintendent, Caldwell Schools, 1912-1914; Instructor and Conductor in County Teachers' Institutes, 1903; Assistant to the Dean of the Division of Agriculture, Kansas State Agricultural College, 1915—.

Office Ag 30; Res. 730 Osage St.

MABEL WINIFRED FORTNEY,

Specialist in Domestic Art, Extension Schools, Division of College Extension.

Instructor, Public Schools of Pennsylvania and New York, 1897-1904; Trade Dressmaking and Tailoring, Philadelphia, Pennsylvania, 1904-1905, 1906, and 1913; Diploma, School of Design and Parisian Academy, ibid., 1906; Diploma in Domestic Art, Drexel Institute, 1908; Instructor of Evening Settlement Classes, Philadelphia, Pennsylvania, 1907-1908; Special Student in Household Arts, Teachers' College, Columbia University, 1909-1910; Instructor of Sewing Classes, Union Settlement, New York City, 1909-1910; Director of Home Arts Work, Idaho State Academy, 1912; Certificate in Domestic Science, Pennsylvania State College, Summer, 1912; Student, ibid., 1913; Designer of Millinery, Albuquerque, New Mexico, 1914; Assistant in Domestic Art, Kansas State Agricultural College, 1910-1911; Specialist in Domestic Art, Extension Schools, Division of College Extension, ibid., 1915—.

Office A 36; Res. 901 Laramie St.

MILDRED PEARL FRENCH,

Assistant in Domestic Art.

Graduate, Pratt Institute, 1915; Student, Idaho State Normal School, Summers, 1910, 1911; Instructor, Idaho Public Schools, 1910-1912; Student, University of Idaho, 1912-1913; Instructor in Dietetics, Sanitarium, Baltimore, Maryland, Summer, 1914; Instructor in Young Women's Christian Association and Settlement Work, New York City, 1914-1915; Assistant in Domestic Art, Kansas State Agricultural College, 1915—.

Office L 64; Res. 1219 Poyntz Ave.

DAVID GRAY, B. S.,

Assistant in Animal Husbandry.

B. S., Kansas State Agricultural College, 1914; In Charge Experimental Cattle Feeding, ibid., 1915; Assistant in Animal Husbandry, ibid., 1915—.

Office Ag 13; Res. 321 Pierre St.

WILLIAM ARTHUR HAGAN, D. V. M.,

Assistant in Veterinary Medicine.

D. V. M., Kansas State Agricultural College, 1915; Student Assistant in Pathology, ibid., 1912-1915; Assistant in Veterinary Medicine, ibid., 1915—.

Office V 56; Res. 1500 Poyntz Ave.

FLORENCE SANDER HAGUE, A. M.,

Assistant in Zoölogy.

A. B., University of Kansas, 1911; B. S. in Education, ibid., 1913; A. M., ibid., 1914; Instructor, Council Grove High School, 1911-1913; Technical Assistant with Department of Zoölogy, Kansas State Agricultural College, 1914-1915; Assistant in Zoölogy, ibid., 1915—

Office F 62; Res. 1030 Bluemont Ave.

MARION GREENLEAF KIRKPATRICK, B. S., PH. D.,

Assistant in Home Study Service, Division of College Extension.

B. S., Kansas State Agricultural College, 1915; Ph. D., Highland University, 1907; Student, Campbell College, 1889-1893; Admitted to the Bar, Leavenworth, 1894; Teachers' Life Certificate for Kansas, 1910; Instructor, Kansas Rural Schools, three years; Superintendent, Vermillion City Schools, 1899-1902; Superintendent, Frankfort City Schools, 1902-1914; Conductor of Teachers' Normal Institutes, 1904-1915; Member, State Normal Training Examining Board, 1910 and 1911; Assistant in Home Study Service, Division of College Extension, Kansas State Agricultural College, 1915—.
Office A 5; Res. 1000 Kearney St.

EDGAR TALBERT KEITH, B. S.,

Assistant in Printing.

B. S., Kansas State Agricultural College, 1912; with Department of Printing, ibid., July, 1912-1915; Assistant in Printing, ibid., 1915—.
Office K 1; Res. 1421 Poyntz Ave.

ETHEL MAY LORING,

Assistant in Physical Education for Women.

Graduate, Sargent Normal School of Physical Education, 1915; Director of Playground, Newton Center, Massachusetts, 1912-1915; Assistant in Physical Education for Women, Kansas State Agricultural College, 1915—.
Office N 1; Res. 1645 Fairchild Ave.

JOHN ROBINSON McCLUNG, A. M.,

Assistant in Chemistry.

B. S., Kansas State Agricultural College, 1910; A. M., University of the South, 1913; Student, Northwestern University Medical School, Fall, 1911; Instructor in Science, Sewanee (Tennessee) Military Academy, January 1, 1912-1915; Assistant in Chemistry, University of the South, Summer, 1914; Assistant in Chemistry, Kansas State Agricultural College, 1915—.
Office C 64; Res. 1815 Humboldt St.

ARTHUR ERSKINE McCLYMONDS, B. S.,

Assistant in Agronomy.

B. S. in Agronomy, Kansas State Agricultural College, 1915; Student Assistant in Experimental Work, ibid., 1914-1915; Assistant in Agronomy, ibid., 1915—.
Office and Res. R. R. 8.

ISABEL PAUL MARCH, A. B.,

Loan Assistant in Library.

A. B., Washburn College, 1915; General Librarian, ibid., Summer, 1915; Loan Assistant in Library, Kansas State Agricultural College, 1915—.
Office F 30; Res. 1409 Fairchild Ave.

FRANK EDWARD MUSSEHL, B. S.,

Assistant in Poultry Husbandry.

B. S., University of Wisconsin, 1915; Circulation Manager, Lake Superior Farmer, 1913; Student Assistant, University of Wisconsin, 1914; Special Assistant, Kansas State Agricultural College, Summer, 1914; Assistant in Poultry Husbandry, ibid., 1915—.
Office Ag 38A; Res. 1615 Anderson Ave.

NORMAN EVERETT OLSON, B. S.,

Assistant in Dairy Husbandry.

B. S. in Dairying, Iowa State College, 1915; Assistant in Dairy Husbandry, Kansas State Agricultural College, 1915—.
Office D 30; Res. 1615 Anderson Ave.

KURT PEISER, M. S.,

Assistant in Bacteriology.

B. S., Michigan Agricultural College, 1914; Graduate Student and Student Assistant, ibid., 1914-1915; M. S., ibid., 1915; Assistant in Bacteriology, Kansas State Agricultural College, 1915—.
Office V 26; Res. 821 Osage St.

MARY ALICE POULTER, B. S.,

Specialist in Home Economics, Division of College Extension.

B. S., University of Wisconsin, 1915; Graduate, River Falls (Wisconsin) State Normal School, 1911; Principal, State Graded School, Cumberland, Wisconsin, 1911-1912; Assistant in Agricultural Bacteriology, University of Wisconsin, Second Semester, 1914-1915; Specialist in Home Economics, Division of College Extension, Kansas State Agricultural College, 1915—.

Office A 35; Res. 901 Laramie St.

MONA REDMAN QUINE,[1]

Assistant in Domestic Art.

Graduate, Mechanics Institute, Rochester, New York, 1915; Settlement Worker, Rochester, New York, 1913-1914; in Girls' Club Work, Young Women's Christian Association, ibid., 1914-1915; Director of City Playgrounds, ibid., Summers, 1914, 1915; Assistant in Domestic Art, Kansas State Agricultural College, 1915 - January 1, 1916.

ROY LEANDER SWENSON, B. S.,

Assistant in Shop Practice.

B. S., Kansas State Agricultural College, 1915; Assistant in Shop Practice, ibid., 1915—.

Office S 62; Res. 931 Osage St.

JAMES WALTER ZAHNLEY, B. S.,

Assistant in Agronomy.

B. S., Kansas State Agricultural College, 1909; Superintendent, Dwight City Schools, 1909-1910; Student, University of Kansas, Summer, 1910; Instructor in Agriculture, El Dorado High School, 1910-1915; Teacher in Agronomy, Kansas State Agricultural College, Summer, 1914; Assistant in Agronomy, ibid., 1915—.

Office Ag 79; Res. 1131 Laramie St.

HARPER FYLER ZOLLER, M. S.,

Assistant in Chemistry.

B. S., Lenox College, 1910; Research Assistant in Astronomy, University of Illinois, 1911-1913; Assistant in Chemistry, ibid., 1913; M. S., ibid., 1913; Professor of Chemistry and Physics, College of Puget Sound, 1914-1915; Assistant in Chemistry, Kansas State Agricultural College, 1915—.

Office W 26; Res. 930 Moro St.

JAMES PHILIP CAVANAGH,

Assistant in Heat and Power.

Farmer and Thresher, 1890-1911; Motorman, Topeka Street Railway Company, 1911-1912; Fireman and Steam Fitter, Kansas State Agricultural College, 1912-1915; Assistant in Heat and Power, ibid., Oct. 1, 1915—.

Office E 3; Res. 1113 Bertrand St.

CHARLES A. PYLE,[9] B. S., D. V. M.,

Specialist in Animal Husbandry, Division of College Extension.

B. S., Kansas State Agricultural College, 1904; D. V. M., ibid., 1907; Practicing Veterinarian, Salina, 1907-1908; Assistant, Veterinary Division, University of Minnesota, 1908-1910; Professor of Pathology and Physiology, San Francisco Veterinary College, 1910-1912; Farmer and Stock-raiser, Manhattan, 1912-1915; Specialist in Animal Husbandry, Division of College Extension, Kansas State Agricultural College, Nov. 1, 1915-March 1, 1916.

ROBERT SCHMIDT, B. S.,

Assistant in Botany; Seed Analyst, Agricultural Experiment Station.

B. S., Rutgers College, 1912; Assistant in Botany, New Jersey Agricultural Experiment Station, 1912; Assistant Seed Analyst, ibid., 1913-1915; Assistant in Botany and Seed Analyst, Agricultural Experiment Station, Kansas State Agricultural College, Nov. 1, 1915—.

Office H 54; Res. 307 N. Sixteenth St.

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1. Resigned.

9. Temporary appointment.

GLADYS McKINNON JONES,

Assistant in Domestic Art.

Student, Westover School, Middlebury, Conn., 1910-1912; Student, Mechanics Institute, Rochester, N. Y., 1912-1916; in Girls' Club Work, Brick Church Institute and Y. W. C. A., Rochester, N. Y., 1915; Assistant in Domestic Art, Kansas State Agricultural College, Jan. 1, 1916—.

Office L 65; Res. 1415 Fairchild Ave.

HONOR LOUISE PLUMMER,[9] A. B., B. L. S.,

Assistant in Library.

A. B., University of Colorado, 1907; B. L. S., University of Illinois, 1912; Assistant in Loan Department, Los Angeles Public Library, 1912-1913; Librarian in Charge, Carnegie Public Library, Idaho Springs, Colo., Summer, 1914; Assistant in Medical Library of City and County of Denver, Fall, 1914; Special Work with United States Public Documents, State Library of Colorado, Fall, 1915; Assistant in Library, Kansas State Agricultural College, Jan. 1 - September 1, 1916.

Office F 32; Res. 1645 Fairchild Ave.

CHARLES LORIN QUEAR,

Assistant in Office of the President.

Student, Marion (Indiana) Normal College, 1908-1909; Field Manager, Guaranteed Seed Company, Plano, Illinois, 1910-1911; Student, Purdue University, 1912; Instructor in Charge of Agricultural Department, Muncie (Indiana) Normal College, 1913-1916; Assistant in Office of the President, Kansas State Agricultural College, April 15, 1916—.

Office A 32; Res. 1001 Fremont St.

FLORENCE ELIZABETH BYRD,

Assistant in Boys' and Girls' Club Work, Division of College Extension.

Student, Teachers' School of Training, Valparaiso University, 1906-1907; Instructor, Public Schools of Indiana, 1907-1911; Student, Stout Institute, 1911-1913; Supervisor of Domestic Science and Art, Greencastle (Indiana) High School, 1913-1914; Instructor in Domestic Art, Technical and Manual Training High Schools, Indianapolis, Indiana, 1914-1915; Organizer and Instructor of Home Economics Department, De Pauw University, Summer, 1915, and year 1915-1916; Student, University of Wisconsin, Summer, 1916; Graduate, Stout Institute, 1916; Assistant in Boys' and Girls' Club Work, Division of College Extension, Kansas State Agricultural College, September 1, 1916—.

MINNIE SEQUIST, A. B.,

Specialist in Home Economics, Division of College Extension.

A. B., Kansas State Normal School; Student, Kansas State Agricultural College, Summer, 1912; Graduate, Stout Institute, 1916; Teacher, Kansas Public Schools, Eleven Years; Specialist in Home Economics, Division of College Extension, Kansas State Agricultural College, September 1, 1916—.

Office A 35; Res. ———.

THOMAS SYLVESTER TOWNSLEY,[11] B. S.,

Assistant in Poultry Husbandry.

B. S., Purdue University, 1916; Assistant in Poultry Husbandry, Kansas State Agricultural College, September 1, 1916—.

Office Ag 38 A; Res. ———.

SUPERINTENDENTS

STANLEY PENRHYN CLARK, B. S.,

Superintendent, Colby Branch Agricultural Experiment Station.

B. S., Kansas State Agricultural College, 1912; Instructor, Nashwauk (Minnesota) High School, 1912 - March 1, 1914; Superintendent, Colby Branch Agricultural Experiment Station, March 1, 1914—.

Office and Res., Colby, Kansas.

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9. Temporary appointment.

11. Appointment for the year 1916-1917.

FRANCIS JOHN TURNER,[1]

Superintendent, Dodge City 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; Superintendent, Ogallah Branch Agricultural Experiment Station, 1909-1913; Superintendent, Dodge City Branch Agricultural Experiment Station, 1913 - April 1, 1916.

CHARLES ELMER CASSEL, B. S.,

Superintendent, Tribune Branch Agricultural Experiment Station.

B. S., Kansas State Agricultural College, 1910; Foreman, Tribune Branch Agricultural Experiment Station, 1912-1914; Superintendent, ibid., 1914—.
Office and Res., Tribune, Kansas.

GEORGE SELICK KNAPP, B. S.,

Superintendent, Garden City Branch Agricultural Experiment Station.

B. S., in M. E., Kansas State Agricultural College, 1914; Assistant in Machine Shops, Highland Park College, 1908-1910; Instructor in Mechanical Drawing, Simpson College, 1911-1912; Assistant in Gas Engineering, Kansas State Agricultural College, 1913-1914; Agent, Irrigation Investigations, United States Department of Agriculture, 1914; Acting Superintendent, Garden City Branch Agricultural Experiment Station, Kansas State Agricultural College, December 1, 1915 - April 1, 1916; Superintendent, ibid., April 1, 1916—.
Office and Res., Garden City, Kansas.

M. W. KIRKPATRICK,

Superintendent, Dodge City Branch Agricultural Experiment Station.

Superintendent, Dodge City Branch Agricultural Experiment Station, Kansas State Agricultural College, April 1, 1916—.
Office and Res., Dodge City, Kansas.

AGRICULTURAL AGENTS

PLEASANT ELIJAH CRABTREE,

District Demonstration Agent, Western Kansas, Division of College Extension.

Student, Fort Scott Normal Institute, 1885; Student, Lamar (Missouri) 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; Specialist in Farm Management, Division of College Extension, Kansas State Agricultural College, 1908 - January, 1916; District Agricultural Agent, Division of College Extension, ibid., January 1, 1916—.
Office and Res., Scott City, Kansas.

WILLIAM ARMFIELD BOYS, B. S.,

District Demonstration Agent, West Central Kansas, Division of College Extension.

B. S., Kansas State Agricultural College, 1904; Farmer, Lee's Summit, Missouri, 1904-1906; Farmer, Goodland, Kansas, 1906-1911; Assistant Cerealist, University of California, 1911-1912; District Demonstration Agent, West Central Kansas, Division of College Extension, Kansas State Agricultural College, October, 1912—.
Office and Res., Hays, Kansas.

LEE HAM GOULD, B. S.,

District Demonstration Agent, Southwest Kansas, Division of College Extension.

B. S., Kansas State Agricultural College, 1912; Farm Manager and Grain Buyer for W. H. Gould and Sons, 1912-1913; District Demonstration Agent, Southwest Kansas, Division of College Extension, Kansas State Agricultural College, October 1, 1913—.
Office and Res., Dodge City, Kansas.

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1. Resigned.

CARL G. ELLING, B. S.,

District Demonstration Agent, Southeast Kansas, Division of College Extension.

B. S., Kansas State Agricultural College, 1904; Graduate Student, ibid., June to October, 1904; Assistant in Department of Animal Husbandry, Santiago de las Vegas, Cuba, 1904-1907; Assistant in Animal Husbandry, Kansas State Agricultural College, 1907-1909; in Charge of Live Stock Department on Sugar Plantation, Constancia, Cuba, 1909-1911; Farmer and Stockman, 1911-1914; District Demonstration Agent for Southwest Kansas, Division of College Extension, Kansas State Agricultural College, 1914—.

Office and Res., Parsons, Kansas.

HAROLD THEODORE NIELSON, B. S.,

District Demonstration Agent, Northwest Kansas, Division of College Extension.

B. S., Kansas State Agricultural College, 1903; Graduate Student, Iowa State College, 1903-1904; Scientific Assistant in Agronomy, Bureau of Plant Industry, United States Department of Agriculture, 1904-1909; General Farming, 1909-1911; Assistant in Coöperative Experiments, Kansas State Agricultural College, 1911; Forage Expert, Philippine Bureau of Agriculture, Manila, Philippine Islands, 1911-1913; District Demonstration Agent, Northwest Kansas, Division of College Extension, Kansas State Agricultural College, 1914—.

Office and Res., Norton, Kansas.

CHARLES HENRY TAYLOR,[7] B. S. A.,

Atchison County Agricultural Agent, Division of College Extension.

B. S. A., University of Missouri, 1908; Stock and Fruit Farmer, Shubert, Nebraska, March, 1909 - December, 1913; Lecturer on Animal Husbandry, Division of College Extension, Kansas State Agricultural College, January 1, 1914 - February 1, 1915; Atchison County Agricultural Agent, Division of College Extension, ibid., January 1, 1915—.

Office and Res., Effingham, Kansas.

PONTUS HENRY ROSS,[7] B. S.,

Leavenworth County Agricultural Agent, Division of College Extension.

B. S., Kansas State Agricultural College, 1902; in Charge of United States Experiment Station, Kenai, Alaska, 1903-1907; Farmer, 1907-1911; Teacher of Agriculture, Jewell City Public Schools, 1911-1912; Leavenworth County Agricultural Agent, Division of College Extension, Kansas State Agricultural College, 1912—.

Office and Res., Leavenworth, Kansas.

FRANK PALMER LANE,[7] B. S.,

Harvey County Agricultural Agent, Division of College Extension.

B. S., Oklahoma College of Agriculture and Mechanic Arts, 1913; Graduate, Kansas State Normal School, 1904; Superintendent, Grenola Public Schools, 1905-1906; Superintendent, Cleveland (Oklahoma) Public Schools, 1907-1911; Harvey County Agricultural Agent, Division of College Extension, Kansas State Agricultural College, 1913—.

Office and Res., Newton, Kansas.

EVEREST JOHN MACY,[7] B. S.,

Montgomery County Agricultural Agent, Division of College Extension.

B. S., Earlham College, 1904; Teacher, Indiana Public Schools, 1900-1901; Field Assistant, United States Geological Survey, Summer, 1903; Instructor, Westfield (Indiana) High School, 1904-1907; Assistant Chemist, Florida Agricultural Experiment Station, 1907-1908; Instructor in Science, Rochester (Indiana) College, 1908-1909; Instructor in Chemistry and Physics, Kokomo (Indiana) High School, 1909-1910; Principal, Westfield (Indiana) Academy, 1910-1911; Instructor in Science, Scott County High School, 1911-1913; Montgomery County Agricultural Agent, Division of College Extension, Kansas State Agricultural College, 1913—.

Office and Res., Independence, Kansas.

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7. The U. S. Department of Agriculture and the Farm Bureau of the county cooperating.

WARREN ELMER WATKINS,[7] B. S.,

Allen County Agricultural Agent, Division of College Extension.

B. S., Kansas State Agricultural College, 1906; Dairy Work, Butte, Montana, 1907; General Farming, 1907-1910; Graduate Student, University of Colorado, 1910-1911; with Department of Entomology, Kansas State Agricultural College, 1912-1913; Allen County Agricultural Agent, Division of College Extension, ibid., 1913—.
Office and Res., Iola, Kansas.

AMBROSE DICKSON FOLKER,[7] B. S.,

Jewell County Agricultural Agent, Division of College Extension.

B. S., Iowa State College, 1911; Farmer, Clark County, Missouri, 1911-1913; Jewell County Agricultural Agent, Division of College Extension, Kansas State Agricultural College, 1914—.
Office and Res., Mankato, Kansas.

OTTO C. HAGANS,[7] B. S.,

Miami County Agricultural Agent, Division of College Extension.

B. S., Kansas State Agricultural College, 1911; Instructor in Agriculture and Science, Atchison County High School, 1912-1914; Miami County Agricultural Agent, Division of College Extension, Kansas State Agricultural College, 1914—.
Office and Res., Paola, Kansas.

CAMPBELL KENNEDY PECK,[7]

Linn County Agricultural Agent, Division of College Extension.

Student, Kansas State Agricultural College, 1890-1892, 1893-1894; in Charge of Government Farm, Shawnee, Oklahoma, 1892-1893; in Charge of Government Farm, Pipestone, Minnesota, 1894-1903; in Charge of Government Farm, Mount Pleasant, Michigan, 1903-1905; Teacher of Agriculture, Government School, Pipestone, Minnesota, 1905-1907; Farmer and Horticulturist, Jewell, Kansas, 1907-1913; Teacher of Agriculture, Jewell High School, 1913-1914; Linn County Agricultural Agent, Division of College Extension, Kansas State Agricultural College, 1914—.
Office and Res., Mound City, Kansas.

HUBERT LOWELL POPENOE,[7] B. S.,

Lyon County Agricultural Agent, Division of College Extension.

B. S., Kansas State Agricultural College, 1909; Farmer and Stockman, 1909-1912; Director in Agriculture, State High School, Alexandria, Minnesota, 1912-1914; Lyon County Agricultural Agent, Division of College Extension, Kansas State Agricultural College, 1914—.
Office and Res., Emporia, Kansas.

JACOB CLAUDE HOLMES,[7] B. S.,

Cowley County Agricultural Agent, Division of College Extension.

B. S., Kansas State Agricultural College, 1913; Farmer, Eureka, 1913-1915; Cowley County Agricultural Agent, Division of College Extension, Kansas State Agricultural College, August 1, 1915—.
Office and Res., Winfield, Kansas.

KARL KNAUS,[7] B. S.,

Cloud County Agricultural Agent, Division of College Extension.

B. S., Kansas State Agricultural College, 1914; Farmer, Benedict, 1914-1915; Cloud County Agricultural Agent, Division of College Extension, Kansas State Agricultural College, January 10, 1916—.
Office and Res., Concordia, Kansas.

VALENTINE MEACHAM EMMERT,[7] B. S.,

McPherson County Agricultural Agent, Division of College Extension.

B. S., Kansas State Agricultural College, 1901; Farmer, Blue Rapids, 1901-1909; Farmer, Brogado, Texas, 1911; Instructor, Doran (Minn.) Consolidated Schools, 1913-1914; Instructor in Agronomy, Buffalo (Minn.) High School, 1914-1916; McPherson County Agricultural Agent, Division of College Extension, Kansas State Agricultural College, April 1, 1916—.
Office and Res., McPherson, Kansas.

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7. The U. S. Department of Agriculture and the Farm Bureau of the county cooperating.

RAYMOND OLIVER SMITH,[7] B. S. A.,

Wilson County Agricultural Agent, Division of College Extension.

B. S. in Agriculture, University of Nebraska, 1915; Student Assistant in Experiment Station, ibid., Summers, 1913 and 1914; Instructor in Agriculture, Geneva (Nebraska) High School, 1915 - April, 1916; Wilson County Agricultural Agent, Division of College Extension, Kansas State Agricultural College, April 6, 1916—.

Office and Res., Fredonia, Kansas.

JOHN D. LEWIS,[7] B. S.,

Nemaha County Agricultural Agent, Division of College Extension.

B. S., Pennsylvania State College, 1912; Instructor, Pennsylvania Public Schools, 1906-1907; Assistant in Animal Husbandry, Kansas State Agricultural College, 1912-1914; Instructor in Animal Husbandry, ibid., September 1 to December 1, 1914; in Charge of Government Demonstration Live-stock Farm, Iberia, Louisiana, December 1, 1914 - June 1, 1916; Nemaha County Agricultural Agent, Division of College Extension, Kansas State Agricultural College, June 1, 1916—.

Office and Res., Seneca, Kansas.

FELLOWS

HARRY WINFIELD CAVE, B. S. A.,

Fellow in Dairy Husbandry.

B. S. A., Iowa State College, 1914; Fellow in Dairy Husbandry, Kansas State Agricultural College, 1914—.

Office D 30; Res. 1115 Bluemont Ave.

JESSE JONATHAN FREY, D. V. M.,

Fellow in Bacteriology.

D. V. M., Kansas State Agricultural College, 1914; Private Veterinary Practice, Latham, Kansas, Summer, 1914; Fellow in Bacteriology, Kansas State Agricultural College, 1914—.

Office V 52; Res. R. R. 8.

WALTER ALBERT BUCK, B. S.,

Fellow in Engineering.

B. S. in Electrical Engineering, Kansas State Agricultural College, 1913; Graduate Student, ibid., 1913-1914; Steam Turbine Research Work, General Electric Company, June to November, 1914; Fellow in Engineering, Kansas State Agricultural College, November, 1914—.

Office E. 32; Res. 1419 Laramie St.

JOHN CARSON RIPPERTON, A. B.,

Fellow in Chemistry.

A. B., Fairmount College, 1913; Fellow in Chemistry, University of Nebraska, 1913-1914; Instructor, Fairmount College, Summer School, 1914; Instructor in Physics and Chemistry, Wichita High School, 1914-1915; Fellow in Chemistry, Kansas State Agricultural College, July 1, 1915—.

CLIFF ERRETT AUBEL, B. S.,

Fellow in Animal Husbandry.

B. S., Pennsylvania State College, 1915; Fellow in Animal Husbandry, Kansas State Agricultural College, 1915—.

Office Ag 15; Res. 511 N. Fourteenth St.

LORENZO BECKLEY MANN, B. S. A.,

Fellow in Animal Husbandry.

B. S. A., Kansas State Agricultural College, 1915; Fellow in Animal Husbandry, ibid., 1915—.

Office Ag 13; Res. 511 N. Fourteenth St.

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7. The U. S. Department of Agriculture and the Farm Bureau of the county cooperating.

CLYDE WILLIAM MULLEN, B. S.,

Fellow in Cereal Crops.

B. S., Oklahoma Agricultural and Mechanical College, 1915; Fellow in Cereal Crops, Kansas State Agricultural College, 1915—.
Office Ag 79; Res. 904 Bluemont Ave.

HERSCHEL SCOTT, B. S. A.,

Fellow in Soils.

B. S. A., University of Kentucky, 1915; Fellow in Soils, Kansas State Agricultural College, 1915—.
Office Ag 55; Res. 1615 Anderson Ave.

ERNEST EDWARD DALE, A. B.,

Fellow in Horticulture.

A. B., University of Nebraska, 1913; Graduate Student, ibid., 1914-1915; Fellow in Horticulture, Kansas State Agricultural College, November 1, 1915—.
Office H 33; Res. 904 Bluemont Ave.

OTHER OFFICERS

JACOB LUND, M. S.,

Superintendent of Heat and Power.

B. S., Kansas State Agricultural College, 1883; Steam Fitter and Instructor in Blacksmithing, ibid., 1883-1886; M. S., ibid., 1886; Machinist, Santa Fe 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., 1912-1914; Superintendent of Heat and Power, ibid., 1914.
Office S 34; Res. 1420 Fairchild Ave.

JAMES THOMAS LARDNER,

Financial Secretary and Purchasing Agent.

Student, Kansas Normal College, Fort Scott, 1891-1893; Instructor, Kansas Public Schools, 1893-1896; Student, Kansas State Normal School, 1896-1897; Bookkeeper, Assistant Bank Cashier, and Bank Cashier, 1898-1913; Financial Secretary and Purchasing Agent, Kansas State Agricultural College, 1913—.
Office and Res., Topeka, Kansas.

JESSIE McDOWELL MACHIR,

Registrar.

Assistant Registrar, University of Kansas, August, 1910-1913; Registrar, Kansas State Agricultural College, 1913—.
Office A 29; Res. 1645 Fairchild Ave.

ROSCOE TOWNLEY NICHOLS, B. S., M. D.,

College Physician.

B. S., Kansas State Agricultural College, 1899; M. D., Northwestern University Medical School, 1902; Physician and Surgeon, Liberal Kansas, 1902 - February 1, 1914; College Physician, Kansas State Agricultural College, February 1, 1914—.
Office A 65; Res. 1420 Humboldt St.

MARIE ANNA GREENE, A. M., M. D.,

Assistant College Physician.

A. B., University of Kansas, 1904; Fellow in Philosophy, ibid., 1905; A. M., ibid., 1906; M. D., ibid., 1908; Medical Practitioner, Kansas City, Kansas, and Kansas City, Missouri, 1908-1914; Assistant College Physician, Kansas State Agricultural College, 1914—.
Office A 59; Res. 1725 Poyntz Ave.

GEORGE FRANKLIN WAGNER, B. S.,

Custodian.

B. S., Kansas State Agricultural College, 1899; Custodian, ibid., January 15,1914—.
Office A 47; Res. 1633 Fairchild Ave.

GEORGE RICHARD PAULING,

Engineer of Power Plant.

Oiler in Power Plant, Metropolitan Street Railway, Kansas City, Missouri, 1900-1901; Switchboard Operator, ibid., 1901-1903; Construction Work, General Electric Company, 1903-1904; Student in Night School, Finley Engineering College, 1905-1906; Assistant Engineer of Power Plant, Metropolitan Street Railway, Kansas City, Missouri, 1904-1908; Night Engineer, Missouri River Power Plant, ibid., 1908-1911; Chief Engineer, ibid., 1911-1913; Engineer of Power Plant, Kansas State Agricultural College, November 1, 1913—.
Office E 27; Res. 1021 Fremont St.

ALFRED LESTER CLAPP,[1] B. S.,

Farm Foreman.

B. S., Kansas State Agricultural College, 1914; Farm Foreman, ibid., 1914 - October 1, 1916.
Office and Res., R. R. 8.

Agricultural Experiment Station

Officers of the Station

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

ADMINISTRATION—

W. M. JARDINE, Director.
J. T. WILLARD, Vice Director.
J. T. LARDNER, Financial Secretary.
E. E. JONES, Research Assistant.

AGRONOMY—

L. E. CALL, in Charge.
CECIL SALMON, Crops.
C. C. CUNNINGHAM, Coöperative Experiments.
B. S. WILSON, Coöperative Experiments.
R. I. THROCKMORTON, Soils.
W. E. GRIMES, Farm Management.
RALPH KENNEY, Crops.
M. C. SEWELL, Soils.
R. P. BLEDSOE, Crops.
R. K. BONNETT, Crops.
A. E. MCCLYMONDS, Farm Superintendent.

ANIMAL HUSBANDRY—

W. A. COCHEL, in Charge.
E. N. WENTWORTH, Animal Breeding.
C. W. MCCAMPBELL, Horse Feeding Investigations.
C. M. VESTAL, Animal Nutrition.
A. M. PATERSON, Beef Cattle.
RAY GATEWOOD, Beef Cattle.
E. VANDERWILT, Experimental Records.
LESLIE ROSS, Herdsman.

1. Resigned.

BACTERIOLOGY—

L. D. BUSHNELL, in Charge.
O. W. HUNTER, Dairy Bacteriology.
J. G. JACKLEY, Poultry Disease Investigations.
GRACE GLASGOW, General Investigations.
P. T. GAINEY, Soil Bacteriology.

BOTANY—

H. F. ROBERTS, in Charge.
E. C. MILLER, Plant Physiology.
L. E. MELCHERS, Plant Pathology.
ROBERT SCHMIDT, Seed Analyst.

CHEMISTRY—

J. T. WILLARD, in Charge.
C. O. SWANSON, General Investigations.
R. C. WILEY, Feeding Stuffs and Fertilizer Analysis.
A. G. HOGAN, Animal Nutrition.
E. L. TAGUE, Protein Investigations.
W. L. LATSHAW, Soil Analysis.
R. H. NEEDHAM, Analyst Proprietary Stock Remedies.

DAIRY HUSBANDRY—

O. E. REED, in Charge.
J. B. FITCH, Dairy Production.
W. E. TOMSON, Dairy Manufactures.
N. E. OLSON, Dairy Manufactures.
G. S. HINE, State Dairy Commissioner.
H. M. JONES, Deputy State Dairy Commissioner.
C. E. BUCHANAN, Herdsman.

ECONOMICS—

THEODORE MACKLIN, Agricultural Economics.

ENTOMOLOGY—

G. A. DEAN, in Charge.
J. H. MERRILL, Fruit Insect Investigations.
J. W. MCCOLLOCH, Staple Crop Insect Investigations.
W. P. HAYES, Staple Crop Insect Investigations.

FORESTRY—

C. A. SCOTT, State Forester, in Charge.

HORTICULTURE—

ALBERT DICKENS, in Charge.
M. F. AHEARN, Vegetables and Forcing Crops.
D. E. LEWIS, Diseases of Fruits and Vegetables.
F. S. MERRILL, Cultural Methods and Fertilizer Investigations.

MILLING INDUSTRY—

L. A. FITZ, in Charge.
LEILA DUNTON, Wheat and Flour Investigations.
L. L. LEEPER, Miller.
A. E. LANGWORTHY, Feed Control.
O. C. MILLER, Feed Control.
L. G. HEPWORTH, Feed Control.

POULTRY HUSBANDRY—

W. A. LIPPINCOTT, in Charge.
F. E. MUSSEHL, General Investigations.
N. L. HARRIS, Superintendent of Poultry Plant.

VETERINARY MEDICINE—
F. S. SCHOENLEBER, in Charge.
L. W. GOSS, Histology.
T. P. HASLAM, Pathology.
R. V. CHRISTIAN, Hog Cholera Serum Manufacture.
O. M. FRANKLIN, Veterinary Medicine.
C. W. HOBBS, Field Veterinarian.

ZOÖLOGY—
R. K. NABOURS, in Charge.
J. E. ACKERT, Parasitology.
L. E. DICE, Injurious Mammals.

Branch Experiment Stations

FORT HAYS—
C. R. WEEKS, Superintendent.
A. L. HALLSTED, Dry Farming Investigations.
F. A. KIENE, Cereal Crop Investigations.
R. E. GETTY, Forage Crop Investigations.
E. J. MONTAGUE, Executive Clerk.

GARDEN CITY—
G. S. KNAPP, Superintendent.
C. B. BROWN, Dry-land Agriculture Investigations.

DODGE CITY—
F. J. TURNER, Superintendent.

TRIBUNE—
C. E. CASSEL, Superintendent.

COLBY—
S. P. CLARK, Superintendent.
J. B. KUSKA, Dry-land Agriculture Investigations.

Engineering Experiment Station

Officers of the Station

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

ADMINISTRATION—
A. A. POTTER, Director.
LOUISE SCHWENSEN, Secretary.

APPLIED MECHANICS AND MACHINE DESIGN—
R. A. SEATON, in Charge.
P. J. FREEMAN, Strength of Materials.
M. R. BOWERMAN, Machine Design.
I. I. TAYLOR, General Investigations.

ARCHITECTURE—
J. D. WALTERS, in Charge.
W. A. ETHERTON, Rural Architecture.
F. C. HARRIS, Assistant.
STANLEY A. SMITH, Assistant.

CHEMISTRY—
J. T. WILLARD, in Charge.
H. H. KING, General Investigations.

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

ELECTRICAL ENGINEERING—
C. E. REID, in Charge.
G. B. MCNAIR, General Investigations.

FARM MACHINERY—
F. A. WIRT, in Charge.
R. E. WISEMAN, Assistant.

HIGHWAY AND IRRIGATION ENGINEERING—
W. S. GEARHART, in Charge of Highway Engineering.
H. B. WALKER, in Charge of Irrigation and Drainage Engineering.

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

SHOP PRACTICE—
W. W. CARLSON, in Charge.

STEAM AND GAS ENGINEERING—
A. A. POTTER, in Charge.
S. L. SIMMERING, General Investigations.
W. H. SANDERS, Farm Motors.
J. C. SHUTT, Assistant.
E. V. COLLINS, Assistant.
W. A. BUCK, Fellow.

The College Cadet Corps

(DISTINGUISHED COLLEGE, 1914-1915.)

Commissioned and Noncommissioned Officers

COMMANDANT OF CADETS.

First Lieutenant LAURANCE O. MATHEWS, Fourth U. S. Infantry,
Professor of Military Science and Tactics.

Assistant Commandant of Cadets,
Commissary Sergeant EDWARD L. CLAEREN, U. S. A. (Retired).

Band Leader,
BURR HOWEY OZMENT.

CORPS ORGANIZATION

Cadet Colonel	O. B. Burtis
Cadet Lieutenant Colonel	G. L. Farmer
Cadet Major, First Battalion	A. E. Hopkins
Cadet Major, Second Battalion	W. E. Deal
Cadet Major, Third Battalion	E. R. Martin
Cadet Captain and Adjutant	D. D. Hughes
Cadet Captain and Quartermaster	H. J. Adams
Cadet Captain and Commissary	H. B. Dudley
Cadet Captain and Range Officer (Coach)	O. W. Broberg
Cadet Lieutenant and Adjutant, First Battalion	G. C. Smith
Cadet Lieutenant and Adjutant, Second Battalion	W. W. Frizzell
Cadet Lieutenant and Adjutant, Third Battalion	G. A. Bolz
Cadet Sergeant Major	Zeno Rechel
Cadet Quartermaster Sergeant	D. H. McElvain
Cadet Commissary Sergeant	W. H. Hilts
Cadet Color Sergeant	N. O. Davis
Cadet Color Sergeant	T. O. Garinger
Cadet Chief Trumpeter	D. C. Bunderant
Cadet Sergeant Major, First Battalion	G. Withsitt
Cadet Sergeant Major, Second Battalion	H. M. Gillespie
Cadet Sergeant Major, Third Battalion	R. V. Hill

Company A

Captain:
A. E. Hylton

First Lieutenant:
F. N. Jordan

Second Lieutenant:
F. K. Hanson

First Sergeant:
W. A. Campbell

Quartermaster Sergeant:
A. E. Fincham

Sergeants:
L. A. Tilton
W. A. Ball
J. D. Chapman
M. L. Thackery

Corporals:
M. Evans
G. M. Umberger
J. B. Hinds
V. W. Stambough
F. B. Wenn
W. F. Runyon

Company B

Captain:
J. B. Sweet

First Lieutenant:
C. T. Bischoff

Second Lieutenant:
G. W. Givin

First Sergeant:
C. S. Rude

Quartermaster Sergeant:
E. H. Teagarden

Sergeants:
P. N. Rorst
L. Alford
C. L. Howard
E. D. McCullem

Corporals:
H. C. Colglazier
V. L. Drumm
John Akers
M. P. Schlagel
H. E. Bell
H. C. Altman

Company C

Captain:
Earl Taylor

First Lieutenant:
T. R. Pharr

Second Lieutenant:
W. E. Paterson

First Sergeant:
H. J. Helmkamp

Quartermaster Sergeant:
C. F. Rodewalt

Sergeants:
E. F. Whedon
R. V. May
C. G. Libbey
G. C. Ware

Corporals:
C. W. Bower
W. J. Clapp
C. W. Crites
G. A. Miller
B. F. Barnes
J. H. Parker

Company D

Captain:
K. E. Kenyon

First Lieutenant:
E. F. Whitcomb

Second Lieutenant:
J. E. Hill

First Sergeant:
L. V. Ritter

Quartermaster Sergeant:
J. A. White

Sergeants:
C. G. Hornbaker
F. Haggerty
C. E. Black
H. F. Rippey

Corporals:
J. M. Williams
E. E. Eckelman
C. E. Freeto
S. W. Honeywell
C. N. Sigler
F. S. Papez

Company E

Captain:
F. M. Pickerell

First Lieutenant:
O. T. Bonnett

Second Lieutenant:
N. Pearson

First Sergeant:
F. H. Gulick

Quartermaster Sergeant:
H. H. Dinsmore

Sergeants:
J. C. Wood
M. E. Myer
C. W. Bower
C. P. Neiswender

Corporals:
R. W. Kilbourn
R. F. Coffee
R. A. Randall
L. B. Oglevie
C. S. Briggs
W. W. Fetrow

Company F

Captain:
L. C. Howard

First Lieutenant:
I. O. Mall

Second Lieutenant:
H. Borland

First Sergeant:
J. E. Williamson

Quartermaster Sergeant:
W. Welsh

Sergeants:
C. F. Layton
C. O. Chubb
O. F. Blecha
L. C. Moser

Corporals:
C. C. Davidson
A. W. Foster
R. J. Spurling
O. Steanson
V. Duchesne
Edwin Adee

Company G

Captain:
L. H. Bixby

First Lieutenant:
A. L. Willis

Second Lieutenant:
J. L. Dickerson

First Sergeant:
P. W. Smith

Quartermaster Sergeant:
D. S. McHugh

Sergeants:
S. B. Replogle
R. R. Stafford
Roy Williams
J. E. Harrold

Corporals:
D. M. Braum
J. A. Black
G. W. Schafer
H. L. Kapka
B. B. Brewer
P. L. Mann

Company H

Captain:
G. B. Williams

First Lieutenant:
A. M. Harvey

Second Lieutenant:
H. Dunham

First Sergeant:
W. K. Charles

Quartermaster Sergeant:
W. Bass

Sergeants:
O. W. Bowell
D. M. Geeslin
F. H. Hull
R. H. Clawson

Corporals:
Ralph Nutter
W. A. Nye
F. F. Young
A. B. Cullum
C. B. Jones
J. C. Morton

Company I

Captain:
C. Fletcher

First Lieutenant:
C. K. Chaplin

Second Lieutenant:
D. W. Woolley

First Sergeant:
S. P. Shields

Quartermaster Sergeant:
H. I. Hollister

Sergeants:
C. L. Bower
I. Wulfekuhler
L. A. Plumb
Otto B. Githens

Corporals:
C. F. Barb
D. M. Fullington
V. L. Durand
W. F. Turnbull
S. E. Kelsey
J. C. Gulledge

Company K

Captain:
E. A. Moffatt

First Lieutenant:
G. E. Manzer

Second Lieutenant:
R. V. Knapp

First Sergeant:
A. K. Ramey

Quartermaster Sergeant:
A. E. Cook

Sergeants:
R. F. Sidles
G. F. Hicks
C. M. Barrunger
F. Hawkins

Corporals:
C. W. Rossdeutscher
H. Cross
E. L. Bebb
F. R. Stone
R. D. Nixon
H. B. Lawton

Engineer Company

Captain:
W. Buck

First Lieutenant:
H. R. Johnston
J. L. Dickerson

Second Lieutenant:
R. F. Mirick

Sergeants:
H. Terrill
E. T. Englesby
T. F. Bright
R. W. Haege
C. W. Hickok

Corporals:
A. H. Brewer
L. J. Rees
G. S. Douglass
W. E. Paterson
J. J. Michaels
E. B. Goldsmith

Company L

Captain:
J. Sellon

First Lieutenant:
H. R. Horak

Second Lieutenant:
L. C. Allis

First Sergeant:
W. H. Curtis

Quartermaster Sergeant:
H. A. Acre

Sergeants:
F. J. Maas
L. B. Vorhies
W. B. Gaiser
R. C. Spratt

Corporals:
J. G. Meibeck
R. S. Westcott
E. R. Manners
J. L. Woodhouse
G. A. Foltz
C. Huycke

Signal Company

Captain:
H. M. McClelland

First Lieutenant:
H. W. McClelland

Second Lieutenant:
T. A. Kennicott

Sergeant, First Class:
N. E. Howard

Sergeants:
L. K. Saum
E. Stephenson
G. L. Balderson

Corporals:
H. L. Robinson
W. A. Norman
W. C. Stout
E. C. Sawyer

College Band

DIRECTOR,
BURR HOWEY OZMENT

Principal Musician ..... A. M. Butcher
Drum Major ..... Chas. Zimmerman

Flute and Piccolo:
H. J. Austin
Wellington Brink

Oboe:
W. B. Palmer

Bassoon:
W. L. Hill

Bb Clarinets:
R. H. Oliver
W. B. Palmer
C. F. Zigler
L. R. Vauter
D. F. Kyle
H. R. Russell
F. J. Scriven
A. C. Small
C. R. Witham
J. S. Painter
K. E. Richardson
L. Souders
J. H. Keer
S. Fairman
R. L. Foster
P. L. Fetzer

Eb Clarinet:
W. Karloski

Alto Clarinet:
F. J. Hanna

Bass Clarinet:
E. V. Floyd

Saxophones:
F. L. Innes
J. D. Kreamer
H. C. Wagner

Horns:
D. E. Dewey
L. B. Wilson
D. C. Servis
H. S. Wise
G. E. Wilkinson
W. E. Forney

Baritones:
C. L. Skelley
L. L. Howenstine
O. S. Brown

Trombones:
J. S. Gulledge
M. L. Coe
W. C. Hall
J. Pratt
J. K. Landon
J. H. Kerr

Cornets:
A. M. Butcher
O. F. Fisher
R. A. Maupin
C. E. Elder
L. L. Cobb
W. Knostman
L. F. Gfeller
J. H. Cool
W. F. Upson

Basses:
G. W. Fisher
C. Long
J. Maniger
E. Zollinger
R. B. Schnatterly

Drums:
L. M. Hanna
S. Williams
P. J. Hill
C. D. West
R. E. Staffe

College Orchestra

ROBERT HENRY BROWN, *Conductor.*

First Violins:
Fred Korsmeier, *Concert Master*
Helen Palmer
G. Wilbur Fisher
Chas. Nichols
Fern Preston
Esther French
Mary Lane
Mary Agnes Wilcox

Second Violins:
Don C. West
Helen Strite
Edith Walsh
Walter B. Adair
Lois Bellomy
Geo. A. Miller

Violas:
Rose French-Brooks
Robert J. Fisher

Cellos:
William B. Dalton
Lawton Hanna
Arthur Newkirk
Morrill Moore
Waldo Heppe

Basses:
Wesley G. Bruce
Clyde Long

Piano:
Frances Stall

Harp:
Cora E. Brown

Oboe:
Walter B. Palmer

Flutes:
Wellington Brink
Hubert E. Small

Clarinets:
Francis Albro
Forrest Zeigler

Horns:
Cecil Elder
Donald Dewey

Trumpets:
Eddell C. Jones
Otto Fisher

Trombones:
John Gullege
Cecil Hanna
Ira K. Landon

Bassoons:
Eustace V. Floyd
Ross W. Hill

Tuba:
Chas. L. Skelley

Drums and Traps:
Roland Hill

Tympani:
Herman Gehrke

Men's Glee Club (Apollo Club)

ARTHUR E. WESBROOK, *Director.*

First Tenors:

H. W. Cave
J. R. Mingle
J. A. White
H. R. Johnson
H. I. Muir

Second Tenors:

R. E. Curtis
F. E. Dickinson
F. C. Lewis
H. D. Read
G. A. Given
D. L. Robinson
B. M. Andrews
F. M. Pickrell
R. V. Knapp

First Basses:

D. S. Jordan
B. J. Taylor
L. B. Mann
R. C. Erskine
F. H. Fairchild
R. E. Stuewe
D. W. Woolley

Second Basses:

A. F. Pyle
M. A. Lindsay
R. R. Cushman
R. H. Whitenack
S. M. Mitchell
A. B. Acre
F. H. Dodge
D. M. McElvain

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 appropriated 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 resolution 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 provisions 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 last 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 agriculture 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 for 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 of 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 great 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. 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. Beginning with 1897, 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 the administration of the institution changed, and during the years that have followed the institution has experienced an era of solid, substantial, and uninterrupted growth, gaining steadily in recognition and in influence over the State.

In 1915-'16 the number of heads of departments and full professors was forty-seven, while the entire Board of Instruction and employees numbered 312. The student enrollment for the year 1915-'16, but not including the spring term, was 3232. In the fifteen-year period 1899-1914 additional buildings to the value of about $500,000 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.

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.

Expansion of courses, with consequent increased flexibility, plasticity, and adaptability of the means of instruction to the various ends of industrial life, marked the following 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 practical things, and is educated toward, rather than away from, an interest in industry and manual exertion. 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.

The College trains directly toward the 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. In engineering, the student may take work in 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.

A second large object of the College, made effective through the Agricultural 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 to obtain such training as will fit competent students to become investigators, and to enter fields of agricultural leadership in the experiment stations, in 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 Division 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 trains, dairy trains, corn trains, alfalfa trains, 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 Division of College Extension, 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 work, and other similar duties.

The Experiment Stations

The Agricultural Experiment Station

The Kansas Agricultural Experiment Station was organized under the provisions of an act of Congress, approved 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 March 16, 1906. This measure pro-

vided, "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.

In the neighborhood of fifty projects, covering practically all phases of agricultural investigation, are being studied by the members of the Experiment Station staff.

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

In 1915 the legislature of Kansas appropriated the sum of $80,000 for the support of the Experiment Station for the biennium 1915-1917. The income of the Experiment Station for the year 1916-1917 is, therefore, derived as follows:

Hatch fund (federal)	$15,000
Adams fund (federal)	15,000
State appropriation (general)	40,000
State appropriation (special):	
Coöperative seed experiments	10,000
Irrigation investigations	2,000
Total	$82,000

The results of the work of the Experiment Station are published in the form of bulletins, circulars, and scientific papers other than bulletins and circulars. These bulletins are of two classes, those which record the results of research work of a purely scientific character and those which present technical information in a simplified form, suitable for the general reader. The circulars are brief and condensed popular presentations of data which call for immediate application, as well as timely and useful information not necessarily new or original. The scientific papers are usually published as reprints of addresses given before scientific bodies. These re-

prints contain original information or report definite steps in the progress of investigations under way.

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 the 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 1916 and 1917. This official, appointed by the Board of Administration, 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 Administration 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 suppress 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 University of Kansas 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, $2500 was appropriated in 1915 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 1913):

"Every person, persons, firm, corporation, company or association that shall stand, travel, advertise or offer for public service in any manner any stallion in the State of Kansas, shall secure a license certificate for such stallion from the Kansas State Live Stock Registry Board, as herein provided. Said board shall consist of the dean of the Division of Agriculture, head of the Animal Husbandry Department, and the head of the Veterinary Department of the Kansas State Agricultural College."

To this board is assigned the duty of licensing stallions used for breeding purposes within the State, and authority to verify their breeding and to classify them under the following heads: pure-bred, grade, cross-bred, and scrub. No animal not thus approved and licensed 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 live stock and conducting demonstrations and experiments therewith."

Stock thus acquired can be sold by the Board of Administration, when in the judgment of the Board it 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 for-

estry" 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."

The State has also placed the Experiment Station in charge of the execution of the acts concerning the manufacture and sale of live-stock remedies and commercial feeding-stuffs (Laws of 1913), and also of commercial fertilizers (Laws of 1907, chapter 217). It is provided by the statutes that every brand of live-stock remedy and every brand of commercial 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 such brand 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 expose 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 collected under these acts are used to defray the necessary expenses incurred in carrying out the provisions of the act.

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.

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 research be conducted on the subject. The hearty coöperation and financial support of all the millers' associations and of other commercial bodies rendered it financially possible to inaugurate this important experimental work until special legislative appropriation could be secured. The legislature of 1913 appropriated $7500 for mill equipment, and there is now installed the best-equipped experimental milling plant in the United States. The department has a seventy-five-barrel model mill and a specially

equipped laboratory for carrying on experimental baking tests and for making certain chemical determinations.

The research work includes a complete study of the growing, harvesting, storing and marketing practices 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 mill 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.

By the act of the legislature (Laws of 1911, ch. 23, p. 46) the Board of Administration is 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 was appropriated for each of the two years 1914 and 1915.

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 1911, ch. 214, p. 378).

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 October 22, 1899, 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 purpose 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 legis-

lature 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 plains 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 and dairy 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 $22,500 for 1916 and $22,500 for 1917.

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.

The 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 expenses of pumping and the cost of equipment necessary for plants of this type, which are common in

the shallow-water districts between Garden City and Scott City and along the Arkansas valley. The "duty of water" and the method of applying water are objects of investigation. For improvements and maintenance of this Station the sum of $6000 was appropriated for the year 1915-'16 and $5000 for the year 1916-'17.

Colby Branch Station

The legislature of 1913 provided for the establishment of a branch experiment and demonstration station near Colby, in northwestern Kansas, "for the purpose of advancing and developing the agricultural, horticultural and irrigation interests of this State and western Kansas." Fifteen thousand dollars was appropriated for the establishment and maintenance of the Colby Station for the biennium 1913-'15. The Station was located upon a tract of three hundred and sixteen acres of land bordering upon the town site of Colby. This land was purchased by the county and deeded to the State for the purposes named above. Operations were begun in March, 1914. Cropping experiments are being conducted under dry-land conditions and under irrigation. Water is being lifted one hundred and fifty feet for irrigating a garden, fruit trees, and a few desirable crops, such as alfalfa, that could not be grown successfully in western Kansas with the natural rainfall. The primary purpose of the Colby Station is to determine the best methods of developing the agriculture of northwestern Kansas and to make it a still more desirable place to live.

The 1915 legislature appropriated for the erection of a dairy barn and silos, for the purchase of a dairy herd, and for the maintenance of the Colby Station, $4000 for 1915-'16 and $3000 for 1916-'17.

Other Branch Stations

Branch stations are maintained at Dodge City and Tribune. 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.

The legislature of 1915 appropriated for the maintenance of the Dodge City Station $2000 for the year 1915-'16 and $2000 for the year 1916-'17, and for the Tribune Station $2500 for 1915-'16 and $2000 for 1916-'17.

The Engineering Experiment Station

The Engineering Experiment Station was established for the purpose of carrying on tests and research work of engineering and manufacturing value to the State of Kansas, and of collecting, preparing, and presenting technical information

in a form readily available for the use of the various industries within the State. It is the intention to make all the work of the Experiment Station of direct importance to Kansas.

All of the equipment of the various engineering and scientific laboratories and shops and of the College power plant are available for this work, while the personnel of the Station staff is made up of professors and instructors from the various departments of the Division of Engineering and from other scientific departments whose work is directly related to the work of this division.

Among the tests now being carried on are investigations of the effect of freezing, before it has hardened, on the strength of concrete, the macadam-making properties of various Kansas stones, relative economy of the use of gasoline and cheaper fuels in internal-combustion engines, the effect of compression on the explosion pressures of various gas-engine fuel mixtures, the comparative advantages of steam and oil traction engines, the use of bituminous coals in gas producers, power-plant economics, the use of gasoline-electric generating sets for isolated plants, as on the farm, the use of the windmill for driving electric generators for farm lighting, the losses in electric transmission lines, and in town and city distribution systems, the mechanical and electrical properties of commercial copper wire used in pole-line construction, and the effect of chemical composition on the durability and protective power of paints.

Various other investigations are being carried on upon brick, concrete, fuels, pipe coverings, belt lacings, glued joints, blacksmith coals, foundry sands, centrifugal pumps, farm water supply, sewage disposal, and problems in farm architecture.

The results of the investigations are published as bulletins and circulars of the Engineering Experiment Station, which are sent free to any citizen of the State upon request. Besides issuing these bulletins, the Station answers yearly many hundreds of requests for information upon matters coming within its field.

Requests for bulletins and general correspondence should be addressed to Engineering Experiment Station, Manhattan, Kan. Requests for information in specific matters should be addressed, so far as it is possible, to the heads of departments in whose fields the particular matters lie.

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 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 522 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 plantings 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 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). Erected 1912; cost of portions now completed, $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 is used by the Departments of Agronomy, Animal Husbandry, Milling Industry, and Poultry Husbandry. This wing contains, besides offices and recitation

rooms of these departments and the general offices of the Agricultural Experiment Station, a complete small flour mill, and laboratories for grain judging. Value of equipment: *Agronomy, $24,002; Animal Husbandry, $2339; Dean's Offices, $1642; Executive Department, $740; Experiment Station, $1657; Milling Industry, $13,366; Poultry Husbandry, $772.

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, offices of the Division of College Extension and of the Department of Student Health, and offices and classrooms of the Departments of Architecture and Drawing, Economics, Education, English Language, English Literature, and Mathematics. Value of equipment, $16,181.

AUDITORIUM. Erected, 1904; cost, $40,000; dimensions, 113 x 125 feet. Has a large stage with drop curtain and scenery. Seating capacity, 2300. Contains also the offices and music rooms of the Department of Music. Value of equipment, $2656.

CHEMISTRY ANNEX. Erected, 1876; cost, $8000; dimensions, 35 x 110 and 46 x 175 feet, in the form of a cross. Originally erected as a chemical laboratory. Reconstructed at a cost of $5000 after a fire in 1900, the building was used from 1902 to 1911 as a women's gymnasium; since 1911, used by the Department of Chemistry. Value of equipment, $7260.

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, $1762.

DAIRY HALL. Erected, 1904; cost, $15,000; dimensions, 72 x 103 feet; one story and basement. Contains butter-manufacturing rooms, hand-separator room, laboratory, classroom, three offices, and two refrigerating rooms. Occupied entirely by the Department of Dairy Husbandry. Value of equipment, $6282.

DENISON HALL. Erected, 1902; cost, $70,000; dimensions, 96 x 166 feet; two stories and basement. The east wing is occupied throughout by the laboratories, classrooms, 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: Chemistry, $29,913; Electrical Engineering, $20,462; Executive, $425; Physics, $10,008.

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,

* The figures for equipment are taken from the reports of June 30, 1915.

classrooms, and offices of the Department of Domestic Science; the second floor is occupied by the laboratories, classrooms, and offices of the Department of Domestic Art. Value of equipment: Domestic Science, $14,476; Domestic Art, $5287; Executive, $225.

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. A portion of the building is two stories high. On the upper floor, which has a floor area of 9260 square feet, are classrooms, drafting rooms, pattern storage room, and offices of the Department of Steam and Gas Engineering, Applied Mechanics and Machine Design, and Shop Practice. The woodworking shop (35 x 219 feet) is equipped with the necessary bench tools and woodworking machinery. Adjoining is the machine shop (40 x 170 feet), supplied with benches and tools and amply equipped with the necessary machine tools. The blacksmith shop (50 x 100 feet) contains 35 forges of modern type, connected with power blast and down-draft exhaust. Adjoining is the lecture hall, with demonstration forge and equipment. The iron foundry (27 x 100 feet) and brass foundry (24 x 34 feet) are well supplied with the necessary equipments. The wash and locker room (36 x 40 feet) contains 250 steel lockers. A general supply room (22 x 24 feet) is conveniently located for storing the necessary small supplies. Value of equipment, $39,194.

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, classrooms 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 and the Department of Public Speaking. Value of equipment: Entomology, $13,579; Zoology, $20,669; Executive, $625; History and Civics, $625; Library, $115,313.

FARM BARN. Erected, 1913; cost, $17,000; a stone structure, dimensions, 80 x 160 feet. The west wing contains nine box stalls and twenty-six single stalls, equipped with sanitary feed mangers and racks and designed especially for the housing of horses. The east wing contains twelve box stalls and thirty single stalls for the breeding cattle and show herd. Center section, office and carriage rooms, with basement for heating apparatus.

FARM MACHINERY 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 Machinery, and is filled with all types of farm machinery. Value of equipment, $8124.

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 classrooms, laboratories, museums, and equipment are modern and ample. Value of equipment: Botany, $23,444; Executive, $195; Forestry, $1012; Horticulture, $11,748.

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. Value of equipment, $1022.

KEDZIE HALL. Erected, 1897; cost, $16,000; dimensions, 70 x 84 feet; two stories and basement. Used from its erection till 1908 by the Departments of Domestic Science and Domestic Art. Basement occupied by the printing plant; first floor taken up by the cafeteria, since the summer of 1915, and by offices of the Department of the English Language; second floor divided into general classrooms and offices used by the Departments of Industrial Journalism and Printing, and the English Language. Value of equipment: English Language, $409; Executive, $145; Industrial Journalism and Printing, $7773.

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 Mechanic Arts, the offices and drafting rooms of the Departments of Civil Engineering, Steam and Gas Engineering, and Architecture, a reading room, an amphitheater for lectures and demonstrations, and the experimental laboratories for applied mechanics, hydraulics, road materials, steam and gas engineering. The engines, turbines, generators, and boilers that furnish power and light for the College are installed in this building. Value of equipment, $96,512.

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, classrooms and offices of the Department of Military Training, and several literary society halls. The west wing (40 x 102 feet) contains the offices of the Directors of Athletics and Physical Education, a large locker room for men, classrooms and offices of the Department of German, and several literary society halls. This building is constructed on the old armory-castle type and is modern in every respect. Value of equipment, $5366.

REPAIR SHOP. Erected 1877; cost, $4000; dimensions, 32 x 80 feet; one story and basement. At an early period used as a horticultural hall; now the headquarters for general College repairs. Value of equipment, $309.

SCHOOL OF AGRICULTURE HALL. 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 classrooms and offices of the School of Agriculture. Value of equipment, $1346.

VETERINARY HALL. Erected, 1908; cost, $70,000; dimensions, 133 x 155 feet; two stories and basement. Occupied by the laboratories, demonstration and dissecting rooms, classrooms and offices of the Department of Veterinary Medicine and Bacteriology. Value of equipment and apparatus: Veterinary Medicine, $17,638; Bacteriology, $8288; Executive, $195.

In addition to the substantial stone buildings mentioned above the College has a number of other buildings, among these the following:

SERUM BARN. Erected, 1914; cost, $3000; dimensions, 92 x 96 feet; contains thirty pens, each 8 x 12 feet, and two feed rooms of the same dimensions. This is a frame and cement building situated three-quarters of a mile north of the College campus.

SERUM BUILDING. Erected, 1914; cost, $7000; constructed of brick; dimensions, 24 x 60 feet; two stories.

In addition to the equipment listed in the preceding paragraphs several other important items might well be mentioned, *e. g.*, live stock, valued at $54,764, and the water-tower, heat-tunnels, etc., valued at $64,273.

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 January 1, 1916, the Library contained 52,120 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 Faculty. 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.—Three 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; and the periodical room, containing current magazines and the important daily and weekly Kansas newspapers. These rooms are freely open to the students and to the public for purposes of reading and study.

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.

Requirements for Admission

The entrance requirements to the College are made broad and flexible, only fundamental subjects being definitely required. These requirements are made upon the supposition that high schools are local institutions in which the courses should be adapted to the needs of the individual localities, and that college entrance requirements should be such as to take the output of the high schools, rather than to determine the nature of the work offered in them.

Persons to be admitted to any department of the College must be at least fourteen years of age. Fifteen units 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. All persons who offer fifteen units of work done in an accredited high school, and accepted by such high school for graduation, will be admitted to the freshman class. One who offers fourteen such units will also be admitted as a freshman, but will be conditioned in one unit. Such deficiency must be made up the first year that the student is in attendance. If not made up within that time college credits are taken in its place.

REQUIRED ENTRANCE SUBJECTS

For courses in the divisions of agriculture, home economics, or general science the high-school work offered must include three units of English, two units of mathematics (algebra and geometry), and one unit of physics. For courses in the division of mechanic arts the high-school work offered must include, in addition to the preceding, another unit of mathematics, of which one-half unit must be algebra and one-half geometry. Students lacking any of these must make them up before graduation, and before being assigned to dependent subjects.

ACCEPTABLE ENTRANCE SUBJECTS

The subjects from which entrance credit may be offered, together with the number of units, are arranged in eight groups, as follows:

GROUP I English	Three or four units
GROUP II Foreign Languages	Latin, one, two, three, or four units Greek, one, two, three, or four units German, one, two, three, or four units French, one, two, three, or four units Spanish, one, two, three, or four units

GROUP III Mathematics	Elementary algebra, one or one and one-half units Plane geometry, one unit Solid geometry, one-half unit Plane trigonometry, one-half unit Advanced algebra, one-half unit
GROUP IV Natural Sciences	Physical geography, one-half or one unit *Physics, one unit *Chemistry, one unit *Botany, one-half or one unit *Zoölogy, one-half or one unit *Physiology, one-half or one unit *General biology, one-half or one unit *General science, one-half or one unit
GROUP V History and Social Sciences	Greek and Roman history, one unit Medieval and modern history, one unit English history, one unit American history, one unit Economics, one-half or one unit Sociology, one-half unit Civics, one-half unit
GROUP VI Normal Training Subjects	Psychology, one-half unit Methods and management, one-half unit Higher arithmetic, one-half unit Reviews— Grammar, twelve weeks Geography, twelve weeks } one unit Reading, twelve weeks *Music, one unit
GROUP VII Industrial Subjects	*Agriculture, one-half or one, two, three, or four units *Drawing, one-half or one unit *Woodwork, one-half, one or two units *Forging, one-half or one unit *Domestic science, one-half, one or two units *Domestic art, one-half, one or two units
GROUP VIII Commercial Subjects	Commercial law, one-half unit Commercial geography, one-half unit Bookkeeping, one-half or one unit *Stenography and typewriting, one-half or one unit

DEFICIENCIES

The courses in the School of Agriculture offered in connection with the College give every needed opportunity for students of the College to make up anything lacking in their preparation for entrance. All such entrance deficiencies 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

* In courses consisting of laboratory work wholly or in part, two periods of laboratory work are to be considered the equivalent of one recitation period.

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

At the discretion of the President, students who present certificates showing credits for college work done in other institutions are allowed hour-for-hour credit on courses in this College in so far as they may be directly applied, or can be accepted as substitutions or electives. Candidates must present to the Committee on Advanced Standing their high-school and college credits certified to by the proper authorities. It is requested also that a college catalogue covering the period of attendance be furnished with the above credentials. In cases in which it is impossible for one to furnish an acceptable certificate concerning work upon which advanced credit is asked, examinations are given, if the subject has been studied under competent instruction.

ADMISSION

ADMISSION BY EXAMINATION. Examinations for admission will be held at the College on Tuesday, September 19, 1916; Monday, January 8, 1917, for the winter term; and Tuesday, April 3, 1917, for the spring term.

ADMISSION BY CERTIFICATE. The applicant is required to submit to the Committee on Admission a certificate of the high-school or academy credit 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 school or academy be presented upon these blanks, in order to expedite the granting of credit to such applicants as are entitled to it.

It is greatly to the advantage of the prospective student to see to it that this blank, properly filled out and indicating the course he wishes to take here, be sent to the College as soon as possible after graduation. A permit to register will then be sent him by the Registrar in advance of his coming in September. This will greatly facilitate the work of entrance. The student will present this permit at the registration room in Nichols Gymnasium, and will not be compelled to wait his turn to meet the Committee on Admission.

LATE REGISTRATION

A considerable amount of extra work and a great deal of confusion is caused by the neglect of students to enroll at the time set for that purpose, and a fee of $1 will be charged those who enroll after the time fixed for the close of registration unless they present a good excuse for their delay.

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) 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.

KANSAS HIGH SCHOOLS AND ACADEMIES IN ACCREDITED RELATIONS WITH THE COLLEGE

(Graduates admitted without examination)

Abilene
Admire
Alden
Alma
Almena
Alta Vista
Alton
Altoona
Americus
Andover
Anthony
Argentine
Arkansas City
Ashland
Assaria
Atchison
Atchison County (Effingham)
Atlanta
Attica
Augusta
Axtell
Baker University Academy (Baldwin)
Baldwin
Barnard
Basehor
Bazine
Beattie
Belle Plaine
Belleville
Beloit
Belpre
Benedict
Bethel College (Newton)
Beverly
Blue Mound
Blue Rapids
Bonner Springs
Bronson
Brookville
Brownell
Bucklin
Buffalo
Bunker Hill
Burden
Burlingame
Burlington
Burns
Burr Oak
Burrton
Caldwell
Caney
Canton
Carbondale
Cathedral High School (Leavenworth)
Catholic High School (Kansas City)
Cawker City
Cedar Vale
Centralia
Chanute
Chase
Chase County (Cottonwood Falls)
Cheney
Cherokee County (Columbus)
Cherryvale
Chetopa
Cheyenne County (St. Francis)
Cimarron
Circleville
Claflin
Clay County (Clay Center)
Clearwater
Clifton
Clyde
Coffeyville
Coldwater
Colony
Concordia
Conway Springs
Corning
Council Grove
Courtland
Crawford County (Cherokee)
Cuba
Cunningham
Decatur County (Oberlin)
Delphos
Derby
Dexter
Dickinson County (Chapman)
Dixon Township (Argonia)
Dodge City
Douglass
Downs
Easton
Edna
Edwardsville
El Dorado
Ellinwood
Ellis
Ellsworth
Elsmore
Elwood
Emporia
Englewood
Enterprise
Erie
Esbon
Eskridge
Eudora
Eureka
Everest
Fairview
Florence
Formoso
Fort Scott
Fowler
Frankfort
Fredonia
Friends University Academy (Wichita)
Frontenac
Galena
Garden City
Garden Plain
Gardner
Garnett
Gas
Geneseo
Girard
Glasco
Glen Elder
Goddard
Goff
Grant County (New Ulysses)
Great Bend
Greeley County (Tribune)
Greenleaf
Grenola
Gypsum
Halstead
Hamilton
Hanover
Harper
Hartford
Harveyville
Haven
Havensville
Hays
Hazelton
Herington

Hesston Academy
Hiawatha
Highland
Hill City
Hillsboro
Hoisington
Holton
Hope
Horton
Howard
Hugoton
Humboldt
Hutchinson
Ingalls
Iola
Irving
Jamestown
Jetmore
Jewell City
Junction City
Kansas City
Kincaid
Kingman
Kinsley
Kiowa
Kiowa County (Greensburg)
Kipp
Kirwin
Labette County (Altamont)
La Crosse
La Cygne
La Harpe
Lakin
Lane County (Dighton)
Lansing
Larned
Latham
Lawrence
Leavenworth
Lebanon
Lebo
Lecompton
Leon
Le Roy
Lewis
Liberal
Lincoln
Lindsborg
Linwood
Little River
Logan
Longton
Lost Springs
Lucas
Luray
Lyndon
Lyons
Macksville
Madison
Maize
Manhattan
Mankato
Maple Hill
Marion
Marquette
Marysville
McCracken
McCune
McLouth
McPherson
Meade
Medicine Lodge
Melvern
Meriden
Merriam
Mildred
Milton
Minneapolis
Minneola
Moline
Montgomery County (Independence)
Moran
Morehead
Morrill
Mound City
Moundridge
Mound Valley
Mount Hope
Mulberry
Mulvane
Muscotah
Natoma
Nazareth Academy (Concordia)
Neodesha
Neosho Falls
Neosho Rapids
Ness City
Newton
Norton County (Norton)
Nortonville
Norwich
Oakley
Olathe
Onaga
Oneida
Osage City
Osawatomie
Osborne
Oskaloosa
Oswego
Ottawa
Ottawa University Academy (Ottawa)
Overbrook
Oxford
Ozawkie
Palco
Paola
Parsons
Pawnee Rock
Peabody
Perry
Phillipsburg
Pittsburg
Plainville
Pleasanton
Pomona
Portis
Potwin
Powhattan
Pratt
Preston
Protection
Quenemo
Quincy
Quinter
Ramona
Randall
Randolph
Ransom
Rawlins County (Atwood)
Reading
Redfield
Reno County (Nickerson)
Republic
Robinson
Rock Creek
Rosedale
Rose Hill
Rossville
Russell
Russell Springs
Sabetha
Sacred Heart Academy (Salina)
Salina
Savonburg
Scandia
Scott County (Scott)
Scranton
Sedan
Sedgwick
Seneca
Severance
Severy
Sharon
Sharon Springs
Sheridan County (Hoxie)
Sherman County (Goodland)
Silver Lake
Smith Center
Soldier
Solomon
Southwestern Academy (Winfield)
Spearville
Spivey
Spring Hill
Spring Township (Anthony)
Stafford
Stark
Sterling
St. John
St. Marys
St. Mary's Academy (Leavenworth)
Stockton
Summerfield
Sumner County (Wellington)
Sumner High School (Kansas City)
Sylvan Grove
Syracuse
Tescott
Thayer
Thomas County (Colby)
Tonganoxie
Topeka
Toronto
Towanda
Trego County (Wa Keeney)
Troy
Udall
Ursaline Academy (Paola)
Utica
Valley Center
Valley Falls
Vermillion
Viola
Virgil
Waldo
Walnut
Walton
Wamego
Washburn Academy (Topeka)
Washington
Waterville
Wathena
Weir
Wellsville
Westmoreland
Wetmore
White City
White Cloud
Whiting
Whitewater
Wichita
Wichita County (Leoti)
Williamsburg
Wilson (Ellsworth County)
Winchester
Winfield
Winona
Yates Center

Requirements for Graduation

For graduation, one must complete one of the four-year courses as shown elsewhere. These are believed to provide for the necessities of most students who seek an institution of this kind, and departures from the specified work are not encouraged. Under special conditions, however, such College substitutions are allowed as the interests of the student demand. The total requirement, including military science or physical training, is about 220 term hours, or credits, a credit being one hour of recitation or lecture work, or two hours of laboratory work, a week, for one term of twelve weeks. As the allowance for laboratory work is liberal, and much of this is included in all courses, the total requirement named is not regarded as excessive. A student, to be considered as a candidate for graduation, must have done his last year's work in residence. In special cases, candidates would be considered who have done three full years of work here and have done their last in an institution approved by the Faculty.

DEGREES

The degree of bachelor of science (B. S.) is conferred upon those completing the four-year course in agriculture, mechanical engineering, electrical engineering, civil engineering, architecture, 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.*

* 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.

A certificate is granted to those completing the two-year short course in agriculture.

A certificate is granted to those completing the six-months 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 up to, and including, the class of 1916, 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 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. Of the forty-eight credit units derived from special training, thirty-two may be allowed for original research; sixteen, designated as minors, must be obtained from departments other than that in which the major is taken. A candidate may be allowed not to exceed six credit units for investigative work done in line of instruction or department investigations, either in this institution or elsewhere. Whether this is considered a part of the major or a part of the minor depends on the character of the work. Candidates for the master's degree are required to spend at least nine months in resident advanced study.

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 subject 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 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.

PROFESSIONAL DEGREES IN ENGINEERING AND ARCHITECTURE

Graduates in engineering or in architecture from this College previous to 1917 who have been engaged in engineering or architectural practice for a period of five years or more, and graduates in 1917 or later who have been engaged in engineering or architectural practice for a period of three years or more, will be granted the professional degrees of M. E., C. E., E. E., Agr. E., or Architect under the following conditions:

The graduate to be eligible to a degree must submit a statement of his experience and a thesis covering some phase of his practice. This thesis and experience must be approved by the head of the department in which the degree is requested, by the Dean of the Division of Mechanic Arts, and by the College Committee on Graduate Study before the granting of such a degree will be recommended to the College Faculty and to the Board of Administration.

FELLOWSHIPS

Fellowships have been established for some years by action of the Board, and are available in the several departments of the College. Fellowships are granted to graduate students, who are to devote their entire time during the three months of the summer vacation and half-time during the remaining months to such work as may be laid out for them by the head of the department in which the fellowship is held. The remaining half-time during the College year is to be devoted to graduate study. These fellowships each yield $400 annually. During the College year 1915-1916 there were six fellows in the Division of Agriculture and two in the Division of General Science, operating under the conditions just mentioned. Applications for such fellowships should be made to the professor in charge of the department in which the applicant expects to do his major work.

Two fellowships, each two years in duration, are established in engineering. The holder is expected to devote eleven months of the year to the work laid out, and receives from the College

$500 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. Applications for engineering 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.

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 monthly, admits to membership all instructors and students interested in science. Papers given at the meetings of the Science Club 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. The numerous literary and professional societies, which are described elsewhere in the catalogue under the

title "Student Organizations," also afford excellent training in their diverse lines.

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 $3 a term is charged all students resident in Kansas. For nonresidents, a matriculation, or entrance, fee of $10, and an incidental fee of $10 a term, are charged. Each student pays with his incidental fee a sick-benefit fee of 50 cents each term. In return for this he receives the services of the College physicians for any illness contracted while in College. This fee does not include the cost of any medicine, operations, hospital fees, or the treatment of any chronic conditions. Class instruction in music is free; for individual instruction a fee is required. In all laboratories students are required to pay for apparatus broken or lost and for supplies. For unexcused late registration the student is to pay $1. No other fees are charged.

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 $3.70. Rooms are obtainable at from $5 to $10 a month when occupied by one person, the average room rent paid in these circumstances being $6.80. In cases where a room or suite of rooms is occupied by more than one person the average cost for each person is $5.50 a month. The higher-priced accommodations include 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.

Some students board themselves at less cost than the prices charged for table board, and unfurnished rooms may sometimes be obtained very cheaply. The average expense for washing is 55 cents a week. Books cost on the average about $5.50 a term, the amounts being smaller in the lower classes.

Each young man who takes military drill is required to have

* The averages here given are from data received in 1915 from about 1000 students fairly representing all classes.

a military uniform, costing about $15, and each young woman who takes physical training must have a physical-training suit, costing about $4. Expenditures, aside from clothing, vary according to individual tastes and circumstances; they average $265 a year.

BOARDING AND ROOMING HOUSES

The Christian Associations of the Agricultural College keep on file the official list of boarding and rooming houses. All correspondence relative to boarding accommodations, in advance of the student's arrival in Manhattan, may be addressed to the Secretary of the Young Men's Christian Association, to the Secretary of the Young Women's Christian Association, or to the Registrar of the College. Upon arrival in Manhattan, young men should go directly to the Y. M. C. A. building, and the young women to the Y. W. C. A. office at the College, taking the street car from either depot. The cars from Union Pacific station pass directly by the association buildings. Students leaving the Rock Island station on street car should ask for transfer to the line that passes the association buildings. For three days before the opening of the fall term and for the first three days after the opening day, committees from these associations meet trains and assist in directing new students, either to the association buildings or directly to proper boarding places. The associations make no charge for their services or for lists of all approved boarding places, and new students should depend absolutely upon the recommendations of the association committees.

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 a month, at rates varying from 15 to 20 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. Indeed, about one-quarter of the students support themselves wholly, while a third support themselves in part. 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.

BUSINESS DIRECTIONS

General information concerning the College may be obtained from the President or the Registrar. Financial matters are handled through the office of the Financial 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 regarding which information is sought.

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

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 the library, offices, classrooms, and laboratories are closed and the students gather 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 by 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 address 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 Kansas Sate Collegian,* in the interest of the students at large. This paper is edited and managed by a staff elected by students. A College annual, *Royal Purple,* is published each year by the senior class.

EXAMINATIONS

Examinations are held at the last regular recitation periods of the respective studies at the end of each term. Whether the examination is to extend over the last two periods or over one only is left to the decision of the individual instructor.

Any student who receives a grade of E for the term, in any subject, and who is charged with not to exceed five 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 held on the fourth Saturday of each term. A student who has received the grade C is entitled to take such special examination, provided the instructor or the department head be notified of the student's desire to take the examination not later than the Tuesday evening preceding the Saturday set for the examinations. If a sub-

ject in which a student is conditioned is not passed at the first opportunity, the grade is changed from C to F.

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. 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

Student grades are designated by the letters E, G, M, P, C, F, and U, having the following significance and order of rank:

The grade E designates really distinguished achievement, and is the net resultant of exceptionally good mental ability in conjunction with serious application. It is expected that this grade will not include more than ten per cent of all grades given a class and usually five per cent.

The grade G represents superior achievement, better than that exhibited by the average students, but not distinguished. It is recognized as a mark of considerable honor and is the resultant of high ability and fair application, or of fair ability and serious application. The percentage of students assigned this grade will depend somewhat upon the number assigned grade E, but the sum of grades E and G should approximate twenty-five per cent of all grades assigned.

The grade M represents the standing of about half of all students in the College. It means achievement equal to that of the average of students and includes about half of all students' grades. It indicates neither superior nor inferior accomplishment.

The grade P, meaning passed, represents achievement of a grade below that of the average of students. It indicates a student's position as being in the upper part of the lower fourth of the class and his work as being such as may be described as poor, or inferior. The number of grades P awarded, together with the grades C and F, should not, on the whole, exceed twenty-five per cent of all, and are expected to include about that proportion.

The grade C, meaning conditioned, is the symbol used to represent two types of inferior work: (*a*) that which is deficient in quality, and (*b*) that which is satisfactory as to quality but inadequate as to quantity. The results of 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 as F.

The grade F, meaning failure, is used to indicate work that is so unsatisfactory as to require that the work be repeated in class or under an approved tutor.

The letter U, meaning unfinished, is reported when, in the judgment of the instructor, the student deserves further time to complete work which has been interfered with by illness or other excusable cause of absence or disability. This is only a temporary report and in no way prejudices the student's final grade in a course.

PENALTIES

A student who, at the end of the term, receives grades below passing in fifty per cent or more of the work to which he is assigned is required to leave College for at least one term unless there are sufficiently extenuating circumstances, in which case his dean may suspend the rule and allow an assignment to twelve credit units of work.

Any student who, at the end of a term, receives grades below passing in twenty-five per cent of his assigned work is allowed not more than seventy-five per cent of regular work the next term.

Any student who is found to be persistently inattentive to study is at once temporarily suspended by his dean, and reported to the President for permanent suspension.

HONORS

In each of the divisions of the College "junior honors" are awarded at Commencement to not more than five per cent of the junior class having the highest standing up to the close of the junior year.

In a similar manner "senior honors" are awarded to not exceeding five per cent of the senior class having the highest standing to the close of the senior year.

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. These credits are applied as supplementary minors.

HONOR SOCIETIES

A chapter of Phi Kappa Phi, an honor scholarship fraternity, membership in which is open to honor graduates of all departments of American universities and colleges, was installed at the Kansas State Agricultural College on November 15, 1915. The eligibility of undergraduates to membership is determined on the basis of their scholarship. The candidates are elected to membership at the October and April meetings of the chapter. Besides this, there are a number of honor fraternities, sororities and societies which are open to students in different divisions of the College or in different activities. These are treated later under the heading Student Organizations.

CREDITS FOR EXTRA WORK

Activities connected with the College, but not provided for by any of the courses of study, either as required subjects or as electives, are designated as *extra subjects.*

No credit is given for extra work of any kind unless the student is regularly assigned to it in accordance with the general rules governing assignments, and it is done under the constant supervision of a College officer, who sees that a proper standard is maintained and reports a grade for record.

No student may be assigned to extra work for credit except upon the written recommendation of the instructor in charge of the work. This recommendation is filed in the office of the student's dean, and is effective until revoked.

Credits earned for extra work may be counted as part or all of the electives in any of the College courses. In courses that do not include electives, credits for extra work are available only as substitutions for required work, and must be approved in the regular way before becoming effective. A total of not more than twelve credit units may be allowed a student for extra work, and not more than two credits may be obtained in any one term.

The credit units that may be allowed for extra work are as follows:

Subject.	Per term.	Total.
Physical training	1	6
Military science (unpaid)	1	6
Orchestra	1	6
Band	1	6
Choral Society	1	6
Debate	2	6
Oratorical contest	2	4
Kansas State Collegian journalism	1	6

BIBLE STUDY

Bible study is an elective. Two credit units are granted for each completed one-year course. Credit may be granted to any one student for not more than two courses. Teachers of classes are to be approved as tutors, and the supervision of the work is placed in the Department of Education. This department also conducts the examinations for credit in Bible study.

CLASSES

The minimum numbers for which classes are organized are as follows:

School of Agriculture	18
Freshmen or Sophomores	12
Juniors or Seniors	7

This rule is varied only by special permission of the Board of Administration.

School of Agriculture

HARRY LLEWELLYN KENT, *Principal*
ADA RICE, *Assistant Principal*

The School of Agriculture is organized to meet the needs of young men and young women of Kansas who may need instruction more closely identified with the life of the farm, home and shop than that provided by the high schools of the State. It is also intended to meet the needs of those men and women who find themselves for any cause unable to complete an extensive course of collegiate instruction, yet who feel the necessity of a practical training for their activities in life. A large part of the student's time in the School will be spent in the laboratories and in contact with the real objects of his future work. An element of culture and general information is provided for in several terms of English for each course, and in work in history, economics, citizenship, physics, and chemistry.

The School of Agriculture is not a school preparatory to the College. Its sole purpose is to fit men and women for life in the open country, and to make country life more attractive; to make the workshop more efficient; in short, to dignify and to improve industrial life. It is not established to entice students away from the high school. It is for those of every walk in life who wish a larger view and greater skill in doing the world's work.

All the resources of the College are at the disposal of the School of Agriculture. Its students have every advantage possessed by students in the College.

THE COURSE OF STUDY

The course in agriculture emphasizes the growing of crops and the raising of live stock. A minimum of theory and a maximum of practical work bring the student into close contact with the actual conditions of farm life.

The course in domestic science emphasizes the care of the home. Home decoration, home sanitation, cookery, and sewing receive careful attention.

The course in mechanic arts leads to a trade. It is designed to shorten the time of apprenticeship and to prepare the way for skilled workmanship in shop or factory. The great amount of time spent in the shops should easily lead to skill and efficiency in subsequent work.

ADMISSION

Students who are fourteen years of age or older and who have completed the eighth grade of the public schools are admitted without examination. Students who have not completed the eighth grade are examined in arithmetic, United States history, English grammar, geography, reading, and spelling. Students who have done work in the public high schools receive credit for the work done. Maturity in years and practical experience are given due consideration, but students should not consider these qualifications alone sufficient to admit them. Wherever there is question about a student's qualifications for entering, he should correspond with the Principal of the School of Agriculture before coming.

TIME OF OPENING

All candidates for admission to the School of Agriculture should present themselves for registration at the College September 11 to 13, inclusive. The Principal of the School of Agriculture is charged with the execution of all College and Faculty rules relating to the enrollment of students in classes and their choice of studies. Students entering under the age of seventeen years are required to complete one of the three-year courses as outlined before they may choose work not included in the course.

It is greatly to the advantage of the prospective student to see to it that his certificate of graduation, properly filled out, be sent to the College as soon as possible after graduation. A permit to register will then be sent him by the Registrar in advance of his coming in September; this will greatly facilitate the work of entrance. The student will present this permit at the registration room in Nichols Gymnasium and will not be compelled to wait his turn to meet the committee on admission.

Upon registration each student receives a certificate of his standing, which he presents to the Principal of the School, who is charged with the duty of enrolling students in classes, selecting and arranging subjects, and assigning hours.

GRADES AND FAILURES

Examinations are held at stated periods and at such other times as the Faculty may provide. Absence from examination, or ten or more unexcused absences from class periods, severs a student's connection with the institution, which connection can be renewed only through the action of the Principal of the School. Any withdrawals from school or class must be authorized by the Principal; otherwise, continued absence is construed as failure. Parents or guardians are furnished a copy of the record of the student's work at the close of any term if they so desire.

Course in Agriculture

(SCHOOL OF AGRICULTURE.)

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

FIRST YEAR

FALL	WINTER	SPRING
Industrial Arithmetic A 4 (4-0)	Vocational Algebra 4 (4-0)	Applied Geometry 4 (4-0)
Gas Engines I 3 (1-4)	Elementary Botany 4 (2-4)	Elementary Zoölogy 4 (2-4)
Stock Judging I 3 (0-6)	Beginning Poultry 3 (2-2)	Grain Crops 4 (3-2)
Farm Machinery 3 (2-2)	Carpentry I 3 (1-4)	Gardening I 3 (2-2)
English Readings 4 (4-0)	Grammar and Composition 4 (4-0)	Elementary Composition I 4 (4-0)
Blacksmithing I 3 (1-4)	Military Science (0-3)	Military Science (0-3)
Military Science (0-3)		
Music*	Music*	Music*

**SECOND YEAR

El. Chemistry I 4 (3-2)	El. Chemistry II 4 (3-2)	El. Agricultural Chemistry 4 (3-2)
Forage Crops 3 (2-2)	Physiology and Hygiene 4 (4-0)	Soils and Fertilizers 4 (3-2)
English Classics I 4 (4-0)	El. Composition II 4 (4-0)	Elementary Rhetoric 4 (4-0)
Fruit Growing 4 (3-2)	Rural Economics 3 (3-0)	Farm Insects 3 (3-0)
Stock Judging II 3 (0-6)	Breeds and Breeding 3 (3-0)	Feeds and Feeding 3 (3-0)
Military Science *or* Physical Training§ (0-3)	Military Science *or* Physical Training§ (0-3)	Military Science *or* Physical Training§ (0-3)
Music*	Music*	Music*

THIRD YEAR

Agricultural Bacteriology 4 (2-4)	Farm Management and Farm Accounts 4 (3-2)	Civics† 4 (4-0)
Physics A-I 4 (3-2)	Physics A-II 4 (3-2)	Physics A-III 4 (3-2)
Diseases of Farm Animals 3 (3-0) *or*	Live Stock Production 3 (3-0)	Dairy 3 (2-2)
Grain Marketing 3 (2-2)	Handling and Curing Meats 3 (1-4) *or*	Conference English 4 (4-0)
Theme Writing 4 (4-0)	Farm Writing 3 (2-2)	Forestry and Ornamental Gardening 3 (2-2) *or*
American Nation† I 4 (4-0)	American Nation† II 4 (4-0)	Irrigation and Drainage 3 (1-4)
Military Science *or* Physical Training§ (0-3)	Military Science *or* Physical Training§ (0-3)	Military Science *or* Physical Training§ (0-3)

* Elective.

** See page 107 for announcement of summer project or demonstration work for credit. Third-year students may, with the consent of the principal, elect for substitution: Traction Engines, Gas Engines, Blacksmithing, Concrete Construction, or Nursery Practice.

† By special permission students may substitute American Nation III for Civics, and may substitute Ancient History I, II and III or Modern History I, II and III for corresponding terms of American Nation.

§ All male students are required to take Military Science during the first year and Physical Training during the second year of their attendance in the School of Agriculture.

Course in Mechanic Arts

(SCHOOL OF AGRICULTURE.)

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

FIRST YEAR

FALL	WINTER	SPRING
English Readings 4 (4-0)	Grammar and Composition 4 (4-0)	Elementary Composition I 4 (4-0)
Algebra I 4 (4-0)	Algebra II 4 (4-0)	Algebra III 4 (4-0)
Free-hand Drawing 3 (0-6)	Geometrical Drawing 3 (0-6)	Object Drawing 3 (0-6)
Gas Engines I 3 (1-4)	Elementary Botany 4 (2-4)	Traction Engines I 3 (1-4)
Carpentry I 3 (1-4)	Molding I 4 (1-6)	Blacksmithing II 3 (1-4)
Blacksmithing I 3 (1-4)	Vocational Guidance 1 (1-0)	Concrete Construction I 3 (1-4)
Military Science (0-3)	Military Science (0-3)	Military Science (0-3)
Music*	Music*	Music*

SECOND YEAR

English Classics I 4 (4-0)	Modern History† I 4 (4-0)	Modern History† II 4 (4-0)
Plane Geometry I 4 (4-0)	Plane Geometry II 4 (4-0)	Solid Geometry 4 (4-0)
Physics M-I 4 (3-2)	Physics M-II 4 (3-2)	Physics M-III 4 (3-2)
Shop Drawing I 3 (1-4)	Shop Drawing II 3 (1-4)	Shop Drawing III 3 (1-4)
Machine Shop I 3 (0-6)	Strength of Materials I 3 (3-0)	Strength of Materials II 3 (3-0)
Trade Practice** 3 (-)	Trade Practice** 3 (-)	Trade Practice** 3 (-)
Military Science *or* Physical Training§ (0-3)	Military Science *or* Physical Training§ (0-3)	Military Science *or* Physical Training§ (0-3)
Music*	Music*	Music*

THIRD YEAR

Elementary Composition II 4 (4-0)	Elementary Rhetoric 4 (4-0)	Conference English 4 (4-0)
Trade Calculations 4 (2-4)	Algebra IV 4 (4-0)	Economics 4 (4-0)
Modern History† III 4 (4-0)	El. Industrial History 4 (4-0)	Civics 4 (4-0)
Trade Practice** 8 (-)	Electricity I-S 3 (2-2)	Trade Practice** 8 (-)
	Trade Practice** 5 (-)	
Military Science *or* Physical Training§ (0-3)	Military Science *or* Physical Training§ (0-3)	Military Science *or* Physical Training§ (0-3)

* Elective.

** Trade Practice may be elected from any one of the following trades: Carpentry, Blacksmithing, Concrete Construction, and Steam and Gas Engines. For details of Trade Practice work, see next page.

† Ancient History I, II and III may be substituted for Modern History I, II and III.

§ All male students are required to take Military Science during the first year and Physical Training during the second year of their attendance in the School of Agriculture.

Trade Practice in Mechanic Arts Course

(SCHOOL OF AGRICULTURE.)

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

Trade Practice in Blacksmithing.

SECOND YEAR

FALL	WINTER	SPRING
Blacksmithing III 3 (0-6)	Blacksmithing IV 3 (0-6)	Blacksmithing V 3 (0-6)

THIRD YEAR

Blacksmithing VI 2 (0-4)	Blacksmithing VII 5 (0-10)	Blacksmithing VIII 5 (0-10)
Steam Engines and Boilers I 3 (1-4)		Machine Shop II 3 (0-6)
Elements of Mechanism 3 (3-0)		

Trade Practice in Concrete Construction.

SECOND YEAR

Concrete Construction II 3 (0-6)	Concrete Materials 3 (1-4)	Concrete Construction III 3 (1-4)

THIRD YEAR

Shop Drawing IV 3 (0-6)	Framing 3 (1-4)	Concrete Construction IV 5 (2-6)
Concrete Design I 2 (0-4)	Concrete Design II 2 (0-4)	Concrete Design III 3 (0-6)
Carpentry II 3 (0-6)		

Trade Practice in Carpentry.

SECOND YEAR

Carpentry II 3 (0-6)	Framing 3 (1-4)	Bench Work 3 (0-6)

THIRD YEAR

Shop Drawing IV 3 (0-6)	Building Details 3 (0-6)	Building Construction 6 (0-12)
Inside Finishing 5 (1-8)	Estimating 2 (0-4)	

Trade Practice in Steam and Gas Engines.

SECOND YEAR

Steam Eng. and Boilers I 3 (1-4)	Gas Engines II 3 (1-4)	Machine Shop II 3 (0-6)

THIRD YEAR

Pipe Fitting 2 (0-4)	Gas Engines III 2 (0-4)	Gas Engines IV 2 (0-4)
Traction Engines II 3 (1-4)		Traction Engines III 3 (1-4)
Elements of Mechanism 3 (3-0)	Steam Eng. and Boilers II 3 (0-6)	Steam Eng. and Boilers III 2 (0-4)

Course in Home Economics

(SCHOOL OF AGRICULTURE.)

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

FIRST YEAR

FALL	WINTER	SPRING
English Readings 4 (4-0)	Grammar and Composition 4 (4-0)	Elementary Composition I 4 (4-0)
El. Color and Design I 3 (0-6)	El. Color and Design II 3 (0-6)	El. Home Decoration 4 (0-8)
Sewing I 2 (0-4)	Sewing II 2 (0-4)	Sewing III 2 (0-4)
Cooking I 3 (1-4)	Cooking II 3 (1-4)	Cooking III 3 (1-4)
Household Insects 2 (2-0)	El. of Poultry Keeping 2 (2-0)	Dairying 2 (0-4)
General Housekeeping I 4 (4-0)	General Housekeeping II 4 (4-0)	Carpentry H 3 (0-6)
Physical Training (0-3)	Physical Training (0-3)	Physical Training (0-3)
Music*	Music*	Music*

SECOND YEAR

English Classics I 4 (4-0)	El. Composition II 4 (4-0)	Elementary Rhetoric 4 (4-0)
Elementary Chemistry I 4 (3-2)	El. Chemistry II 4 (3-2)	El. Household Chemistry 4 (3-2)
Indust. Arithmetic W 4 (4-0)	Vocational Algebra 4 (4-0)	Applied Geometry 4 (4-0)
Sewing IV 2 (0-4)	Sewing V 2 (0-4)	Sewing VI 2 (0-4)
Elementary Textiles 2 (2-0)	Dress Design 2 (0-4)	Gardening 2 (1-2)
Cooking IV 2 (0-4)	Cooking V 2 (0-4)	Cooking VI 2 (0-4)
Physical Training (0-3)	Physical Training (0-3)	Physical Training (0-3)
Music*	Music*	Music*

THIRD YEAR

Theme Writing 4 (4-0)	Household English 4 (4-0)	English Classics II 4 (4-0)
Ancient History I† 4 (4-0)	Ancient History II† 4 (4-0)	Civics† 4 (4-0)
Physics H-I 4 (3-2)	Physics H-II 4 (3-2)	Physics H-III 4 (3-2)
Economics 4 (4-0)	Household Bacteriology 4 (3-2)	Physiology and Hygiene 4 (4-0)
El. Art Needlework 2 (0-4)	Elementary Millinery 2 (0-4)	Sewing VII 2 (0-4)
Physical Training* (0-3)	Physical Training* (0-3)	Physical Training* (0-3)
Music*	Music*	Music*

* Elective.

† American Nation I, II and III or Modern History I, II and III may be substituted for Ancient History I, II and Civics. Ancient History III may be substituted for Civics.

Agricultural Courses

AGRONOMY

GRAIN CROPS. First year, spring term. Class work, three hours; laboratory, two hours. Four credits. Mr. Bledsoe.

The course consists of a study of grain-crop production. The factors that affect the yield of grain crops are given the greatest consideration. These factors include crop adaptation, methods of planting, methods of cultivation, and methods of harvesting. In order that such study may be of the greatest value, the structure of the plants and methods of improvement are considered. The greatest emphasis is placed upon the economic production of the crops. Eight grain crops are included in the study, being given consideration in accordance with their importance in the State.

FORAGE CROPS. Second year, fall term. Class work, two hours; laboratory, two hours. Three credits. Prerequisites: Grain Crops; General Biology II. Mr. Zahnley.

This course takes up the culture, adaptation, distribution and uses of crops for pasture, hay, roughage, silage, soiling; cover crops; green manure crops. The use of these crops for the maintenance of soil fertility, together with their importance in systems of cropping and rotation, is given special emphasis. The seed production of grasses, legumes, annuals, and forage crops is also studied.

Laboratory.—The laboratory work of this course is planned to give the student training in the identification of seeds and plants studied in the class. A study is made of the quality, mixtures, and adulteration of seeds.

SOILS AND FERTILIZERS. Second year, spring term. Class work, three hours; laboratory, two hours. Four credits. Prerequisites: Agricultural Chemistry; Forage Crops. Mr. Zahnley.

This course involves discussion of depth of plowing for different crops, the conservation of moisture, and the handling of soils to prevent blowing. It also involves a study of the care and use of barnyard manure, of green manuring crops, and of commercial fertilizers.

FARM MANAGEMENT AND FARM ACCOUNTS. Third year, winter term. Class work, three hours; laboratory, two hours. Four credits. Prerequisites: Forage Crops; Breeds and Breeding. Assistant Professor Grimes.

The purpose of this course is to correlate in a definite manner the information relating to farming that the student has accumulated in other agricultural courses. The course involves a study of the selection of farms, plans and arrangements of fields and farm buildings, and the investment and proper distribution of capital in the farming business. The relation of live-stock farming to crop farming, and the most profitable combinations of these, together with their effect upon soil fertility and the upbuilding of the farm, are considered. Farm accounts and records are studied, and special emphasis is given to systems of account keeping that are accurate, simple, and applicable to farm conditions. Text, Boss' *Farm Management.*

HOME PROJECT OR DEMONSTRATION WORK. Summer vacations. Maximum credits, eight; four each vacation.

Students in the course in agriculture of the School of Agriculture may, upon recommendation of the Principal, earn not to exceed four credits

during each of the two summer vacations by doing project or demonstration work on the home farm. This work must be arranged for with the head of the department in charge of the work of the College, and must be approved by the Dean of the Division of Agriculture. The work must include a detailed plan of the project, a report of work done, and a final report of results. The amount of credit given for a project shall be determined by the head of the department, but shall in no case exceed four credit hours for the work of one summer.

DAIRYING

DAIRYING. First year, spring term. Laboratory, four hours. Two credits. Mr. Tomson.

Lectures are given at different times during the course, which includes a study of the composition and the secretion of milk, the Babcock test, the principles of separation, the care of milk and cream, cream ripening, butter making, and fancy cheese making.

Laboratory.—This work includes testing milk and cream by the Babcock test, separating milk, churning, and fancy cheese making.

STOCK JUDGING II. Second year, fall term. Laboratory, six hours. Three credits. Course in agriculture. Associate Professor Fitch.

Two weeks are given over to the judging of dairy cattle. The rest of the course is devoted to the study of the breeding and market types of horses, cattle, sheep, and swine, and is presented by the Department of Animal Husbandry.

DAIRY. Third year, spring term. Lectures, two hours; laboratory, two hours. Three credits. Mr. Olson.

This course includes lectures on milk and its composition, Babcock testing, separation, churning, and feeding the dairy herd.

Laboratory.—The laboratory work comprises the operation of the Babcock test, testing separators, churning, and judging dairy cattle.

FORESTRY

FORESTRY AND ORNAMENTAL GARDENING. Third year, spring term. Lectures, two hours; laboratory, two hours. Three credits. Forester Scott.

This course includes a study of methods of planting and managing a farm wood-lot, the place of a wood-lot in every well-managed farm, and the value of well-kept farm-home yards; how to lay out and plant a home yard, and a discussion of suitable species for such planting. The laboratory work consists of making planting plans for home grounds and identifying species of trees and shrubbery.

FOREST NURSERY PRACTICE. Spring term, third year. Elective. Class work, two hours; laboratory, four hours. Four credits. Forester Scott.

This course takes up a study of nursery practices, including gathering, storing, and planting tree seeds and special treatment to insure germination of certain species; the preparation of the seed beds, and sowing the seed; methods of combating fungous diseases injurious to seedlings, and the care of seedling trees throughout the summer; and the digging, packing and shipping of nursery stock. The laboratory work consists of practical nursery work in coniferous and broad-leaved nurseries.

HORTICULTURE

GARDENING I. First year, spring term. Lectures, two hours; laboratory, two hours. Three credits. Mr. Merrill.

This course consists of a study of the principles and practices involved in the care and cultivation of market and home gardens.

FRUIT GROWING. Second year, fall term. Lectures, three hours; laboratory, two hours. Four credits. Professor Dickens.

The purpose of this course is to give the student a working knowledge of the requirements of the small-fruit and orchard crops. A discussion of soil preparation, of selection of site, of planting plans, and of varieties is included.

GARDENING. Second year, spring term. Lectures, one hour; laboratory, two hours. Two credits. Mr. Merrill.

The practices and principles involved in the cultivation and care of home and market gardens are here studied.

LIVE STOCK

STOCK JUDGING I. First year, fall term. Laboratory, six hours. Three credits. Assistant Professor Vestal, Mr. Gatewood, and Mr. Paterson.

This course consists in score-card practice in judging horses, cattle, sheep, and swine, in which the students become familiar with the general points to be observed in judging live stock. Text, Gay's *Principles and Practice of Judging Live Stock.*

STOCK JUDGING II. Second year, fall term. Laboratory, six hours. Three credits. Prerequisite: Stock Judging I. Assistant Professor Vestal, Mr. Gatewood, and Mr. Paterson.

This course consists of the study of the breeding and market types of horses, cattle, sheep, and swine. Two weeks of this time is given to the study of dairy cattle, presented by the Department of Dairy Husbandry. Text, Craig's *Judging Live Stock.*

BREEDS AND BREEDING. Second year, winter term. Class work, three hours. Three credits. Prerequisite: Stock Judging II. Mr. Aubel.

This course consists of the study of pure-bred horses, cattle, sheep, and swine, and the methods practiced by the best breeders. It also embraces the study of the general principles of breeding, such as variation and heredity. Text, Harper's *Breeding of Farm Animals.*

FEEDS AND FEEDING. Second year, spring term. Class work, three hours. Three credits. Prerequisite: Elementary Chemistry II. Mr. Gatewood.

This course involves the study of the comparison and usefulness of various feeds for growing and fattening all classes of farm animals. Text, Henry's *Feeds and Feeding.*

LIVE-STOCK PRODUCTION. Third year, winter term. Class work, three hours. Three credits. Prerequisite: Feeds and Feeding. Professor Cochel.

This course consists of a study of successful and economical methods of growing and finishing cattle, sheep, and hogs for market purposes, as well as the breeding of both market and pure-bred animals.

HANDLING AND CURING MEAT. Optional course, third year, winter term. Class work, one hour; laboratory, four hours. Three credits. Prerequisite: Feeds and Feeding. Mr. Paterson.

This course consists of a study of methods of slaughtering and dressing animals, cutting up carcasses into wholesale and retail cuts, and curing meat for farm use. Laboratory work is offered in killing small animals.

MILLING INDUSTRY

GRAIN MARKETING. Third year, fall term. Class work, two hours; laboratory, two hours. Three credits. Professor Fitz.

In this course are studied methods of harvesting, handling and storing of grain, together with the marketing of surplus grain from the farm.

This involves methods of selling, shipping, and grading grain; organization of grain-inspection departments, with their merits and defects; the principal grain markets, with receipts, shipments, and grain consumed. The by-products resulting from the manufacture of food products from grain will be studied with regard to their feeding value and comparative cost.

POULTRY

BEGINNING POULTRY. First year, winter term. Recitation, two hours; laboratory, two hours. Three credits. Mr. Mussehl.

This course takes up a discussion of the various operations that go to make up the art of poultry keeping.

Laboratory.—The laboratory study includes work in dressing, packing and caponizing.

ELEMENTS OF POULTRY KEEPING. Second year, winter term. Recitation, two hours. Two credits. Professor Lippincott.

This course is a duplicate of Beginning Poultry, except that no laboratory work is required.

VETERINARY MEDICINE

DISEASES OF FARM ANIMALS. Third year, fall term. Class work, three hours. Three credits. Doctor Hagan.

This course is intended to teach the student the recognition of disease, the principles involved in the preservation of health, and the application of first aid in disease or accident among farm animals. The various diseases resulting from the use of spoiled foods or the improper or injudicious use of good foods are discussed. The value of food, care and nursing of the sick animal is thoroughly impressed upon the student. The common infectious diseases and the means for their prevention and eradication are also considered. Text, *Common Diseases of Farm Animals,* by Craig.

General Science Courses

BACTERIOLOGY

AGRICULTURAL BACTERIOLOGY. Third year, fall term. Lectures, two hours; laboratory, four hours. Four credits. Prerequisite: Chemistry, three terms. Mr. Peiser.

An elementary course in the principles of bacteriology is here offered, taking up bacteriological problems from an entirely practical standpoint. The course is offered in order to give the student a reading knowledge of the sources and modes of infection; the relation of bacteriology to dairying and to soils and crop production; general sanitation; fermentations, etc.

Laboratory.—General laboratory manipulations; normal and abnormal fermentations of milk and milk products; quantitative study of bacteria in the soil; a limited study of fermentations, of pathogenic bacteria, of sewage pollution of water, etc., comprise the laboratory work.

HOUSEHOLD BACTERIOLOGY. Third year, winter term. Lectures, two hours; laboratory, four hours. Four credits. Mr. Peiser.

This course includes a general survey of the science of bacteriology as applied to the home. It includes a discussion of microörganisms as

related to air, water, foods, general sanitation, fermentations, etc. An attempt is made to present the subject in as simple a manner as possible. The course is offered in the hope of giving the student a general understanding of the fundamentals, and a reading knowledge of the science.

Laboratory.—Various microscopic forms of importance in fermentations; preservation and spoilage of foods; the influence of various preservatives upon microörganisms common in the home; methods of sterilization and of pasteurization; the handling of infectious material, etc., are the subjects taken up in the laboratory work.

BOTANY

ELEMENTARY BOTANY. First year, winter term. Class work, two hours; laboratory, four hours. Four credits. Mr. Poole.

This course involves an elementary study of the biology of plants, including the simpler facts of their structure and of their physiology. The life history of a seed plant is followed from the germination of the seed to maturity, and the structure and work of the root, stem and leaf systems is studied in some detail. The biology of the flower, and its peculiar adaptations to insect or wind pollination is emphasized, as well as the manner in which seeds and fruits are distributed. Throughout the course emphasis is laid on the relations of plants to light, air, water, and soil, and on the relation between the biology of plants to agricultural practice.

CHEMISTRY

ELEMENTARY CHEMISTRY I. Lectures and recitations, three hours; laboratory, two hours. Four credits. Mr. Gutsche.

The work this term is an elementary study of the general principles of chemistry, using the elements oxygen, hydrogen, nitrogen, chlorine, and carbon, and their most important compounds, as its basis. So far as possible, illustrations are drawn from practical life on the farm and in the home. The laboratory work is designed to give the student some knowledge of the essential features of chemical change, as well as to familiarize him with some of the more important elements and chemical compounds. Textbook, McPherson and Henderson's *First Course in Chemistry.*

ELEMENTARY CHEMISTRY II. Lectures and recitations, three hours, laboratory, two hours. Four credits. Prerequisite: Elementary Chemistry I. Mr. Gutsche.

The work this term is a continuation of that begun in Elementary Chemistry I. Sulphur and phosphorus and to a slight extent other nonmetals and their compounds are studied. This work is followed by some study of the most important metals and their compounds. The practical aspects of the subjects are emphasized throughout. Textbook, McPherson and Henderson's *First Course in Chemistry.*

ELEMENTARY HOUSEHOLD CHEMISTRY. Lectures and recitations, three hours; laboratory, two hours. Four credits. Course in home economics. Prerequisite: Elementary Chemistry II. Mr. Gutsche.

In the work of this term chemistry is studied in its more direct application to the household. The course includes not only some special applications of inorganic chemistry, but simple organic chemistry, especially in its relation to foods. The laboratory work is an application of chemistry to various household problems touching water, foods, textiles, and utensils. Textbook, Snyder's *Chemistry of Plant and Animal Life.*

ELEMENTARY AGRICULTURAL CHEMISTRY. Lectures and recitations, three hours; laboratory, two hours. Four credits. Course in agriculture. Prerequisite: Elementary Chemistry II. Mr. Gutsche.

The general principles of chemistry are presented as applicable on the farm in relation to soils, fertilizers, dairy products, feeds, water, etc. The laboratory work is made as practical as possible. Textbook, Snyder's *Chemistry of Plant and Animal Life.*

ECONOMICS

RURAL ECONOMICS. Second year, winter term. Class work, three hours. Three credits. Mr. Macklin.

This course presents briefly the fundamental principles of economics as related to the farm. It deals with the factors of production and the organization of the farm, followed by the principles governing value and a survey of marketing problems. Coöperation and its place with reference to farm needs is treated. The aim of the course is to give a knowledge of the principles that should guide the farmer in his work. Instruction is imparted by lectures, assigned readings, and reports.

ECONOMICS. Third year, fall or spring term. Class work, four hours. Four credits. Mr. Macklin.

This course is a study of fundamental principles underlying man's wealth-getting and wealth-using activities, and their application to conditions and problems of the industries of to-day. Instruction is based on a text, assigned readings, and reports.

ENGLISH

ENGLISH READINGS. First year, fall term. Class work, four hours. Four credits. Assistant Professor Rice, Miss Leonard, and Mr. Cooke.

In this course a careful study is made of interesting standard literary selections. Class readings, class discussions, written sketches, abstracts, and outlines, and training in the practical use of the dictionary, give the student the opportunity to grow in power to think clearly and to express himself accurately. This course is enriched by interesting outside readings.

GRAMMAR AND COMPOSITION. First year, winter term. Class work, four hours. Four credits. Prerequisite: English Readings. Miss Leonard, Mr. Winship, and Mr. Cooke.

This course is a review of the essentials of the English language. Short, interesting selections are studied definitely and interpreted clearly. The correct thought-interpretation of ordinary English sentences is taught in connection with the selections read and studied. The aim is to give little theory and much practice in the intelligent use of the language.

ELEMENTARY COMPOSITION I. First year, spring term. Class work, four hours. Four credits. Prerequisite: Grammar and Composition. Assistant Professor Rice, Miss Leonard, and Mr. Cooke.

The work of this term includes: instruction in the elementary principles of composition; advanced drill in the use of the dictionary; the study of words and sentences; special drills in punctuation; exercises in letter writing; drills in abstracting; and the writing of short themes. Special personal help is given the student at consultation hours.

ENGLISH CLASSICS I. Second year, fall term. Class work, four hours. Four credits. Prerequisite: Elementary Composition I. Assistant Professor Rice, Miss Leonard, and Mr. Cooke.

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.

ELEMENTARY COMPOSITION II. Second year, winter term. Class work, four hours. Four credits. Prerequisite: English Classics I. Mr. Winship, Mr. Cooke, and Miss Leonard.

This course is a continuation of Elementary Composition I. The 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. Special emphasis is placed upon practical writing on topics of keenest interest to the pupil.

ELEMENTARY RHETORIC. Second year, spring term, or third year, winter term. Class work, four hours. Four credits. Prerequisite: Elementary Composition II. Assistant Professor Rice, Miss Leonard, and Mr. Cooke.

This course includes a general survey of description, narration, exposition, and argumentation, with special emphasis placed upon clear, interesting, effective oral and written expression. Special exercises in punctuation, short drills in proofreading, drills in outlining, abstracting, oral discussions, and elementary debating, are also emphasized in this course.

THEME WRITING. Third year, fall term. Class work, four hours. Four credits. Prerequisite: Elementary Rhetoric. Assistant Professor Rice, Mr. Winship, and Mr. Cooke.

Special emphasis is placed upon exposition, or clear-cut explanation. Pupils are trained to tell accurately and interestingly how things are done in various fields of human activity. This course is conducted with the idea of assisting the student to acquire the habit of clear, accurate thought-getting and thought-expression in all of his technical work.

HOUSEHOLD ENGLISH. Third year, winter term. Class work, four hours. Four credits. Assistant Professor Rice, Miss Boot, and Miss Syford.

Proper home reading, a study of club programs, the preparation of club papers, outlining, note-taking, oral discussions and demonstrations, and reviews of interesting current news and magazine articles, are features of this course. Special drill exercises in the essentials of English will be given as needed.

ENGLISH CLASSICS II. Third year, spring term. Class work, four hours. Four credits. Prerequisite: Household English. Assistant Professor Rice, Miss Boot, and Miss Syford.

This course is designed to afford an additional drill and study in the cultural side of literature and language. The student is given a bird's-eye view of the field of literature, with an intensive study of representative classics from Shakespeare, Tennyson, and other authors. This intensive study of representative classics is broadened and enriched by well-selected supplementary reading.

CONFERENCE ENGLISH. Third year, spring term. Class work, four hours. Four credits. Prerequisite: Theme Writing. Assistant Professor Rice, Mr. Winship, and Mr. Cooke.

This course includes a thorough review of the essentials of English. Special emphasis is placed upon the ability to write and to tell accurately the thought to be conveyed. This course requires of all students daily practice in oral and written English, and includes regular conferences and consultations with students on matters concerning their greatest needs in the use of language. The course is designed with special reference to the needs of students in engineering and in agriculture.

ENTOMOLOGY

HOUSEHOLD INSECTS. First year, fall term. Class work, two hours. Two credits. Prerequisite: General Biology. Professor Dean.

This course consists of illustrated lectures and reference reading on the habits, life history, and general methods of control of the principal insects injurious to house, garden, lawn, and human health.

FARM INSECTS. Second year, spring term. Class work, three hours. Three credits. Prerequisite: General Biology. Assistant Professor Welch.

This is a study of the elementary anatomy, structure and physiology of insects, complete enough to give a clear understanding of the general structure of insects and the underlying facts upon which the scientific application of remedial or preventive measures is based. All of the more important insects of the farm, garden, and orchard are discussed at sufficient length to give a clear idea of their life histories and habits, together with the best means of control. The class work consists of lectures and text.

HISTORY

ANCIENT HISTORY I, II, AND III. Third year, three terms. Class work, four hours each term. Four credits each term. Miss Reynolds.

The history of civilization in the Nile and the Tigris-Euphrates valleys serves as an introduction to the more serious work of this course in which the emphasis is placed upon the history of Greece and Rome and Western Europe down to 800 A. D. In addition to the greater political events characterizing the history of these regions, special attention is given to the institutional life of this period, to the social, economic and intellectual forces at work in the different states as well as to their governmental organization. Text, Westermann's *The Story of the Ancient Nations.*

MODERN HISTORY I, II, AND III. Third year, three terms. Class work, four hours each term. Four credits each term. Assistant Professor James and Miss Reynolds.

Beginning with 800 A. D., a general survey is made of the development of Europe down to the present time and conditions. The more important events of the eleven centuries comprising this period are treated in as full detail as time will permit. The social, economic, cultural, religious, and diplomatic phases are emphasized. In view of the fact that greater changes have taken place in Europe since 1789 than in the thousand years preceding, special attention is given to the social and economic developments of this period and to the political developments and international relations, especially the changes which have prepared the way for the present European situation. Text, Harding's *New Medieval and Modern History.*

AMERICAN NATION I, II, AND III. Third year, three terms. Class work, four hours each term. Four credits each term. Assistant Professor James.

This course consists of a survey of American history from the discovery of America to the present time. It deals with the establishment of the English colonies in America; the growth of social and political institutions in these colonies; the development of an American nationality; the struggle among European nations for the possession of North America; the causes and meaning of the American Revolution; the formation and establishment of the constitution; the rise of the West and its influence, socially, politically and economically; the growth of sectionalism, the secession movement and the struggle to preserve the Union; and the important events characterizing American history since the ter-

mination of the contest between the North and the South. Along with the political history of the United States, a study of its economic development is made for the purpose of understanding the steps by which America, from humble beginnings in the colonial period, has reached its present high position as an industrial state. Texts, West's *American History and Government,* and Bogart's *The Economic History of the United States.*

CIVICS. Third year, spring term. Class work, four hours. Four credits. Assistant Professor James.

This is not a course of the old type, usually called civil government, nor a course in constitutional law, but a vigorous course in the actual workings of our present-day governmental and political activities. Text, Guitteau's *Government and Politics in the United States,* Kansas edition.

ELEMENTARY INDUSTRIAL HISTORY. Third year, winter term. Class work, four hours. Four credits. Assistant Professor James.

This course is devoted to a study of American industrial life; how industries have developed, how they have modified our history and government, and how in turn they have been modified by historical development and governmental regulations. The course is based primarily on the third edition of Bogart's *Economic History of the United States.*

ELEMENTARY ENGLISH HISTORY. Elective. Class work, four hours. Four credits. Miss Reynolds.

This is a brief course in the history of England, with some attention to contemporary European history and institutions, and is especially desirable as a background for the course in American history. Text, Andrews' *Short History of England.*

INDUSTRIAL JOURNALISM

FARM WRITING. Third year, winter term. Class work, two hours; laboratory, two hours. Three credits. Mr. Snow.

The course treats the elementary principles of writing for newspapers and farm publications, on such subjects as the students are likely to encounter in practical life. The student is shown how to obtain effective publicity for worthy enterprises in which he may be engaged. Emphasis is laid on agriculture, rural life, and general community service.

MATHEMATICS

INDUSTRIAL ARITHMETIC A. First year, fall term. Class work, four hours. Four credits. Assistant Professor Stratton and Mr. Fehn.

The course has two distinct aims: (1) A practical knowledge of the principles of numbers, both integral and fractional; (2) the practical application of these principles to problems of the farm and the shop. A large number of problems arising from actual experience over the whole field of agricultural science will be made the basis of problem work. Farm investments, farm accounts, and farm values will receive special attention. Text, Stratton and Remick's *Agricultural Arithmetic.*

INDUSTRIAL ARITHMETIC W. Second year, fall term. Class work, four hours. Four credits. Miss Zeininger and Miss Holroyd.

This course follows the lines of Industrial Arithmetic A, except that the points of emphasis are varied to meet the needs of young women. Text, same as for the course above.

VOCATIONAL ALGEBRA. First or second year, winter term. Class work, four hours. Four credits. Miss Holroyd and Mr. Dean.

The course includes an introduction to the first principles of algebra; the use and meaning of symbols; simple problems in algebraic reckoning;

the solution of the simplest equations of the first and second degrees; careful practice in the evolution of algebraic formulæ; first ideas of graphical analysis and the fundamental relation. Textbook, Wentworth and Smith's *Vocational Algebra.*

ALGEBRA I. First year, fall term. Class work, four hours. Four credits. Miss Zeininger and Mr. Dean.

This course includes a study of the four fundamental operations, integral linear equations, and factoring. Text, Hawkes, Luby, and Touton's *First Course in Algebra.*

ALGEBRA II. First year, winter term. Class work, four hours. Four credits. Prerequisite: Algebra I. Miss Zeininger, Miss Holroyd, and Mr. Dean.

Equations treated by factoring; fractions; fractional and literal linear equations; simultaneous linear equations; graphical representations, are taken up in the course. Text, Hawkes, Luby, and Touton's *First Course in Algebra.*

ALGEBRA III. First year, spring term. Class work, four hours. Four credits. Prerequisite: Algebra II. Assistant Professor Stratton and Mr. Dean.

The subjects considered in this course are: Involution, evolution, the theory of exponents, radicals, quadratic equations, with applications to practical problems. Text, Hawkes, Luby, and Touton's *First Course in Algebra.*

ALGEBRA IV. Third year, winter term. Class work, four hours. Four credits. Prerequisites: Algebra III, Plane and Solid Geometry. Miss Zeininger, Mr. Fehn, and Miss Holroyd.

This course includes a rapid review of factoring, fractions, linear equations and systems, roots, radicals and exponents, quadratic forms and systems with graphical work and theory of quadratics, ratio, proportion, and variation, the progressions, and the binomial theorem for positive integral exponents. Text, Hawkes, Luby, and Touton's *Second Course in Algebra.*

APPLIED GEOMETRY. First or second year, spring term. Class work, four hours. Four credits. Prerequisite: Algebra I or its equivalent. Assistant Professor Stratton and Mr. Fehn.

The course includes simple problems in geometrical construction; illustration, rather than proof, of important geometrical theorems; computation of areas and volumes, with especial emphasis upon the problems arising in buildings and constructions on the farm. The whole will consist of a simple and practical course in mensuration.

PLANE GEOMETRY I. Second year, fall term. Class work, four hours. Four credits. Prerequisite: Algebra III. Miss Zeininger and Miss Holroyd.

Books I and II of Wentworth and Smith's *Plane and Solid Geometry* are studied in this course.

PLANE GEOMETRY II. Second year, winter term. Class work, four hours. Four credits. Prerequisite: Plane Geometry I. Mr. Fehn and Mr. Dean.

This course includes a study of books III, IV, and V of Wentworth and Smith's *Plane and Solid Geometry.*

SOLID GEOMETRY. Second year, spring term. Class work, four hours. Four credits. Prerequisite: Plane Geometry II. Miss Zeininger, Mr. Fehn, Miss Holroyd, and Mr. Dean.

Books VI, VII, and VIII of Wentworth and Smith's *Plane and Solid Geometry* are studied in this course.

TRADE CALCULATIONS. Third year, fall term. Class work, two hours; laboratory, four hours. Four credits. Assistant Professor Stratton.

This course embraces such subjects as the use of vernier and micrometer calipers and the slide rule; work and power; levers and beams; specific gravity; the use of squared and logarithmic paper; logarithms and the elements of trigonometry; problems in heat and electricity. Text, Cobb's *Applied Mathematics*. The theoretical part only is given here, the laboratory work being presented in the shops, and described among shop courses.

MILITARY SCIENCE

All male students are required to take military science during the first year of their attendance in the School of Agriculture. For information as to the uniform worn and as to the other matters in this connection, see the articles on "Military Training" elsewhere in the catalogue.

MUSIC

Music is offered as an elective for both young women and young men. Instruction is furnished free to all regular students assigned to music classes, but for individual instruction a fee is charged. Further particulars are given in the article on "Music," which is to be found elsewhere.

PHYSICAL EDUCATION

MEN'S DEPARTMENT

PHYSICAL TRAINING I, II, and III. Professor Lowman.

Six health talks are given. In addition, the course includes elementary free-hand calisthenics; elementary light hand apparatus, including wands, dumb-bells, etc.; elementary heavy apparatus work, and games. All work is graded in progressive order for each term. Swimming is taught in the spring term. A physical examination is made of each student when he enters.

WOMEN'S DEPARTMENT

PHYSICAL TRAINING I, II, and III. First year. Assistant Professor Enyart and Miss Loring.

This is an introductory course, including corrective exercises, light apparatus work, folk dancing, games, swimming. A physical examination is made of each entering student.

PHYSICAL TRAINING IV, V, and VI. Second year. Assistant Professor Enyart and Miss Loring.

These courses are a continuation of Physical Training I, II, and III. Fancy steps, Swedish gymnastics, games, and swimming are taught in the course.

PHYSIOLOGY

PHYSIOLOGY AND HYGIENE. Third year, spring term. Assistant Professor Burt.

This course includes study of the anatomical structure and physiological functions of the human body. It includes a careful consideration of such factors in the maintenance of health as fresh air, diet, sleep, bathing, and exercise.

PHYSICS

PHYSICS A-I. Third year, fall term. Class work, three hours; laboratory, two hours. Four credits. Prerequisite: Algebra III. Mr. Jenness.

The fundamental laws of mechanics and sound are presented in this course. The application of these principles to agriculture is especially

emphasized. Laboratory work is conducted, based upon principles discussed in class and outlined in such a manner as to give students special drill in exact measurements. Text, Black and Davis's *Physics.*

PHYSICS A-II. Third year, winter term. Class work, three hours; laboratory, two hours. Four credits. Prerequisite: Physics A-I. Mr. Jenness.

This is a continuation of work given in Physics A-I. A study is made of the units used in measuring electrical energy, of the principles involved in current distribution, and of the applications now being made of electricity on the farm. Laboratory work is arranged to give students practice in working with electrical instruments and appliances. Text, Black and Davis's *Physics.*

PHYSICS A-III. Third year, spring term. Class work, three hours; laboratory, two hours. Four credits. Prerequisite: Physics A-II. Mr. Jenness.

This is a continuation of Physics A-II, and involves a study of light and heat as a form of radiant energy involved in plant growth, weather conditions, and general phenomena. The laboratory work consists of thermometer tests, humidity measurements, calorimetry work, and light measurements. Text, Black and Davis's *Physics.*

PHYSICS H-I. Second year, fall term. Class work, three hours; laboratory, two hours. Four credits. Prerequisite: Algebra III. Assistant Professor Floyd.

The work given in this course has a direct bearing on the principles of mechanics and sound as they apply to the home. The laboratory work is especially adapted to this phase of the work. Text, Tower, Smith, and Turton's *Physics.*

PHYSICS H-II. Second year, winter term. Class work, three hours; laboratory, two hours. Four credits. Prerequisite: Physics H-I. Assistant Professor Floyd.

This course is a continuation of Physics H-I. The fundamental principles and laws of electricity are presented in this course, with special applications of the use of electricity in the home. Laboratory work is based on the study of simple electrical appliances used in the home. Text, Tower, Smith, and Turton's *Physics.*

PHYSICS H-III. Second year, spring term. Class work, three hours; laboratory, two hours. Four credits. Prerequisite: Physics H-II. Assistant Professor Floyd.

This course is a continuation of Physics H-II and includes a study of the principles of heat and light, special work being done in illumination and ventilation of the home. The laboratory work is based on methods of measuring heat, testing thermometers, and testing light sources. Text, Tower, Smith, and Turton's *Physics.*

PHYSICS M-I. Second year, fall term. Class work, three hours; laboratory, two hours. Four credits. Prerequisite: Algebra III.

Mechanics and Sound. This course provides the fundamental laws of mechanics and sound as adapted to work in mechanic arts, and special emphasis is placed upon a thorough knowledge of the units used and of the laws underlying machine principles. Laboratory work is arranged to give the students an opportunity to use some instruments of the better grade for making measurements and to test some of the physical properties of matter. Text, Millikan and Gale's *Physics.*

PHYSICS M-II. Second year, winter term. Class work, three hours; laboratory, two hours. Four credits. Prerequisite: Physics M-I.

Electricity. This course is a continuation of Physics M-I. The methods of producing electromotive force and of transferring, transforming,

and measuring electrical energy are presented in this course. Laboratory work gives students an opportunity to use instruments and electrical apparatus in measuring and testing the effects of current. Text, Millikan and Gale's *Physics*.

PHYSICS M-III. Second year, spring term. Class work, three hours; laboratory, two hours. Four credits. Prerequisite: Physics M-II.

Heat and Light. This course is a continuation of Physics M-II. A thorough study is made of heat and light as fundamental in the work of a mechanic, especially with respect to its application in heating, lighting, and ventilation. The laboratory work gives students opportunity to use light as an accurate method of measurement, and to test materials with respect to heat conductivity. Text, Millikan and Gale's *Physics*.

ZOOLOGY

ELEMENTARY ZOÖLOGY. First year, spring term. Class work, two hours; laboratory, four hours. Four credits. Mr. Allen.

This course deals with the natural history of animals. The laboratory work consists of one four-hour period a week. This work is carried on for the most part out of doors. The ponds and streams, meadows and woodlands are visited and the animals studied in their relation to each other and to their environments. Numbers of animals are brought to the laboratory, where they are kept in vivaria, and such study is given them as is not permitted out in the field. The two hours of class work are devoted to résumés of the field and laboratory work and to general matters of animal biology.

Mechanic Arts Courses

DRAWING

FREE-HAND DRAWING. First year, fall term. Laboratory, six hours. Three credits. Mr. Smith.

This course includes: exercises in drawing simple figures illustrating the effects of geometrical arrangement, radiation, repetition, symmetry, proportion, harmony, and contrast; exercises in drawing conventional plant ornaments; and free-hand lettering.

GEOMETRICAL DRAWING. First year, winter term. Laboratory, six hours. Three credits. Prerequisite: Free-hand Drawing. Mr. Smith.

This course comprises the construction of perpendiculars, parallels, angles, polygons, tangent connections, and the like; construction of the ovoid, oval, spiral, and ellipse; the use of the T-square, drawing boards, and India ink; the making of simple working drawings; lettering.

ELEMENTARY OBJECT DRAWING. First year, spring term. Laboratory, six hours. Three credits. Prerequisite: Free-hand Drawing. Mr. Smith.

Drawing from geometric solids and simple objects, and shading from the object are included in this course.

CONCRETE CONSTRUCTION AND MATERIALS

CONCRETE CONSTRUCTION I. Fall and spring terms. Class work, one hour; laboratory, four hours. Three credits. Prerequisite: Carpentry I. Mr. Taylor.

This course gives elementary instruction in the selection of materials and proportions for different kinds of concrete construction, and in the

essential principles of building forms, and of mixing and placing concrete, with special reference to machine and building foundations, sidewalks, and floors.

The laboratory work consists of practice in the construction of such items as mentioned above, and of simple laboratory tests.

CONCRETE CONSTRUCTION II. Second year, fall term. Laboratory, six hours. Three credits. Prerequisite: Concrete Construction I. Mr. Taylor.

Field work is given in practical reinforced concrete construction, with lectures on field methods of bending steel, of placing it and securing it in place, and of mixing and placing concrete, with special reference to building and bridge construction. Simple laboratory tests of steel, of concrete, and of reinforced concrete beams are also included.

CONCRETE MATERIALS. Second year, winter term. Class work, one hour; laboratory, four hours. Three credits. Prerequisite: Concrete Construction I. Mr. Taylor.

This course includes standard tests for fineness, specific gravity, soundness and strength of cement, for voids, uniformity coefficient and cleanness of sand and stone, and for the effect of variation of these properties on the strength of mortars and concretes.

STRENGTH OF MATERIALS I. Second year, winter term. Class work, three hours. Three credits. Prerequisites: Physics M-I and Plane Geometry I. Messrs. Bowerman and Taylor.

The reactions, bending moments, shears and stresses in simple structures are determined in this course.

STRENGTH OF MATERIALS II. Second year, spring term. Class work, three hours. Three credits. Prerequisite: Strength of Materials I. Messrs. Bowerman and Taylor.

The course embraces a study of the behavior of wood, steel and concrete when under stress, with the principles of design of structural elements, especially of concrete, wood and steel.

CONCRETE CONSTRUCTION III. Second year, spring term. Class work, one hour; laboratory, four hours. Three credits. Prerequisite: Concrete Construction II, and Strength of Materials I. Mr. Taylor.

A study is made of concrete machinery and of concrete factories. Practice is given in the manufacture of concrete blocks and in ornamental casting.

ELEMENTS OF MECHANISM. Third year, fall term. Class work, three hours. Three credits. Prerequisites: Plane Geometry II, and Shop Drawing II. Mr. Bowerman.

The course includes an analysis of the different machine elements, such as screws, pulleys, belting, cams and gears, with such computations as are necessary to enable the proper size of these elements to be selected for use under given conditions.

CONCRETE DESIGN I. Third year, fall term. Laboratory, four hours. Two credits. Prerequisite: Shop Drawing IV, taken simultaneously. Messrs. Bowerman and Taylor.

Plain concrete structural elements, such as foundations and retaining walls, are designed.

CONCRETE DESIGN II. Third year, winter term. Laboratory work, four hours. Two credits. Prerequisite: Concrete Design I. Messrs. Bowerman and Taylor.

The course includes the design of simple reinforced concrete structures, with calculations for the amount of steel required and with complete working drawings.

CONCRETE DESIGN III. Third year, spring term. Laboratory, six hours. Three credits. Prerequisites: Concrete Design II, and Framing. Messrs. Bowerman and Taylor.

This is a continuation of the preceding term's work, with practice in the design of forms and centering for concrete construction.

CONCRETE CONSTRUCTION IV. Third year, spring term. Class work, two hours; laboratory, six hours. Five credits. Prerequisites: Concrete Design II and Concrete Construction III. Mr. Taylor.

Costs of concrete work are estimated, and the most economical methods of handling work in the field are considered. A study of concrete factories is made and practice is given in the manufacture of concrete blocks and in ornamental casting. Concrete machinery and distributing systems used on large construction work are studied. Practice is given in the construction of plaster and stucco work and in the finishing of concrete surfaces.

ELECTRICITY

ELECTRICITY I-S. Third year, fall term. Class work, two hours; laboratory, two hours. Three credits. Mr. McNair.

This course embraces a study of wiring materials and electrical machinery; line work; illumination; open and concealed wiring; wiring in conduit and metal molding; installation and operation of both direct- and alternating-current motors, generators, lamps, and heating appliances.

FARM MACHINERY

FARM MACHINERY. First year, fall term. Class work, two hours; laboratory, two hours. Three credits. Messrs. Wirt and Wiseman.

In this course the student is taught in the classroom the mechanical principles of the different types of farm machinery, and in the laboratory and the field is taught to adjust and operate the machines properly. Instruction is also given in fence construction, rope splicing, and cement work.

IRRIGATION AND DRAINAGE

IRRIGATION AND DRAINAGE. Third year, spring term. Optional. Class work, one hour; laboratory, four hours. Three credits. Associate Professor Walker and Assistant Professor Frazier.

This course offers an opportunity for students who are interested in either irrigation or drainage to become familiar with the fundamental principles underlying both these practices. Practical work is given in the field in the use of the level, in digging drainage ditches, in laying tile, and in studying drainage systems in operation on the College farm and adjoining farms.

MECHANICAL DRAWING

SHOP DRAWING I. Second year, fall term. Class work, one hour; drafting room practice, four hours. Three credits. Prerequisite: Geometrical Drawing. Geometry I must accompany or precede this course. Messrs. Bowerman and Taylor.

This course includes a study of the fundamental principles of lettering, and the use of drawing instruments; orthographic projection in its relation to working drawings; simple exercises leading up to the study of working drawings in the succeeding terms.

SHOP DRAWING II. Second year, winter term. Class work, one hour; drafting room practice, four hours. Three credits. Prerequisite, Shop Drawing I and Geometry I. Messrs. Bowerman and Taylor.

This is a continuation of the preceding course, with more difficult

exercises. In the latter part of the term free-hand sketches are made of simple machine parts, and working drawings are made from these sketches. Practice is given in making blue-prints.

SHOP DRAWING III. Second year, spring term. Class work, one hour; drafting room practice, four hours. Three credits. Prerequisites: Shop Drawing II and Geometry II. Mr. Bowerman.

Further practice is given in making working drawings of machine parts. Some attention is given to isometric and cabinet projections and to the development of patterns for sheet-metal work.

SHOP DRAWING IV. Third year, fall term. Laboratory, six hours. Three credits. Prerequisite: Shop Drawing III. Mr. Bowerman.

Plans and specifications for a complete building are drawn up, with a detailed list of all material used, and the cost is estimated from the plans so prepared.

SHOP WORK

BLACKSMITHING I. First year, fall term. Lectures, one hour; laboratory work, four hours. Three credits. Messrs. Lynch and Henry.

This is a very practical course in the forging operations, such as drawing, upsetting, welding, bending, twisting and punching, together with instructions in the proper use and care of the fire, tools, etc., and in the handling of the metals in the forge.

BLACKSMITHING II. First year, spring term. Lectures, one hour; laboratory, four hours. Three credits. Prerequisite: Blacksmithing I. Messrs. Lynch and Henry.

The history and manufacture of tool steel, its relation to the industries, and the proper methods of selecting and working it in the shop are studied. The laboratory work consists of the making of such tools as punches, chisels, drills, scrapers, hammers, and other tools that are used in the trade.

BLACKSMITHING III. Fall, winter and spring terms. Laboratory, six hours. Three credits. Prerequisite: Blacksmithing II. Messrs. Lynch and Henry.

This is a practical course in the various forging operations, with practice both as a blacksmith and helper, and includes the planning and laying out of work with special provisions for duplicate parts; forging and forming tools are made as nature of work requires. Lectures are given so that the principles underlying the different operations are thoroughly understood.

BLACKSMITHING IV. Fall, winter and spring terms. Laboratory, six hours. Three credits. Prerequisite: Blacksmithing III. Messrs. Lynch and Henry.

This course includes: the theory of hardening, tempering and annealing, case- and pack-hardening; a study of the nature of the different grades of carbon tool steel; tool forging, including the proper manipulation of the various lathe, planer and shaper tools; forging and heat treatment of special and high-speed steels. Instruction is by lectures and demonstrations.

BLACKSMITHING V. Fall, winter and spring terms. Laboratory, six hours. Three credits. Prerequisite: Blacksmithing IV. Messrs. Lynch and Henry.

General shop work is here given, in which emphasis is laid on the quantity as well as the quality of the work, the idea being to give the student a knowledge of the amount of time required to do certain work. The work is varied as much as possible so that the knowledge acquired will be as complete as possible.

BLACKSMITHING VI. Fall, winter and spring terms. Laboratory, four hours. Two credits. Prerequisite: Blacksmithing V. Messrs. Lynch and Henry.

This course is a continuation of Blacksmithing V, with practice with the oxacetylene and thermit processes of welding. Written reports will be required on assigned subjects.

BLACKSMITHING VII. Winter term. Laboratory, ten hours. Five credits. Prerequisite: Blacksmithing VI. Mr. Lynch.

On the basis of the knowledge acquired during the previous terms, the student is required to make estimates on job work, direct workmen in the various lines of shop production, and lay out plans for general repair work. The idea is to give the student the knowledge and experience that will enable him to plan and manage a shop to the best advantage.

BLACKSMITHING VIII. Spring term. Laboratory, ten hours. Five credits. Prerequisite: Blacksmithing VII. Mr. Lynch.

Regular blacksmithing and machine-shop practice is given on work such as is found in the regular custom shop, in order to develop accuracy and speed. The student at all times works under the critical eye of the instructor. Visits are made to commercial shops, and written reports and discussions are required on the methods of getting out work, pay systems, cost systems, buying and selling material, methods of handling men and customers, and the general matters to be considered in conducting a business.

CARPENTRY I. First year, fall and winter terms. Lectures, one hour; laboratory work, four hours. Three credits. Messrs. Parker and Ball.

This is a course of exercises in joinery which are so graded as to give the student the principles of general carpenter work, and training in the proper use of tools and in the reading of drawings and blue-prints. Some work is given to bring out the principles of framing and building operations, and practice is given in the use of paints and varnishes as protective coverings for woodwork.

CARPENTRY II. Fall, winter and spring terms. Laboratory, six hours. Three credits. Prerequisites: Carpentry I, and Molding I. Messrs. Parker and Ball.

Exercises in turning cylinders, cones, beads, convex and concave turning, and exercises that will involve the use of all the different turning tools, and turning between centers, on the faceplate and with hollow chucks are here included. Some of the exercises are: tool handles, dumbbells, rolling-pins, napkin rings, table legs, porch posts, ballusters, built-up and solid newel posts, columns, and rosettes.

CARPENTRY H. First year, spring term. Laboratory, six hours. Three credits. For women only. Messrs. Ball and Parker.

This is a practical course in woodwork where the student makes simple articles, the making of which gives her the proper training in the use of tools, and acquaints her with the different kinds of woods, stains, varnishes, and paints. Lectures and assignments are given along with the work in order to bring out the different points more clearly.

BENCH WORK. Fall, winter and spring terms. Laboratory, six hours. Three credits. Prerequisite: Framing. Messrs. House and Ball.

This laboratory course consists of hand work with the rabbet, router, beading and matching planes, and with dado, plow, and fillister in making window sashes and frames, doors and frames, grooved flooring, door jambs, and molding.

FRAMING. Winter term. Lectures, one hour; laboratory, four hours. Three credits. Prerequisite: Carpentry II. Messrs. House and Ball.

The fundamental factors to be taken into consideration in the construction of buildings, as the building site, laying out and squaring foundation, excavating, types of foundations, form building for concrete anchoring, placing of the sills, joists, bridging, studding, bracing, rafter cutting and fitting, are studied in this course. The laboratory work consists of exercises along the lines given above.

INSIDE FINISHING. Fall term. Lectures, one hour; laboratory, eight hours. Five credits. Prerequisite: Bench Work. Messrs. House and Ball.

Lectures are given along with the work on the protective coatings for woods, and written reports and discussions will be required. A study is also made of the different kinds of woodworking machinery, from manufacturers' catalogues and from machines, with instruction as to their proper care and use.

This course includes a combination of machine and hand work where the material is worked up on the machines and then fitted by hand. Some of the work consists of making plain and fancy casings, plate rails, picture moldings, picture frames, and in making simple pieces of furniture, which are stained, varnished or otherwise finished.

ESTIMATING. Winter term. Laboratory, four hours. Two credits. Prerequisite: Shop Drawing IV. Mr. Ball.

Building plans and specifications are studied in this course. A complete detailed list of all material required is made out, and the cost of such material is estimated from architects' plans and specifications.

BUILDING DETAILS. Winter term. Laboratory, six hours. Three credits. Prerequisite: Inside Finishing. Messrs. House and Ball.

This work includes a study of the different varieties of stairs, porches, siding, building paper, cornices, chimneys, furnaces, and ventilating systems, with written reports and discussions, from catalogues, books and plans. The structure drawn in the fall term is built on a small scale.

BUILDING CONSTRUCTION. Third year, spring term. Laboratory, twelve hours. Six credits. Prerequisites: Shop Drawing IV, and Building Details. Messrs. House and Ball.

This course embraces a study of building plans and specifications in order to learn to correctly interpret them. The laboratory work consists of practical building work, and so far as it is possible the work will be on buildings in the actual process of construction, and written reports and discussions are required. A study is also made of commercial shops, of pay systems, cost systems, buying and selling material, methods of handling men and customers, and the best methods used by successful men in conducting business enterprises.

MOLDING I. First year, winter term. Lectures, one hour; laboratory, six hours. Four credits. Mr. Grant.

This course consists of floor and bench molding with a great variety of patterns, along with which the student gets experience with different kinds of sand and facings; also, open sand work, sweep molds, and instruction in machine molding, core making, setting of cores, gates and risers, and different methods of venting. The lecture consists of practical talks on the materials used in the foundry, the selection of sands, methods of venting, drying and handling of molds, and cores, for various classes of work. Also discussions on the handling of the cupola and the grading and mixing of the iron suitable for different classes of work. Special emphasis in all cases is laid upon the practical side of the work.

MOLDING II. Elective. Fall and spring terms. Laboratory, four hours. Two credits. Prerequisite: Molding I. Mr. Grant.

MOLDING III. Elective. Fall and spring terms. Laboratory, four hours. Two credits. Prerequisite: Molding II. Mr. Grant.

MACHINE SHOP I. Fall and spring terms. Laboratory, six hours. Three credits. Prerequisite: Molding I. Messrs. Hayes and Yost.

Practice is had in chipping, filing, scraping, drilling, and in shaper and planer work. Lathe work is given in cutting right and left threads, taper turning and threading.

MACHINE SHOP II. Fall and spring terms. Laboratory, six hours. Three credits. Prerequisites: Blacksmithing I, and Machine Shop I. Messrs. Hayes and Yost.

This course embraces practical work in making repairs on machinery, such as babbitting and fitting bearings, aligning shaftings and pulleys, lacing and fitting belts, and general repair work on engines and other machinery.

MACHINE SHOP III. Elective. Fall and spring terms. Laboratory, four hours. Two credits. Prerequisite: Machine Shop II. Messrs. Hayes and Yost.

MACHINE SHOP IV. Elective. Fall and spring terms. Laboratory, four hours. Two credits. Prerequisite: Machine Shop III. Messrs. Hayes and Yost.

MACHINE SHOP V. Elective. Fall and spring terms. Laboratory, four hours. Two credits. Prerequisite: Machine Shop IV. Messrs. Hayes and Yost.

MACHINE SHOP VI. Elective. Fall and spring terms. Laboratory, four hours. Two credits. Prerequisite: Machine Shop V. Messrs. Hayes and Yost.

PIPE FITTING. Fall and spring terms. Laboratory, four hours. Two credits. Messrs. Hayes and Yost.

Practice work is given in the cutting and threading of all sizes of standard and extra heavy pipe up to 10-inch, in the use of fittings of various kinds, in the squaring up of flanges, in the cutting, fitting and testing of gaskets for various pressures, in the grinding, packing and testing of valves.

TRADE CALCULATIONS. Fall term. Class work, two hours; laboratory, four hours. Four credits. Professor Carlson.

Many of the problems which are common to practically all trades are taken up and solved in the laboratory and shop. The class work is given by the Department of Mathematics and is described elsewhere.

STEAM AND GAS ENGINES

GAS ENGINES I. First year, fall term. Class work, one hour; laboratory, four hours. Three credits. Messrs. Shutt and Collins.

This course comprises a study of heat engines, principles of gas engines, gas-engine auxiliaries, two- and four-cycle frames, material used in construction, essential parts of an internal-combustion engine. The laboratory work consists of a study of the different engines, batteries, different systems of ignition, cooling, operation and care, lubricators, lubricants, and adjustments.

TRACTION ENGINES I. First year, spring term. Class work, one hour; laboratory, four hours. Three credits. Prerequisites: Blacksmithing I, Molding I, Gas Engines I. Messrs. Sanders and Collins.

The subjects studied in this course are: Fundamental parts of a traction engine; steam and gas traction-engine details; differentials, gearing trains, and clutches.

STEAM ENGINES AND BOILERS I. Second or third year, fall term. Class work, one hour; laboratory, four hours. Three credits. Prerequisite: Traction Engines I. Mr. Shutt and assistants.

The principal parts of a steam-power plant are considered, including fire-tube and water-tube boilers, boiler auxiliaries, piping for boilers, feed-water heaters, firing; fundamental details of steam engines; selection, operation and management of steam engines and boilers.

GAS ENGINES II. Second year, winter term. Class work, one hour; laboratory, four hours. Three credits. Prerequisites: Gas Engines I, Physics M-I. Messrs. Shutt and Collins.

The work here given includes a study of ignition, cooling, and gas-engine accessories, of the elements of gas producers, of the assembling of gas engines. The laboratory work teaches the operation of engines of all types, the dismounting, reassembling and adjusting valves, gears and ignition devices.

TRACTION ENGINES II. Third year, fall term. Class work, one hour; laboratory, four hours. Three credits. Prerequisite: Steam Engines and Boilers I. Mr. Sanders and assistant.

Traction-engine types and variations in detail for light and heavy fuels; radiators, cooling, ignition, lubrication, mountings; tractor wheels; steam and gas traction-engine auxiliaries—these are the subjects studied here.

GAS ENGINES III. Third year, winter term. Laboratory, four hours. Two credits. Prerequisite: Gas Engines II. Messrs. Shutt and Collins.

Fuels, both liquid and gaseous, are studied. Heat determinations of different fuels are made. A study is made of indicators, planimeters, and brakes, of power determinations, and engine testing, of carburetion and carburetors. The laboratory work includes the running of engines with different fuels and different carburetors; practice with indicators and planimeters; brake tests for fuel economy and mechanical efficiency.

STEAM ENGINES AND BOILERS II. Third year, winter term. Laboratory, six hours. Three credits. Prerequisite: Steam Engines and Boilers I. Mr. Shutt.

This is a continuation of the work given in the previous term, including a study of fuels and combustion, also pumps and injectors.

STEAM ENGINES AND BOILERS III. Third year, spring term. Laboratory, four hours. Two credits. Prerequisite: Steam Engines and Boilers II. Mr. Shutt.

The various steam-engine valve gears and governors are studied, adjusted and tested. Some attention is also given to indicators and planimeters.

TRACTION ENGINES III. Third year, spring term. Class work, one hour; laboratory, four hours. Three credits. Prerequisites: Traction Engines II, and Machine Shop II. Mr. Sanders and assistant.

Steam and gas traction engines are operated, adjusted, and repaired.

GAS ENGINES IV. Third year, spring term. Laboratory, four hours. Two credits. Prerequisite: Gas Engines III. Mr. Shutt.

The construction, erection, design, and operation of complete gas-engine plants for mills, factories, shops, lighting, water supply, irrigation, and private use are studied in this course. As laboratory work, a gas producer is operated; fuels and lubricants are tested; general engine repair work is done.

Home Economics Courses

DOMESTIC ART

SEWING I. First year, fall term. Laboratory, four hours. Two credits. Miss Buxton.

This course is based on the fundamental principles underlying the construction of garments. It includes (1) a complete sewing knowledge of stitches and where to use them; (2) the construction of cloth; (3) practice in the following: bag, sewing apron, mending, silvercase and towel.

SEWING II. First year, winter term. Laboratory, four hours. Two credits. Prerequisite: Sewing I. Miss Buxton.

This course includes the study of (1) the construction of the sewing machine, the use of the parts, the attachments, and the care of the machine; (2) the care of clothing and economic saving by proper care; (3) the manufacture of lace and embroidery and conditions of the factories; (4) the making of dress cover, kimona gown, drawers and corset cover.

SEWING III. First year, spring term. Laboratory, four hours. Two credits. Prerequisite: Sewing II. Miss Buxton.

This course deals with a study of the materials suitable to the garments to be made; the drafting and construction of a combination suit, petticoat and simple waist; a study of the factory conditions under which these are made.

SEWING IV. Second year, fall term. Laboratory, four hours. Two credits. Prerequisite: Sewing III. Miss Buxton.

This course offers more advanced work in sewing with special emphasis on the principles of elementary dressmaking with a study of (1) material suitable for garments to be made; (2) design as applied to the selection of styles and color; (3) altering drafted patterns to the design chosen; (4) making a tailored wash skirt, lingerie waist and tub silk waist.

ELEMENTARY TEXTILES. Second year, fall term. Lecture, two hours. Two credits. Miss Fecht.

The history and manufacture of textiles, the development of spinning and weaving, the classification and study of fibers, and practical tests for adulteration are taken up in this course.

SEWING V. Second year, winter term. Laboratory, four hours. Two credits. Prerequisite: Sewing IV. Miss Buxton.

This course offers a study of commercial patterns, including the conditions under which they are made; of woolen material, the adulteration and economics conditions; the conditions governing the production of ready-made garments; the making of a woolen dress, and the remodeling of a woolen dress.

DRESS DESIGN. Second year, winter term. Laboratory, four hours. Two credits. Prerequisite: Color and Design I. Miss Hunt.

This course comprises the study of design, of color harmony and its application to costumes and embroideries, and the making of costumes in pencil and water color.

SEWING VI. Second year, spring term. Laboratory, four hours. Two credits. Prerequisite: Sewing V.

In this course a commercial pattern is adapted to a design chosen and made into a lingerie dress. This gives skill in the working over of commercial patterns and use of fine materials.

ELEMENTARY ART NEEDLEWORK. Third year, fall term. Laboratory, four hours. Two credits. Miss Hunt.

This course includes the following: stitches in crochet, knitting, cross-stitch, French embroidery, Roman cut work, and their application to undergarments, waists, collars, and household articles.

ELEMENTARY MILLINERY. Third year, winter term. Laboratory, four hours. Two credits. Miss Palmer.

This course includes the practical and artistic principles of millinery; practice in making bows, rosettes and other forms of hat decorations; the use of velvet, silk and straw, and a brief study of the manufacturing conditions.

SEWING VII. Third year, spring term. Laboratory, four hours. Two credits. Prerequisite: Sewing VI. Miss Buxton.

This course offers more technical work in dressmaking; the handling of silk materials and trimmings; the study of dress to occasions, as to house, street, afternoon and evening.

DOMESTIC SCIENCE

COOKING I. First year, fall term. Recitation, one hour; laboratory, four hours. Three credits. Miss Skinner.

Carbohyrdate foods are here studied—their source, composition, manufacture, economic and nutritive value, care and storage in the home. The laboratory work includes a study of the effect of heat on typical foods, and of the principles underlying cookery. Practice is given in the cooking of sugar, starches, vegetables, fruits, cereals, and simple starchy puddings and sauces. A close study of current prices is made throughout all of the cooking courses.

COOKING II. First year, winter term. Recitation, one hour; laboratory, four hours. Three credits. Miss Skinner and Miss Rigney.

A study is made of typical fat and protein foods as outlined above. The laboratory work includes practice in the making of pastry, in frying, and in cooking eggs, milk, cheese, meats, and legumes.

COOKING III. First year, spring term. Recitation, one hour; laboratory, four hours. Three credits. Prerequisite: Cooking II. Miss Skinner.

The laboratory work includes practice in the various leavening agents, and manipulation of flour mixtures with special emphasis on bread. Some practice is also given in making special desserts and frozen dishes.

COOKING IV. Second year, fall term. Laboratory, four hours. Two credits. Prerequisite: Cooking III. Miss Skinner.

One-half of the term is devoted to a study of the principles underlying the preservation of foods, with practice in canning, preserving, and pickling. The latter half of the course is devoted to a study of foods adapted to special menus, with practice in the preparation of dishes requiring skill in manipulation.

COOKING V. Second year, winter term. Laboratory, four hours. Two credits. Miss Skinner.

The planning, ordering, preparation and serving of meals are here included. Both simple service and service with a maid are studied. Only the members of the class are served so that students may receive instruction in acting as host and hostess, as well as cook and waitress.

Meals are planned at various fixed costs. A study is also made of the selection, preparation, and packing of foods for lunches.

COOKING VI. Second year, spring term. Laboratory, four hours. Two credits. Miss Bartholomew.

Practice is given in planning, preparing and serving food for large numbers. Catering for special occasions, and a study of the management of tea rooms is also included.

GENERAL HOUSEKEEPING I. First year, fall term. Recitation, four hours. Four credits. Miss Skinner, Miss Kennedy, and Miss Bartholomew.

The location, heating, lighting and ventilation of the home, rural and municipal water supply and sewage disposal, sanitation of foods, the transmission and prevention of disease, and home care of the sick are studied in this course. Text, *The People's Health,* by Walter Moore Coleman, amplified by class discussions of outside readings.

GENERAL HOUSEKEEPING II. First year, winter term. Recitation, four hours. Four credits. Miss Bartholomew.

This course includes the arrangement and furnishing of the home; buying of supplies; keeping of accounts; planning of household work in relation to efficiency; cleaning; laundering; care of walls and floors. Note-book work is required together with some outside readings.

HOME ART

ELEMENTARY COLOR AND DESIGN I. Freshman year, fall term. Studio work, six hours. Three credits. Miss Averill.

Colors are studied with reference to value, hue, and intensity. Color harmonies and design principles are devoted and adapted to objects constructed of paper, cloth, leather and reeds.

COLOR AND ELEMENTARY DESIGN II. First year, winter term. Studio work, six hours. Three credits. Prerequisite: Elementary Color and Design I. Miss Averill.

This course is a further application of principles underlying pleasing color combinations and good designs. Many exercises are given in selecting from objects of clothing and house furnishings those involving color harmonies, consistent shapes and orderly arrangement.

ELEMENTARY HOME DECORATION. First year, spring term. Studio work, eight hours. Four credits. Prerequisite: Elementary Color and Design II. Miss Holman.

Color and design principles are studied in application to all problems involved in home decoration; such as, window, door and wall spacings, wood work, wall coverings and floor coverings—appropriate furniture and the arrangement of these in different rooms.

General Course

VOCATIONAL GUIDANCE. Freshman year, winter term. One credit. Associate Professor Kent.

The purpose of this course is to give the students some insight into the vocations open to them, in order that they may have a sufficient knowledge for making wise selections. Both the social and economic possibilities of the different vocations are discussed.

Division of Agriculture

WILLIAM M. JARDINE, *Dean*

The teaching of a rational, practical system of agriculture is fundamental to industrial development in a State whose principal 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, at minimum cost, a maximum quantity of the best quality of agricultural products to the acre.

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 products of the farm; and, in addition to all this, the making of the farm home the center of influence for 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 systematic and practical 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 in this College are of the best. 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. A tract of 320 acres is devoted to the work in agronomy. For horticultural and forestry work, eighty acres are used; for dairy work, 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, many animals of which 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 social and public affairs. Professional men, such as veterinarians, are placed in a more or less public relation to the community they serve. 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 veterinary science, as 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.

COURSE OF STUDY

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

A six-year course in animal husbandry and veterinary medicine.
A four-year course in agriculture.
A four-year course in veterinary medicine.
A two-year short winter course in agriculture.
A one-year short winter course in dairy manufactures.
A short course in testing dairy products.

DEGREES AND CERTIFICATES

The four-year course in agriculture leads 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 short-course certificate is granted to a student completing the two-year short course in agriculture.

The four-year course in agriculture is designed to meet the needs primarily of the students who expect to return to the farm. However, the student who completes the course 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 colleges and departments of agriculture, high schools, private institutions 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 the four-year course. 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 a 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 on the first day he enters College, and continues it throughout the course.*

THE COURSE IN AGRICULTURE

Two hundred and fourteen credits in addition to military science are required for graduates, as follows:

	Credits.
Prescribed agriculture	55
Electives in agriculture required, with their prerequisites	35 to 40
Required in agriculture	90 to 95
Prescribed in nonagriculture	107
Electives in nonagriculture	17 to 12
Total in nonagriculture	124 to 119
Total term hours for graduation	214 214

In addition to the required work, as shown in the tabulated course below, the candidate for graduation must have completed fifty-two credits in electives. Of these credits, twenty must be within some one of the departments of the Division of Agriculture, and in every case any prerequisites must have been taken previously. Not more than seventeen of these fifty-two credits may be nonagricultural. The candidate must also have had at least six months' farm experience, approved by the Dean of the Division of Agriculture.

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. 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 agriculture to be taught that it becomes necessary for the student to choose in which of the general lines he will find that which best suits his needs or liking. This is made possible by numerous electives in soils, crops, farm machinery, animal husbandry, dairying, horticulture, milling, and poultry.

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 of methods of culture adapted to the region under cultivation.

THE COURSE IN VETERINARY MEDICINE

Veterinary medicine has made remarkable advances within recent years, and is taking its place alongside 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 the advance of live stock in value, there is 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 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, and diphtheria. There is ample work for all of the thoroughly competent veterinarians that the colleges 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 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, 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 ANIMAL HUSBANDRY AND VETERINARY MEDICINE

The combined course in animal husbandry and veterinary medicine has been outlined so that students may receive the degree of bachelor of science in agriculture at the end of four years, and the degree of doctor of veterinary medicine at the end of two years more, thus securing both degrees in six years.

Course in Agriculture

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

FRESHMAN

FALL	WINTER	SPRING
Chemistry I 4 (3-2)	Chemistry II 4 (2-4)	Chemistry III 4 (3-2)
English I 4 (4-0)	English II 4 (4-0)	College Rhetoric I 4 (4-0)
General Botany 5 (3-4)	Plant Anatomy 5 (3-4)	Plant Physiology I 4 (2-4)
Market Types and Classes of Stock 4 (1-6)	Breeding Types and Classes of Stock 4 (1-6)	Plant Propagation 4 (3-2)
		Dairy Judging 2 (0-4)
Military Science (0-3)	Military Science (0-3)	Military Science (0-3)

SOPHOMORE

Qualitative Analysis 4 (2-4)	Organic Chemistry 4 (4-0)	Quantitative Analysis I 2 (0-4) *or*
Cereal Crop Production 5 (3-4)	Forage Crops 4 (3-2)	Agricultural Chemistry 2 (2-0)
General Zoölogy I 4 (2-4)	General Zoölogy II 4 (2-4)	Embryology 4 (2-4)
Anatomy 5 (3-4)	Library Methods 2 (2-0)	Farm Machinery I 4 (2-4)
	Animal Physiology 4 (4-0)	Principles of Feeding 4 (4-0)
		Elements of Dairying 4 (2-4)
Military Science (0-3)	Military Science (0-3)	Military Science (0-3)

COURSE IN AGRICULTURE—*continued*

JUNIOR

FALL	WINTER	SPRING
Agricultural Chemistry 2 (2-0) *or*	American Government 4 (4-0)	General Entomology 4 (3-2)
Quantitative Analysis I 2 (0-4)	Soils 5 (3-4)	Soil Fertility 4 (3-2)
General Geology 4 (4-0)	Principles of Animal Breeding 4 (4-0) *or*	Elementary Journalism 2 (2-0)
General Bacteriology 4 (2-4)	Plant Genetics I 4 (2-4)	
Farm Poultry Production 3 (2-2)		
Electives* 5 (-)	Electives* 5 (-)	Electives* 8 (-)

SENIOR

Agricultural Economics 4 (4-0)	Rural Sociology 4 (4-0) *or*	Principles of Sociology 4 (4-0) *or*
College Rhetoric II 4 (4-0)	American History I 4 (4-0) *or*	American History I 4 (4-0) *or*
	Coöperative Marketing 4 (4-0)	Money and Banking 2 (2-0) *and*
	Farm Management 4 (3-2)	Public Finance 2 (2-0)
Electives* 10 (-)	Electives* 10 (-)	Electives* 14 (-)

Agricultural Electives for Students in the Course in Agriculture

AGRONOMY

FALL	WINTER	SPRING
Forage Crop Improvement 4 (2-4)	Principles of Agronomic Experimentation 2 (1-2)	Cereal Crop Improvement 4 (2-4)
Advanced Soils Laboratory 2 (0-4)		Soil Survey 4 (2-4)
Advanced Grain Judging 2 (0-4)	Soil Research I 4 (2-4)	Soil Research II 4 (0-8)
Dry Land Farming 2 (2-0)		Farm Cost Accounting 2 (1-2)
		Advanced Farm Management 3 (1-4)
Agronomy Seminar 1 (-)		
Crop Research (any term) (throughout the year)		

ANIMAL HUSBANDRY

Advanced Stock Judging I 2 (0-4)		Advanced Stock Judging II 2 (0-4)
History of Breeds and Pedigrees 5 (3-4)	Pork and Mutton Production 3 (3-0)	Live Stock Management II 2 (0-4)
Live Stock Management I 2 (0-4)	Meats 4 (2-4)	
	Advanced Feeding 3 (3-0)	Beef Production 2 (2-0)
Breeding Pure-bred Live Stock 2 (2-0)		Horse Production 3 (3-0)
Form and Function in Farm Animals 4 (0-8)		A. H. Seminar 1 (1-0)
		Live Stock Marketing 3 (3-0)
Animal Genetics 2 (1-2)	Advanced Animal Genetics I 2 (0-4)	Advanced Animal Genetics II 2 (0-4)

* Students preparing to teach should take Psychology and the educational electives for their nonagricultural electives.

Electives—continued

DAIRY HUSBANDRY

FALL	WINTER	SPRING
Pure-bred Dairy Cattle 3 (2-2)	Milk Production and Herd Management 3 (3-0)	Dairy Inspection I 2 (1-2)
Butter-making and Creamery Management 5 (3-4)		Cheese and Ice Cream Making 4 (2-4)
Market Milk 2 (1-2)		Dairy Buildings and Equipment 2 (2-0)
		Advanced Dairy Judging 1 (0-2)
		Dairy Seminar 2 (2-0)
		Dairy Refrigeration 3 (1-4)
Dairy Research (any term by appointment.)		Four credits.

FORESTRY

	Dendrology 2 (1-2)	Dendrology 2 (1-2)
	Farm Forestry 4 (3-2)	
	Silviculture 3 (2-2)	Silviculture 3 (2-2)

HORTICULTURE

FALL	WINTER	SPRING
Pomology I 4 (1-6)		Principles of Orcharding 4 (3-2)
Kitchen Gardening 2 (2-0)	Spraying 3 (1-4)	Ornamental Gardening 1 (0-2)
Advanced Pomology 4 (2-4)	Small Fruits 3 (2-2)	Orchard Management 4 (2-4)
Theory and Æsthetics of Landscape Gardening 4 (3-2)		Landscape Gardening 4 (2-4)
		School Gardening 4 (2-4)
	Greenhouse Construction and Management 4 (4-0)	Plant Materials of Landscape Gardening 4 (2-4)
	Landscape Gardening II 4 (0-8)	
	History and Literature of Landscape Gardening 2 (2-0)	
		Tree Surgery 4 (1-6)
	City and Town Planting 4 (0-8)	

MILLING INDUSTRY

Commercial Grain and Grain Inspection 4 (3-2)	Grain Products 4 (3-2)	Experimental Milling 2 (0-4)
Advanced Experimental Milling 4 (0-8)	Wheat and Flour Testing 4 (1-6)	Experimental Baking A 4 (0-8)
		Milling Practice 4 (0-8)

POULTRY HUSBANDRY

Practice in Candling 1 (0-2)	Advanced Poultry Judging 2 (0-4)	Practice in Poultry Feeding 1 (-)
	Poultry Management (Vet.) 2 (2-0)	Practice in Incubation 1 (-)
Poultry Breeds and Types 3 (1-4)	Home Poultrying 2 (2-0)	Practice in Brooding 1 (-)
Practice in Milk Feeding 1 (0-2)	Poultry Breeding 2 (0-4)	Poultry Bacteriology 4 (2-4)
Market Poultry 2 (1-2)	Poultry Farm Management 3 (1-4)	
Poultry Research (any term)		

Electives—continued

VETERINARY MEDICINE

FALL	WINTER	SPRING
Anatomy I 6½ (2-9)	Anatomy II 6½ (2-9)	Farm Animals in Health and Disease 4 (3-2)
Anatomy IV 4 (1-6)	Anatomy V 4 (1-6)	Anatomy III 4 (1-6)
Horseshoeing 2 (2-0)		Anatomy VI 4 (1-6)
Histology III 4 (2-4)	Histology I 4 (2-4)	Histology II 4 (2-4)
	Comparative Physiology I 7 (5-4)	Comparative Physiology II 7 (5-4)
Pathology I 7 (5-4)	Pathology II 7 (4-6)	Pathology III 7 (4-6)
Obstetrics I 2 (2-0)	Obstetrics II 3 (2-2)	
Chemical and Experimental Physiology 4 (2-4)		Conformation and Soundness of the Horse 2 (2-0)

Pathological Technique and Diagnosis I
(Each term for graduates)
4 (0-8)

Pathological Technique and Diagnosis II
(Each term for graduates)
4 (0-8)

List of Electives for Agricultural Students, with Their Prerequisites

Subject.	*Prerequisites.*
AGRONOMY.	
Forage Crop Improvement	Forage Crops, Principles of Breeding.
Principles of Agronomic Experimentation	Forage Crops, Soil Fertility, Forage Crop Improvement.
Advanced Grain Judging	Cereal Crop Production.
Cereal Crop Improvement	Forage Crops, Plant Pathology, Principles of Breeding.
Soil Survey	Soils.
Dry-land Farming	Soils.
Advanced Soils Laboratory	Soils.
Soils Research I	Advanced Soils Laboratory, Quantitative Analysis.
Soils Research II	Soils Research I.
Farm Cost Accounting	None.
Agronomy Seminar	Cereal Crop Production, Forage Crops and Soil Fertility.
Crop Research	Cereal Crop Improvement.
Advanced Farm Management	Farm Management.
ANIMAL HUSBANDRY.	
History of Breeds and Pedigrees	Breeding Types and Classes.
Live Stock Management I	Principles of Feeding.
Principles of Animal Breeding	Embryology.
Pork and Mutton Production	Principles of Feeding.
Live Stock Management II	Live Stock Management I.
Advanced Judging I	Breeding Types and Classes.
Advanced Judging II	Advanced Judging I.
Breeding Pure-bred Live Stock	History of Breeds and Pedigrees.
Meats	Principles of Feeding.
Beef Production	Principles of Feeding.
Horse Production	Principles of Feeding.
Animal Husbandry Seminar	Breeding Pure-bred Live Stock.
Animal Genetics	Embryology, Principles of Animal Breeding *or* Plant Genetics I.
Advanced Animal Genetics I	Animal Genetics.
Advanced Animal Genetics II	Advanced Animal Genetics I.
Advanced Feeding	Principles of Feeding.
Marketing Live Stock	Agricultural Economics.
Form and Function in Farm Animals	Advanced Judging II.

Electives—continued

Subject.	*Prerequisites.*
APPLIED MECHANICS AND MACHINE DESIGN.	
Mechanical Drawing E-I	None.
Mechanical Drawing E-II	Mechanical Drawing E-I.
Mechanical Drawing E-III	Mechanical Drawing E-II.
Mechanical Drawing	None.
Concrete Construction	None.
Strength of Materials I	None.
Strength of Materials II	Strength of Materials I.
Structural Materials Tests	Strength of Materials II, simultaneously.
ARCHITECTURE AND DRAWING.	
Residences	None.
Farm Buildings and Equipment	None.
Farm Architecture	None.
Landscape Design	Landscape Gardening, simultaneously.
BACTERIOLOGY.	
Soil Microbiology	General Bacteriology.
Dairy Bacteriology	General Bacteriology.
Serum Therapy (Vets.)	Pathogenic Bacteriology I and II.
Poultry Bacteriology	General Bacteriology.
BOTANY.	
Plant Genetics II	Plant Genetics I.
Economic Botany	Plant Morphology.
Plant Pathology I	Plant Physiology.
Plant Pathology II	Plant Pathology I.
Plant Pathology III	Plant Pathology II.
CHEMISTRY.	
Quantitative Analysis II	Quantitative Analysis I.
Quantitative Analysis III	Quantitative Analysis II.
Quantitative Analysis IV	Quantitative Analysis III.
Chemistry D-I	Quantitative Analysis I.
Chemistry D-II	Chemistry D-I.
Principles of Animal Nutrition	Elementary Organic Chemistry.
Inorganic Chemistry I, II, III	Qualitative Analysis.
Organic Chemistry I, II, III	Qualitative Analysis.
Physiological Chemistry I, II, III	Elementary Organic Chemistry.
CIVIL AND HIGHWAY ENGINEERING.	
Surveying	Trigonometry.
Irrigation and Drainage	None.
Highway Engineering	None.
Farm Sanitation and Water Supply	None.
DAIRY HUSBANDRY.	
Dairy Inspection I	General Bacteriology, Chemistry D-I and D-II.
Pure-bred Dairy Cattle	Elements of Dairying.
Milk Production and Herd Management	Principles of Feeding and Elements of Dairying.
Butter-making and Creamery Management	Elements of Dairying, Dairy Bacteriology.
Cheese and Ice Cream Making	Chemistry D-I and D-II, Dairy Bacteriology.
Dairy Buildings and Equipment	None.
Advanced Dairy Judging	Dairy Judging.
Dairy Seminar	Elements of Dairying, Dairy Inspection I, Pure-bred Dairy Cattle, Milk Production.
Dairy Inspection II	None.
Home Dairying	None.
Market Milk	Elements of Dairying, Dairy Bacteriology.
Dairy Research	Milk Production and Herd Management, *or* Butter Making and Creamery Management.
ECONOMICS.	
Agricultural Economics	None.
Farm Marketing and Coöperation	Agricultural Economics.
ELECTRICAL ENGINEERING.	
Electricity	None.

Electives—continued

Subject.	*Prerequisites.*
EDUCATION.	
Psychology	None.
History of Education	Psychology.
Principles of Education	Psychology.
Teaching Methods	Psychology.
Educational Psychology	Psychology.
Educational Administration	Psychology.
Practice Teaching	Psychology and Observation.
Agricultural Education	Psychology.
Rural Education	Psychology.
Educational Seminar	Psychology, History of Education and Principles of Education *or* Educational Psychology.
Observation	Psychology.
ENGLISH LANGUAGE.	
Argumentation and Debate	College Rhetoric I.
Bible English	College Rhetoric I.
English Practice	College Rhetoric I.
Farm and Home English	College Rhetoric I.
Business English	College Rhetoric I.
Applied English	College Rhetoric I.
Farm Advertising	College Rhetoric I.
Farm Stories	College Rhetoric I.
Farm Bulletins	College Rhetoric I.
Applications	College Rhetoric I.
ENGLISH LITERATURE.	
English Literature I	College Rhetoric I.
English Literature II	English Literature I.
Studies in Oratory	College Rhetoric I.
The English Drama	College Rhetoric I.
The English Novel	College Rhetoric I.
Nineteenth Century Literature	College Rhetoric I.
American Literature	College Rhetoric I.
ENTOMOLOGY.	
Insect Morphology	General Entomology.
Horticultural Entomology	General Entomology.
General Economic Entomology	General Entomology.
General Advanced Entomology	General Entomology.
Apiculture	General Entomology.
Milling Entomology	General Entomology.
FARM MECHANICS.	
Farm Machinery I	None.
Farm Machinery II	Farm Machinery I.
Advanced Farm Machinery	Farm Machinery I.
Farm Machinery III	Farm Machinery II.
Farm Machinery IV	Farm Machinery III.
Farm Machinery V	Farm Machinery II and Farm Buildings and Equipment.
FORESTRY.	
Farm Forestry	None.
Dendrology	None.
Silviculture	Farm Forestry *or* Dendrology.
GERMAN.	
Elementary German I	None.
Elementary German II	Elementary German I.
German Readings	Elementary German II.
German Comedies	German Readings.
Scientific German I	German Readings.
Scientific German II	Scientific German I.
German Short Stories	German Readings.
HISTORY.	
Modern Europe	None.
American History I	None.
American History II	American History I.
Advanced Industrial History	None.
Kansas History	None.
Current History	None.
Business Law	None.
Farm Law	None.

Electives—continued

Subject.	*Prerequisites.*
HORTICULTURE.	
Kitchen Gardening	None.
Pomology I	None.
Advanced Pomology	Pomology I.
Small Fruits	Plant Propagation.
Principles of Orcharding	Plant Propagation and Pomology I.
Spraying	Chemistry II.
Orchard Management	None.
Market Gardening	None.
Landscape Gardening	None.
Greenhouse Construction and Management,	None.
School Gardening	None.
Theory and Æsthetics of Landscape Gardening	None.
Plant Materials of Landscape Gardening,	Plant Propagation.
Landscape Gardening II	Landscape Gardening I.
History and Literature of Landscape Gardening	Theory and Æsthetics of Landscape Gardening.
Tree Surgery	Plant Physiology.
City and Town Planting	None.
INDUSTRIAL JOURNALISM.	
Industrial Writing	Elementary Journalism.
Copy Reading	Industrial Writing.
Journalism Practice I to VI	Preceding terms in Journalism Practice.
Editorial Practice	Copy Reading.
The Economics of Journalism	Copy Reading.
The Ethics of Journalism	The Economics of Journalism.
The Materials of Journalism	None.
Magazine Features	Consult Professor of Journalism.
The History of Journalism	None.
Journalism Surveys	Consult Professor of Journalism.
MATHEMATICS.	
Analysis of Statistics	None.
MILITARY SCIENCE.	
Small Arm Firing Regulations	None.
First Aid to the Injured	None.
Military Engineering I	Two years of Military Science.
Military Engineering II	Military Engineering I.
Military Engineering III	Military Engineering II.
MILLING INDUSTRY.	
Commercial Grain and Grain Inspection,	Cereal Crop Production.
Grain Products	Commercial Grain and Grain Inspection.
Experimental Milling	Grain Products.
Advanced Experimental Milling	Experimental Milling.
Wheat and Flour Testing	Grain Products, and Quantitative Analysis.
Experimental Baking A	Wheat and Flour Testing.
Milling Practice	Advanced Experimental Milling.
POULTRY HUSBANDRY.	
Practice in Poultry Feeding	None.
Practice in Incubation	None.
Practice in Brooding	Practice in Incubation.
Practice in Candling	None.
Poultry Breeds and Types	None.
Advanced Judging	Poultry Breeds and Types.
Poultry Management	None.
Home Poultrying	None.
Practice in Milk Feeding	None.
Market Poultry	None.
Poultry Breeding	Animal Breeding.
Poultry Research	Practice in Incubation, Brooding and Feeding, and Farm Poultry Production.
SHOP PRACTICE.	
Woodwork I	None.
Woodwork II	Woodwork I.
Forging I	None.
Forging II	Forging I.
Machine Tool Work I	None.
SOCIOLOGY.	
Rural Sociology	None.
Community Surveys	None.

Electives—continued

Subject.	*Prerequisites.*
STEAM AND GAS ENGINEERING.	
Farm Motors A-I	None.
Farm Motors A-II	Farm Motors A-I.
Farm Motors A-III	Farm Motors A-II.
VETERINARY MEDICINE.	
Farm Animals in Health and Disease	Anatomy, Animal Physiology.
Anatomy I to VI, inclusive	None.
Comparative Physiology I, II	Organic Chemistry.
Histology I, II, III	None.
Pathology I, II, III	Histology III and Animal Physiology.
Horseshoeing	Anatomy, Animal Physiology.
Conformation and Soundness	Anatomy, Animal Physiology.
Obstetrics I	Anatomy, Animal Physiology, Embryology.
Obstetrics II	Pathology.
Chemical and Experimental Physiology	Organic Chemistry, Physiology.
Pathological Technique and Diagnosis	Pathology III.
ZOÖLOGY.	
Advanced Zoölogy I, II, III	Zoölogy I, II, and Embryology.
Advanced Mammalian Embryology	Zoölogy I, II, and Embryology.
General Zoölogy Technique	Zoölogy I, II.
Parasitology	Zoölogy I, II.
Evolution of Domestic Animals	Zoölogy I, II, and Embryology.
Economic Zoölogy	Zoölogy I, II.

Course in Veterinary Medicine

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

FRESHMAN

FALL	WINTER	SPRING
Anatomy I 6½ (2-9)	Anatomy II 6½ (2-9)	Anatomy III *or* IV 4 (1-6)
Chemistry I 4 (3-2)	Chemistry II 4 (2-4)	Chemistry III 4 (3-2)
General Zoölogy I 4 (2-4)	General Zoölogy II 4 (2-4)	Embryology 4 (2-4)
	Histology I 4 (2-4)	Histology II 4 (2-4)
Market Types and Classes of Stock 4 (1-6)	Poultry Management 2 (2-0)	Breeding Types I 4 (1-6)
Military Science (0-3)	Military Science (0-3)	Military Science (0-3)

SOPHOMORE

Anatomy IV *or* III 4 (1-6)	Anatomy V 4 (1-6)	Anatomy VI 4 (1-6)
Histology III 4 (2-4)	Comparative Physiology I 7 (5-4)	Comparative Physiology II 7 (5-4)
Organic Chemistry 4 (4-0)	Qualitative Analysis 4 (2-4)	Principles of Feeding 4 (4-0)
Medical Botany 3 (1-4)	Pathogenic Bacteriology I 4 (2-4)	
English I 4 (4-0)	English II 4 (4-0)	College Rhetoric I 4 (4-0)
Military Science (0-3)	Military Science (0-3)	Military Science (0-3)

JUNIOR

FALL	WINTER	SPRING
Pathology I 7 (5-4)	Pathology II 7 (4-6)	Pathology III 7 (4-6)
Materia Medica I 4 (4-0)	Materia Medica II 2 (2-0)	
Pharmacy 3 (1-4)	Therapeutics I 2 (2-0)	Therapeutics II 4 (4-0)
Surgery I 3 (3-0)	Surgery II 3 (3-0)	Surgery III 3 (3-0)
Diagnosis 3 (3-0)	Medicine I 3 (3-0)	Medicine II 3 (3-0)
	Pathogenic Bacteriology II 4 (2-4)	Serum Therapy 4 (3-2)
Clinic 6 (0-12)	Clinic 6 (0-12)	Clinic 6 (0-12)

SENIOR

Surgery IV 3 (3-0)	Surgery V 3 (3-0)	Surgery VI 3 (3-0)
Medicine III 3 (3-0)	Infectious Diseases 4 (4-0)	Sanitary Medicine 4 (4-0)
History of Breeds and Pedigrees 5 (3-4)	Principles of Animal Breeding 4 (4-0)	Conformation and Soundness 2 (2-0)
Horseshoeing 2 (2-0)	Parasitology 3 (2-2)	Meat Inspection 4 (4-0)
Operative Surgery I 2 (0-4)	Operative Surgery II 2 (0-4)	Dairy Inspection II 2 (0-4)
Obstetrics I 2 (2-0)	Obstetrics II 3 (2-2)	Jurisprudence 2 (2-0)
Ophthalmology 2 (2-0)		
Clinic 6 (0-12)	Clinic 6 (0-12)	Clinic 6 (0-12)

COURSE IN ANIMAL HUSBANDRY AND VETERINARY MEDICINE

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

FRESHMAN

Straight Course in Agriculture

SOPHOMORE

FALL	WINTER	SPRING
Qualitative Analysis 4 (2-4)	Organic Chemistry 4 (4-0)	Quantitative Analysis I 2 (0-4) *or*
Cereal Crop Production 5 (3-4)	Forage Crops 4 (3-2)	Agricultural Chemistry 2 (2-0)
General Zoölogy I 4 (2-4)	General Zoölogy II 4 (2-4)	Embryology 4 (2-4)
		Farm Machinery I 4 (2-4)
		Principles of Feeding 4 (4-0)
Anatomy I 6½ (2-9)	Anatomy II 6½ (2-9)	Anatomy III 4 (1-6)
Military Science (0-3)	Military Science (0-3)	Military Science (0-3)

JUNIOR

FALL	WINTER	SPRING
Agricultural Chemistry 2 (2-0) *or*	Soils 5 (3-4)	General Entomology 4 (3-2)
Quantitative Analysis I 2 (0-4)	Principles of Animal Breeding 4 (4-0)	Soil Fertility 4 (3-2)
General Bacteriology 4 (2-4)	Library Methods 2 (2-0)	Elementary Journalism 2 (2-0)
Anatomy IV 4 (1-6)	Anatomy V 4 (1-6)	Anatomy VI 4 (1-6)
Farm Poultry Production 3 (2-2)	Histology I 4 (2-4)	Histology II 4 (2-4)
Electives 5 (-)		

SENIOR

Economics 4 (4-0) *or*	Agricultural Economics 4 (4-0) *or*	Principles of Sociology 4 (4-0) *or*
Principles of Sociology 4 (4-0)	Rural Sociology 4 (4-0) *or*	Economics 4 (4-0)
College Rhetoric II 4 (4-0)	American History I 4 (4-0)	Elements of Dairying 4 (2-4)
Histology III 4 (2-4)	Comparative Physiology I 7 (5-4)	Comparative Physiology II 7 (5-4)
Electives 6 (-)	Farm Management 4 (3-2)	Electives 3 (-)
	American Government 4 (4-0)	

FIFTH YEAR—Same as Junior year in the course in Veterinary Medicine.

SIXTH YEAR—Same as Senior year in the course in Veterinary Medicine, but substituting electives for History of Breeds and Pedigrees, 4 hours, and Principles of Breeding, 4 hours.

Agronomy

Professor CALL
Associate Professor SALMON
Assistant Professor THROCKMORTON
Assistant Professor GRIMES
Assistant Professor KENNEY
Assistant Professor CUNNINGHAM
Instructor BLEDSOE
Instructor SEWELL
Instructor MILLAR*
Assistant WILSON
Assistant BONNETT
Assistant MCCLYMONDS
Assistant ZAHNLEY
Fellow SCOTT
Fellow MULLEN

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 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 the students in the study and determination of the grains and forages best adapted to different purposes and most suitable

* Resigned.

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 Department of Agronomy offers courses in cereal and forage crop production and improvement of soils, soil fertility, dry-land farming, farm machinery, 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

FOR UNDERGRADUATES

CEREAL CROP PRODUCTION. Sophomore year, fall term. Class work, three hours; laboratory, four hours. Five credits. Required in the course in agriculture; elective in the courses in agricultural engineering and general science. Prerequisite: Plant Physiology I. Associate Professor Salmon and Mr. Zahnley.

This course is a study of cereal crops, largely from a production viewpoint. The crops considered are corn, wheat, oats, barley, rye, rice, buckwheat, and grain sorghum. The origin, the history of development, and the factors influencing growth, are studied. Facts designating the best place in a rotation of crops are presented. Proper seed-bed preparation, cultural methods, and factors which tend to maximum production, receive highest consideration.

Laboratory.—In the laboratory a study of the physical characters of each of the cereal crops is made.

FORAGE CROPS. Sophomore year, winter term. Class work, three hours; laboratory, two hours. Four credits. Required in the course in agriculture; elective in the course in general science. Prerequisite: Plant Physiology I. Assistant Professor Kenney and Mr. Zahnley.

This course includes a study of forage and fiber crops, with special reference to history, method of development, growth, distribution, culture, and uses. The culture and the adaptation of perennial grasses for hay and pasture are considered. Annual forage crops, including sorghums, rape, millets, legumes, and cereals, are studied with reference to their production and uses for pasture, silage, soiling, fodder, and hay.

Laboratory.—In the laboratory both sheaf and mounted specimens of forage 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 and growth of many forage plants. A study is made of the different commercial tame grasses and clovers and their seeds, with special reference to quality, purity, and freedom from adulterants and weed seeds.

ADVANCED GRAIN JUDGING. Senior year, fall term. Laboratory, four hours. Two credits. Elective in the course in agriculture. Prerequisite: Cereal Crop Production. Associate Professor Salmon.

This course consists of the study of grain. It includes the determination of moisture and the effect of excessive moisture on the quality of grain. A study is made of the effect of mixed varieties and foreign material upon quality. These studies are made with reference to conditions during production, harvesting, and marketing. The course includes the judging and commercial grading of grain.

FOR GRADUATES AND UNDERGRADUATES

CEREAL CROP IMPROVEMENT. Senior year, spring term. Lecture, two hours; laboratory, four hours. Four credits. Elective in the course in agriculture. Prerequisites. Forage Crops, Plant Pathology, and Principles of Breeding. Associate Professor Salmon.

This is an advanced study of the cereal crops and methods for their improvement. The laws and principles underlying the breeding of cereals are given special attention. The lectures deal with systems of grain crop management and factors affecting their improvement.

Laboratory.—The laboratory period is used partly for the collection, reading and classification of material concerning cereal improvement. Various assignments are given the students. So far as possible, the individual desires of each student and his interest in a particular crop are allowed to govern the assignment of subjects.

FORAGE CROP IMPROVEMENT. Senior year, fall term. Class work, two hours; laboratory, four hours. Four credits. Elective in the courses in agriculture and general science. Prerequisite: Principles of Breeding, Forage Crops. Assistant Professor Kenney.

This is an advanced course in forage crops and their improvement, especially from the breeder's standpoint. The lectures deal with forage-crop investigations.

Laboratory.—The laboratory period is devoted to the collecting, compiling, classifying and card-indexing of the data on this subject. Special subjects are assigned to each student for presentation to the class. The individual desires of each student and his interest in a particular crop are allowed to govern assignments of subjects.

PRINCIPLES OF AGRONOMIC EXPERIMENTATION. Senior year, winter term. Class work, one hour; laboratory, two hours. Two credits. Elective in the course in agriculture. Prerequisites: Forage Crops, Soil Fertility, Forage Crop Improvement, and Principles of Breeding. Associate Professor Salmon.

This is an advanced course in technical experimentation along agronomic lines. The lectures deal with the history and development of experiments with soils and field crops. Attention is called to the arrangement of the crops on an experiment farm as regards adaptation to soil and topography. The size, the management, and the shape of plots for crop and soil, or joint research, are considered. The method and theory of check plats and the duplication of experiments are discussed. The residual effects and the seasonal influences and their effects upon the following year's work are considered, together with means of overcoming these factors. The methods of experimentation followed at various stations are discussed.

Laboratory.—The laboratory period is devoted to the working out of results secured in actual experimental operations and the compiling of these data.

CROP RESEARCH. Maximum credit, four hours a term. Laboratory, four to eight hours. Prerequisite: Cereal Crop Improvement. Associate Professor Salmon.

In this work a definite problem is assigned to or chosen by the student which must be completed to obtain credit. A thesis presented in good form giving the results of the work is required. No student may be assigned to this course without previous consultation and consent of the instructor in charge.

COURSE IN SOILS

FOR UNDERGRADUATES

SOILS. Junior year, winter term. Class work, three hours; laboratory, four hours. Five credits. Required in the course in agriculture; elective in the course in general science. Prerequisites: Agricultural Chemistry, Geology, and Bacteriology. Professor Call, Assistant Professor Throckmorton, and Mr. Sewell.

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 upon the physical condition of the soil.

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

SOIL FERTILITY. Junior year, spring term. Class work, three hours; laboratory, two hours. Four credits. Required in the course in agriculture; elective in the course in general science. Prerequisites: Quantitative Analysis I, and Soils. Professor Call, Assistant Professor Throckmorton, and Mr. Sewell.

This course involves a study of the food combinations of plants and the effect of different amounts of 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 soils for commercial fertilizers and the kinds of fertilizers to apply.

Laboratory.—The laboratory exercises supplement the class work in demonstrating the effect of fertilizers and manures upon plant growth.

FOR GRADUATES AND UNDERGRADUATES

SOIL SURVEY. Junior year, spring term. Lectures and recitations, two hours; laboratory, four hours. Four credits. Elective in the course in agriculture. Prerequisite: Soils. Assistant Professor Throckmorton.

This subject is pursued by lectures and recitations on the types of soil of the United States as classified by the Bureau of Soils, United States Department of Agriculture, and the adaptability of different crops to these soil classes. A study is also made of the soil surveys of different states, and especially of the soil survey of Kansas.

Laboratory.—Field work in mapping soils comprises the laboratory work.

DRY-LAND FARMING. Senior year, fall term. Class work, two hours. Two credits. Elective in the course in agriculture. Prerequisite: Soils. Professor Call and Assistant Professor Throckmorton.

This course is a brief study of the principles underlying the practice of dry-land farming.

ADVANCED SOILS LABORATORY. Senior year, fall term. Laboratory, four hours. Two credits. Elective in the course in agriculture. Prerequisite: Soils. Assistant Professor Throckmorton and Mr. Sewell.

This course is a continuation of the laboratory work begun in soils.

SOIL RESEARCH I. Senior year, winter term. Class work, two hours; laboratory, four hours. Four credits. Elective in the course in agriculture. Prerequisites: Quantitative Analysis and Advanced Soils Laboratory. Assistant Professor Throckmorton.

The student taking this course pursues a definite line of laboratory work on some soil problem. During the winter term the work is principally in the greenhouse and in the laboratory, but includes assigned readings. In the spring term an opportunity is afforded to carry into the field lines of research started in the greenhouse and in the laboratory.

SOIL RESEARCH II. Senior year, spring term. Laboratory, eight hours. Four credits. Elective in the course in agriculture. Prerequisite: Soil Research I. Assistant Professor Throckmorton.

COURSES IN FARM MANAGEMENT

FOR UNDERGRADUATES

FARM MANAGEMENT. Senior year, winter term. Lectures and recitation, three hours; laboratory, two hours. Four credits. Required in the course in agriculture; optional in the course in agricultural engineering; elective in the course in general science. Prerequisites: Forage Crops, Principles of Feeding, Soil Fertility. Assistant Professor Grimes.

The purpose of this course is: First, to assemble and correlate the principles involved in the agricultural subjects taught in 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 and of the fields and the crops; on the ease, cost and methods of marketing different farm products. Different regions are discussed with especial reference to their adaptability to certain types of farming. 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. Methods of renting and leasing farms are discussed, and their important points emphasized.

Laboratory.—The layout, arrangement of buildings, cropping systems, and business organizations of actual farms is studied and replanned by the student. Various regions are studied as to the types of farming. The factors affecting profits are carefully studied. Practice is given in watching the daily markets. Text, Warren's *Farm Management.*

FOR GRADUATES AND UNDERGRADUATES

ADVANCED FARM MANAGEMENT. Senior year, spring term. Class work, one hour; laboratory, four hours. Three credits. Elective in the course in agriculture. Prerequisite: Farm Management. Assistant Professor Grimes.

The course is a continuation of the course in Farm Management. Farms are visited and studied with reference to their location, arrangement, equipment, and business organization. Data for computing labor incomes is obtained and analyzed by the student. The course affords opportunity to observe the principles of farm management as given in the previous course in actual operation on successful farms. Trips are taken to various parts of the state to acquaint the student with the type of farming followed in those regious. In securing and analyzing labor income data, the student becomes acquainted with the methods of conducting farm surveys. During the first half of the term general farming conditions are studied. In the latter part of the term, opportunity is afforded students specializing in certain lines of agriculture, such as dairying, live-stock production, poultrying and horticulture, etc., to visit and study farms specializing in those products.

FARM COST ACCOUNTING. Elective, spring term. Lecture, one hour; laboratory, two hours. Two credits. Assistant Professor Grimes.

Various systems of farm records and accounts are discussed and explained with the view of acquainting the student with the more practical systems.

Laboratory.—The student is given practice in the keeping of farm records and accounts.

AGRONOMY SEMINAR. One credit. Required throughout the senior year of all students electing their major work in farm crops, soils, or farm management. Prerequisites: Cereal Crop Production, Forage Crops, and Soil Fertility. Professor Call.

Animal Husbandry

Professor COCHEL
Professor WENTWORTH
Assistant Professor MCCAMPBELL
Assistant Professor VESTAL
Instructor GATEWOOD
Assistant PATERSON
Assistant VANDEWILT
Assistant GRAY
Fellow AUBEL
Fellow MANN

The Department of Animal Husbandry owns about 140 acres of land, and rents 460 acres for the maintenance of herds and flocks of pure-bred horses, cattle, sheep, and hogs. The College live stock has attained a national reputation among the breeders and feeders on account of the many prize-winning animals produced.

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. He 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 arranged 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

FOR UNDERGRADUATES

MARKET TYPES AND CLASSES OF STOCK. Freshmen year, fall term. Class work, one hour; laboratory, six hours. Four credits. Required in the course in agriculture; elective in the course in industrial journalism and in the course in general science. Professor Wentworth, Assistant Professor Vestal, Messrs. Gatewood, Paterson, and Gray.

This course consists of a study of the market types and classes of horses, cattle, sheep, and swine. Text, Vaughn's *Types and Market Classes.*

Laboratory.—Practice in scoring and judging market animals.

BREEDING TYPES AND CLASSES OF STOCK. Freshman year, winter term. Class work, one hour; laboratory, six hours. Four credits. Required in the course in agriculture; elective in the courses in general science,

veterinary medicine, and industrial journalism. Prerequisite: Market Types and Classes of Stock. Professor Wentworth, Assistant Professor Vestal, Mr. Gatewood, and Mr. Paterson.

This course consists of a study of the types and classes of horses, cattle, sheep, and swine from the standpoint of both grade and pure-bred animals used for breeding purposes. Text, Curtis' *Live Stock Judging and Selection.*

Laboratory.—Practice is given in scoring and judging breeding animals.

BREEDING TYPES I. Freshman year, spring term. Class work, one hour; laboratory, six hours. Four credits. Special course for veterinary students only. Prerequisite: Market Types and Classes of Stock. Mr. Gatewood.

This course consists of a study of the more important breeds of horses, beef cattle, dairy cattle, sheep, and swine. One-third of the time required in this course is devoted to the study of dairy cattle, during which time the class is in charge of the Department of Dairy Husbandry. Text, Craig's *Judging Live Stock.*

Laboratory.—Practice is given in scoring and in judging.

PRINCIPLES OF FEEDING. Sophomore year, spring term. Lecture, two hours; recitation, two hours. Four credits. Required in the course in agriculture and in the course in veterinary medicine. Prerequisite: Elementary Organic Chemistry. Assistant Professor Vestal.

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

HISTORY OF BREEDS AND PEDIGREES. Elective. Fall term. Class work, three hours; laboratory, four hours. Five credits. Elective in the course in agriculture. Prerequisites: Breeding Types and Classes of Stock; Principles of Feeding. Professor Wentworth.

A study is made of the early history and development of pure-bred domestic animals; also a sufficient study of herd books and pedigrees to acquaint students with the leading strains and families of the different breeds of horses, cattle, sheep, and swine. Text, Plumb's *Types and Breeds of Farm Animals.*

LIVE-STOCK MANAGEMENT I. Elective, fall term. Laboratory, four hours. Two credits. Elective in the course in agriculture. Prerequisite: Principles of Feeding. Mr. Paterson.

Practice is given in the feeding, care, and management of cattle and hogs.

PRINCIPLES OF ANIMAL BREEDING. Junior or Senior year, winter term. Class work, four hours. Four credits. Required in the course in agriculture and in the course in veterinary medicine. Prerequisite: Embryology. Professor Wentworth.

This course embraces the general principles of heredity, variation, sex-limited inheritance, prepotency, fertility and sterility, systems of breeding, and the influence of pedigree and herd-book standards.

PORK AND MUTTON PRODUCTION. Elective, winter term. Class work, three hours. Three credits. Elective in the course in agriculture. Prerequisite: Principles of Feeding. Mr. Gatewood and Mr. Paterson.

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.

LIVE-STOCK MANAGEMENT II. Elective, spring term. Laboratory work, four hours. Two credits. Elective in the course in agriculture.

Prerequisites: Principles of Feeding; Live-stock Management I. Mr. Paterson.

This course deals with the practical side of the feeding, care, and management of horses and sheep.

ADVANCED STOCK JUDGING I. Elective, fall term. Laboratory, four hours. Two credits. Elective in the course in agriculture. Prerequisite: Breeding Types and Classes. Assistant Professor McCampbell.

The course deals with the judging of market classes as well as with all of the different breeds of pure-bred stock. The stock is judged in groups of from four to six animals in the same manner that is customary at county or state fairs.

ADVANCED STOCK JUDGING II. Elective, spring term. Laboratory, four hours. Two credits. Elective in the course in agriculture. Prerequisite: Advanced Judging I. Assistant Professor McCampbell.

This is a continuation of Advanced Judging I. During the work of the 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 stockmen of the state.

BREEDING PURE-BRED LIVE STOCK. Elective, fall term. Class work, two hours. Two credits. Prerequisite: History of Breeds and Pedigrees. Professor Wentworth.

The practices in breeding pure-bred live stock are here studied.

MEATS. Elective, winter term. Class work, two hours; laboratory, four hours. Four credits. Elective in the course in agriculture. Prerequisites: Principles of Feeding; Principles of Animal Breeding. Mr. Paterson.

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

BEEF PRODUCTION. Elective, spring term. Class work, two hours. Two credits. Elective in the course in agriculture. Prerequisite: Principles of Feeding. Professor Cochel.

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.

HORSE PRODUCTION. Elective, spring term. Class work, three hours. Three credits. Elective in the course in agriculture. Prerequisite: Principles of Feeding. Assistant Professor McCampbell.

This course involves a study of the most successful methods of growing and developing young horses and mules and of the most satisfactory rations for horses, together with an investigation of the best methods of preparing horses for market.

FORM AND FUNCTION IN FARM ANIMALS. Elective, fall term. Laboratory, eight hours. Four credits. Elective in the course in agriculture. Prerequisite: Advanced Judging II. Assistant Professor McCampbell.

A detailed and specific study of animal form and type, the influence of type upon function, the relation of form, type and condition as affecting growth and development. Comparative measurements of growing and fattening animals, speed and draft horses, mutton and wool sheep, and lard and bacon types of hogs.

FOR GRADUATES AND UNDERGRADUATES

ADVANCED FEEDING. Elective, winter term. Class work, three hours. Three credits. Elective in the course in agriculture. Prerequisite: Principles of Feeding.

This course consists of a survey of the experimental feeding of horses, cattle, sheep and hogs, together with a detailed study of the fundamental and practical feeding problems of the various sections of the country. Emphasis is placed upon the methods employed and the results obtained in the experimental investigation of these problems. Assistant Professor Vestal.

LIVE-STOCK MARKETING. Elective, spring term. Class work, three hours. Three credits. Elective for seniors in the course in agriculture. Prerequisite: Agricultural Economics, and Coöperative Marketing.

This course includes a study of the art of marketing live stock and live-stock products, freight and insurance rates in transit, liability of carrier and shipper, terminal charges, etc. Commissions for sale or storage. The relation of market prices of grain and hay upon contemporary values of live stock and meat. Professor Cochel.

ANIMAL HUSBANDRY SEMINAR. Elective, spring term. One credit. Prerequisite: Breeding Pure-bred Live Stock.

ANIMAL GENETICS. Elective, fall term. Class work, one hour; laboratory, two hours. Two credits. Elective in the courses in agriculture and general science. Prerequisites: Embryology, Principles of Animal Breeding or Plant Breeding. Professor Wentworth.

This course offers opportunity for individual problems in experimental heredity. Facilities are afforded for inheritance studies in laboratory animals. The lectures treat of disputed questions of heredity. In case work with domestic animals is elected, Advanced Animal Genetics I and II must be taken in the two following terms. Text, *Mechanism of Mendelian Heredity*, by Morgan, Sturtevant, Müller, and Bridges.

ADVANCED ANIMAL GENETICS I. Elective, winter term. Laboratory work, four hours. Two credits. Elective in the courses in agriculture and general science. Prerequisite: Animal Genetics. Professor Wentworth.

This course is a continuation of Animal Genetics. Library reference work takes the place of lectures.

ADVANCED ANIMAL GENETICS II. Elective, spring term. Laboratory work, four hours. Two credits. Elective in the courses in agriculture and general science. Prerequisite: Animal Genetics I. Professor Wentworth.

This course is a continuation of Advanced Animal Genetics I.

Dairy Husbandry

Professor REED
Associate Professor FITCH
Instructor TOMSON
Assistant OLSON
Fellow CAVE

The College dairy farm, including the buildings and yards, consists of about fifty acres of medium upland. This land is used for growing corn, alfalfa, and other crops, such as cowpeas, field peas, and sorghum, and for the pasture of 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 exist 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 excellence of the dairy herd is shown by an average production for the past year of over 400 pounds of butter by the Guernseys, 475 pounds by the Ayrshires, over 500 pounds by the Jerseys, and 572 pounds by the Holsteins. Maid Mary, a thirteen-year-old Holstein, produced 19,600 pounds of milk, yielding 835 pounds of butter in one year. The Owl's Design ranks high among the Jerseys of the world, with a record of 14,606 pounds of milk produced in one year. She has also produced 764 pounds of butter in a year.

The dairy building houses the creamery, the cheese rooms, the classrooms, and the 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

FOR UNDERGRADUATES

ELEMENTS OF DAIRYING. Sophomore year, spring term. Class work, two hours; laboratory, four hours. Four credits. Required in the course in agriculture; elective in the course in general science. Mr. Tomson and Mr. Olson.

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 text, Wing's *Milk and Its Products.*

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

DAIRY JUDGING. Freshman year, spring term. Laboratory, four hours. Two credits. Required in the course in agriculture; elective in the course in general science. Associate Professor Fitch and Mr. Tomson.

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.

BREEDING TYPES I. Freshman year, spring term. Required in the course in veterinary medicine. Associate Professor Fitch.

One-third of this course, which is described more fully under the Department of Animal Husbandry, is given by members of the Department

of Dairy Husbandry, and comprises the judging and scoring of dairy cattle.

DAIRY INSPECTION I. Elective, spring term. Class work, one hour; laboratory, two hours. Two credits. Elective in the course in agriculture. Prerequisites: General Bacteriology; Chemistry D-I and D-II. Mr. Olson.

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. Text, Farrington and Woll's *Testing Milk and Its Products.*

PURE-BRED DAIRY CATTLE. Elective, fall term. Class work, two hours; laboratory, two hours. Three credits. Elective in the course in agriculture. Professor Reed.

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.

MILK PRODUCTION AND HERD MANAGEMENT. Elective, winter term. Class work, three hours. Three credits. Elective in the course in agriculture. Prerequisite: Principles of Feeding. Professor Reed.

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, forming test associations, and organizing plans for improvement of quality of dairy cattle.

BUTTER MAKING AND CREAMERY MANAGEMENT. Elective, fall term. Class work, three hours; laboratory, four hours. Five credits. Elective in the course in agriculture. Mr. Olson.

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. Text, McKay and Larson's *Principles and Practice of Butter Making.*

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 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.

HOME DAIRYING. Elective, winter term. Class work, two hours; laboratory, four hours. This course extends over half a term and carries two credits. For young women only; elective in the course in home economics. Professor Reed and Mr. Tomson.

This course includes a study of the composition of milk, Babcock testing, separation of milk, cream ripening, and farm butter making; also a brief study of the breeds of dairy cattle. It is given with the elective course in Home Poultrying, offered by the Department of Poultry Husbandry in the first half of the term.

CHEESE AND ICE-CREAM MAKING. Elective, spring term. Class work, two hours; laboratory, four hours. Four credits. Elective in the course in agriculture. Prerequisites: Chemistry D-I and D-II; Dairy Bacteriology. Mr. Olson.

This course includes the making of cheese on the farm for home use and for sale, and the commercial manufacture of Chedder 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; the manufacture and handling of ice cream and ices for the retail and wholesale trade, in the second half. Text, Van Slyke-Publow's *The Science and Practice of Cheese Making.*

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 latter half of the term is devoted to the making of ice cream and ices.

DAIRY BUILDINGS AND EQUIPMENT. Elective, spring term. Class work, two hours. Two credits. Elective in the course in agriculture. Professor Reed.

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.

MARKET MILK. Fall term. One hour lecture; laboratory, two hours. Two credits. Prerequisites: Elements of Dairying and Dairy Bacteriology. Mr. Olson.

This course includes a study of the classes of market milk (certified, inspected and pasteurized, also other classifications), equipment and methods for clean milk production, and the relation of clean milk to producer, dealer, and consumer. Also systems of milk inspection, score cards and milk and cream contests. Lectures are also given on milk plants, including their methods and equipment, such as receiving, storing, separating, removing sediment, pasteurization, bottling and capping, cleaning and sterilizing bottles and cans, the use of homogenizer and emulser and practical and laboratory methods of examining milk.

Laboratory.—The work includes actual practice in all the steps in the production of market milk and cream in the college milk plant.

DAIRY INSPECTION II. Senior year, spring term. Laboratory, four hours. Two credits. Required in the course in veterinary medicine. Mr. Tomson.

This course comprises the testing of dairy products, the inspection and scoring of dairies and milk depots, and the testing for adulterants in dairy products. Text, Farrington and Woll's *"Testing Milk and Its Products."*

FOR GRADUATES AND UNDERGRADUATES.

ADVANCED DAIRY JUDGING. Elective, spring term. Laboratory, two hours. One credit. Associate Professor Fitch.

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.

DAIRY SEMINAR. Elective, spring term. Class work, two hours. Two credits. Prerequisites: Elements of Dairying, Dairy Inspection I, Purebred Dairy Cattle, and Milk Production and Herd Management. Professor Reed.

This course includes a study and review of dairy periodicals and experiment station bulletins, books, and other dairy literature.

DAIRY RESEARCH. Fall, winter or spring term, by appointment. Four credits. Prerequisites: Milk Production and Herd Management, or Butter Making and Creamery Management.

This course gives credit on special problems assigned to students. Professor Reed.

Forestry

Forester SCOTT

The Department of Forestry, established by the 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 offered in forestry 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 prairie farm is universally acknowledged. The direct value of the farm supplies in posts, poles, and fuel is readily computed, but the value of these woodland areas as a protection to the home, to growing crops and cultivated fields, and improved landscape effects, is even greater.

COURSES IN FORESTRY

FOR UNDERGRADUATES

FARM FORESTRY. Elective, winter term. Class work, three hours; laboratory, two hours. Four credits. Elective in the course in agriculture and in the course in general science. Forester Scott.

This course includes a study of wood-lot conditions in Kansas, a classification of the different types of wood-lot lands, and a detailed study of the several species of trees best suited to each type and a system of management for each; the value of the timber crop and the place in a system of farm management for the wood lot; the composition and location of windbreaks, their value as a protection to the home, to growing crops and cultivated fields. The class work consists of lectures supplemented by references. The laboratory work includes the identification of conifers found growing in the community and of determining the rate of growth of trees in wood lots.

DENDROLOGY. Elective, winter or spring term. Class work, one hour; laboratory, two hours. Two credits. Elective in the course in agriculture and in the course in general science. Forester Scott.

This course takes up the classification and identification of the broad-leavened trees growing on the campus and in the vicinity of Manhattan by means of the bud and twig characteristics. Nearly one hundred species of trees and shrubs are found growing in this vicinity and included in this course.

SILVICULTURE. Elective, winter or spring terms. Class work, two hours; field work, two hours. Three credits. Prerequisites: Dendrology or Farm Forestry. Forester Scott.

A study is made of the forest regions of the United States; the commercial range of the important economic species, their soil and climatic requirements; 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.

Horticulture

Professor DICKENS
Professor AHEARN
Assistant Professor LEWIS*
Instructor MERRILL
Fellow DALE

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 new greenhouses have 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. 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

FOR UNDERGRADUATES

PLANT PROPAGATION. Freshman year, spring term. Class work, three hours; laboratory, two hours. Four credits. Required in the course in agriculture; elective in the course in general science. Prerequisite: Plant Anatomy. Instructor Merrill.

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. The work is given by means of lectures and assigned readings.

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

ORNAMENTAL GARDENING I. Freshman year, spring term. Laboratory, two hours. One credit. Required in the course in home economics. Professor Ahearn.

This course is designed to give the young women an acquaintance with the materials used in landscape work. The greenhouses, campus, nursery, and forest planting give opportunity to know plants, trees, and shrubs of many species and varying ages.

KITCHEN GARDENING. Sophomore year, fall term. Class work, two hours. Two credits. Required in the course in home economics; elective in the course in agriculture. Professor Ahearn.

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* Resigned.

Lectures are given 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.

POMOLOGY I. Elective, fall term. Class work, one hour; laboratory, six hours. Four credits. Elective in the course in agriculture. Text, Waugh's *Systematic Pomology.* Professor Ahearn and Instructor Merrill.

The course comprises exercises in selecting specimens, and in the preparation of exhibits; identification and description of varieties; identification of diseases and of injuries which damage storage fruits.

SMALL FRUITS. Elective, winter term. Class work, two hours; laboratory, two hours. Three credits. Elective in the course in agriculture. Prerequisite: Plant Propagation. Professor Dickens and Instructor Merrill.

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.

Laboratory.—Principles of pruning and general experience in cultural methods are given consideration, together with variety adaptations and selections.

FOR GRADUATES AND UNDERGRADUATES

ADVANCED POMOLOGY. Elective, fall term. Class work, two hours; laboratory, four hours. Four credits. Elective in the course in agriculture. Prerequisite: Pomology I. Professor Dickens, Professor Ahearn, and Instructor Merrill.

Class work includes lectures on picking, packing, grading and storage and marketing of commercial fruits. Given by means of lectures.

Laboratory.—Includes study in the orchard of the operations of picking and grading. Work is offered in packing, and studies of storage temperatures and requirements are made.

PRINCIPLES OF ORCHARDING. Elective, spring term. Class work, three hours; laboratory, two hours. Four credits. Elective in the course in agriculture. Prerequisites: Plant Propagation and Pomology I. Professor Dickens.

This includes studies of the necessary conditions for success with orchards, including location, improvement of soil, application of fertilizers and cultural methods and pruning. Text, Bailey's *Principles of Fruit Growing.*

Laboratory.—Offers practice in spraying, establishing young orchards, pollination studies, thinning of fruit and summer pruning.

SPRAYING. Elective, winter term. Class work, one hour; laboratory, four hours. Three credits. Elective in the course in agriculture. Prerequisites: Chemistry I and II. Assistant Professor Lewis.

Practice is given in preparing spray mixtures, and in the use of spraying machinery.

ORCHARD MANAGEMENT. Elective, spring term. Class work, two hours; laboratory, four hours. Four credits. Elective in the course in agriculture. Professor Dickens.

This is a detailed study of the capital and equipment necessary for the handling of orchards of varying age and size, and of requirements of marketing, storage, and by-products.

MARKET GARDENING. Elective, spring term. Class work, two hours; laboratory, four hours. Four credits. Elective in the course in agriculture. Professor Ahearn.

This course comprises a study of the problems and possibilities of the market garden, the necessary equipment, and soil requirements therefor; the value and cost of fertilizers. Text, Lloyd's *Productive Vegetable Gardening.*

Laboratory.—The laboratory work consists of the preparation of 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.

ORNAMENTAL GARDENING II. Sophomore year, spring term. Class work, two hours. Two credits. Required in the course in home economics. Professor Ahearn.

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

LANDSCAPE GARDENING. Elective, spring term. Class work, two hours; laboratory, four hours. Four credits. Elective in the course in agriculture, and in the course in general science. Professor Ahearn.

This course is a study of the ideals of landscape work, and the means adopted to secure the best results in lawns, parks, public grounds, and cemeteries. Text, Waugh's *Landscape Gardening.*

Laboratory.—The laboratory work is in making plans for plantings of various types, including lawns, parks, and cemeteries.

GREENHOUSE CONSTRUCTION AND MANAGEMENT. Elective, spring term. Class work, four hours. Four credits. Professor Ahearn.

This course consists of a term's work covering the more important points of greenhouse construction and the proper methods of conducting the greenhouse business. Not only is this subject treated from the commercial standpoint, but the management of private conservatories is also carefully studied.

SCHOOL GARDENING. Elective, spring term. Class work, two hours; laboratory, four hours. Four credits. Professor Ahearn.

The object of this course is to give teachers a knowledge of the principles which underlie success in gardening and the adaptation of small areas to the production of vegetables and flowers. The subjects of soil preparation, seed selection, fertilizers, hotbeds, plant manipulation, and the planning of the garden are given special consideration. Opportunity is given for teachers to become familiar with general garden methods and the use and manipulation of garden tools, including seeders, weeders and wheel hoes. Allotments of ground areas required for different crops, the length of time required for different crops, the length of time required to mature various vegetable and flower crops, the adaptation of these to country and city schools, and suggestions for marketing, are among the subjects considered.

THE THEORY AND ÆSTHETICS OF LANDSCAPE GARDENING. Elective, fall term. Class work, three hours; laboratory, two hours. Four credits. Professor Ahearn.

A study of different styles in landscape art and the principles governing them.

PLANT MATERIALS OF LANDSCAPE GARDENING. Elective, spring term. Class work, two hours; laboratory, four hours. Four credits. Prerequisite: Plant Propagation. Professor Ahearn.

A study of the form, habits and adaptations of trees, shrubs, vines and herbaceous plants with reference to their value and use in landscape design.

LANDSCAPE GARDENING II. Elective, winter term. Laboratory, eight hours. Four credits. Prerequisite: Landscape Gardening I. Professor Ahearn.

A study of the more advanced problems of designing and reconstruction from topographic and transit surveys as offered by large areas of parks, play grounds and country estates.

HISTORY AND LITERATURE OF LANDSCAPE GARDENING. Elective, winter term. Class work, two hours. Two credits. Prerequisite: The Theory and Æsthetics of Landscape Gardening. Professor Ahearn.

A study of the chronological order of the history and literature of landscape gardening with special reference to the early influences as they govern modern design.

TREE SURGERY. Elective, spring term. Class work, one hour; laboratory, six hours. Four credits. Prerequisite: Plant Physiology. Instructor Merrill.

A study and practice of the most approved methods of caring for ornamental trees and the technical details of planting, pruning and spraying, bolting, chaining and cavity work. Shade tree legislation and the duties of shade tree commissions and tree wardens.

CITY AND TOWN PLANNING. Elective, winter term. Laboratory, eight hours. Four credits. Professor Ahearn.

Has to do with the laying out of streets and planting of same.

Milling Industry

Professor FITZ
Instructor DUNTON
Miller LEEPER

The Department of Milling Industry was primarily established by the Board of Regents to undertake investigations in the handling, marketing and milling of wheat. Every student of agriculture 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 grain in the manufacture of food, together with the natural by-products resulting therefrom.

The department has a well-equipped plant, consisting of six double-stand 7″ x 14″ rolls, with necessary cleaning machinery and dust collectors, sifters, and purifiers. The results secured here are comparable with those from a regular commercial mill. A baking laboratory equipped with proofing closet, dough mixer, and electric ovens is open for student use, as is also a laboratory for chemical tests on wheat and flour.

COURSE IN MILLING INDUSTRY

FOR UNDERGRADUATES

COMMERCIAL GRAIN AND GRAIN INSPECTION. Junior year, fall term. Class work, three hours; laboratory, two hours. Four credits. Prerequisites: Cereal Crop Production. Professor Fitz.

This course includes a study of methods of handling, storing, marketing, and grading of grain; the history of the origin and development of grain inspection and grades; the classification and organization of in-

spection system; the organization and functions of grain exchanges or boards of trade; and principal grain market, with receipts, shipments, and consumption.

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.

GRAIN PRODUCTS. Junior year, winter term. Class work, three hours; laboratory, two hours. Four credits. Prerequisite: Commercial Grain and Grain Inspection. Professor Fitz.

A brief study of the methods of manufacturing food products from cereals, with the resulting by-products, and a comparison of composition and feeding value of these by-products.

Laboratory.—A study is made of actual samples of most important cereal food products and by-products.

EXPERIMENTAL MILLING. Junior year, spring term. Laboratory, four hours. Two credits. Prerequisite: Grain Products. Miller Leeper.

This course includes a study of the theory and practice of milling, with demonstrations on a small experimental mill.

FOR GRADUATES AND UNDERGRADUATES

ADVANCED EXPERIMENTAL MILLING. Senior year, fall term. Laboratory, eight hours. Four credits. Prerequisite: Experimental Milling. Miller Leeper.

This course consists of practice in the art of milling, with demonstrations on model mill.

WHEAT AND FLOUR TESTING. Elective, winter term. Class work, one hour; laboratory, six hours. Four credits. Prerequisites: Grain Products, and six credit hours of Quantitative Analysis. Miss Dunton.

This course includes special quantitative tests applied to cereals and their by-products; methods for analysis and interpretation of results.

EXPERIMENTAL BAKING A. Senior year, spring term. Laboratory, eight hours. Four credits. Prerequisite: Wheat and Flour Testing. Miss Dunton.

This course includes practice in making tests; comparison of methods, formulas, and flour; and interpretation of results.

EXPERIMENTAL BAKING H. Senior year, spring term. Class work, one hour; laboratory, six hours. Four credits. Elective in the course in home economics. Prerequisite: Foods III. Miss Dunton.

This course includes demonstrations in milling and practice in bread making; comparison of methods, yeasts and flours, and a study of the more important conditions which influence the quality of bread.

MILLING PRACTICE. Senior year, spring term. Laboratory, eight hours. Four credits. Prerequisite: Advanced Experimental Milling. Miller Leeper.

This course is a continuation of Advanced Experimental Milling.

Poultry Husbandry

Professor LIPPINCOTT
Assistant MUSSEHL
Superintendent HARRIS

The poultry plant is situated just north of the northeast corner of the College campus. The plant occupies eight acres, and is devoted to the breeding and rearing of the stock 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 in the government and state experiment stations and in schools and colleges an increasing demand for men with experience and systematic training in handling poultry. There is likewise a growing demand for men capable of managing poultry farming enterprises of considerable proportions, or of entering the commercial branches of the work.

COURSES IN POULTRY HUSBANDRY

FOR UNDERGRADUATES

FARM POULTRY PRODUCTION. Junior year, fall term. Class work, two hours; laboratory, two hours. Three credits. Required in the course in agriculture; elective in the course in general science. Professor Lippincott.

This course takes up the problems of poultry management on the general farm. The subjects of feeding, breeding, incubating, brooding, and preparing for market are studied.

POULTRY MANAGEMENT. Freshman year, winter term. Lectures, two hours. Two credits. Required in the course in veterinary medicine. Professor Lippincott.

This course takes up the general problems of poultry practice, and pays particular attention to the relation of these problems to the maintenance of health.

PRACTICE IN POULTRY FEEDING. Elective, spring term. Three times a day, seven days a week, for a period of four weeks, at hours outside the regular schedule. One credit. Mr. Mussehl.

This course consists of the actual care of a flock of fowls by the student, under supervision of an instructor. Careful record is kept of the feeds used and the eggs produced. A financial statement is required at the end of the feeding period.

PRACTICE IN INCUBATION. Elective, spring term. Three times a day, seven days a week for a period of four weeks. One to three credits. For one credit one successful hatch must be brought off in either a hot-air or hot-water incubator. For further credit the other types must be operated, careful records being kept of varying temperature, moisture and ventilation conditions. Students specializing in Poultry Husbandry must take three credits in this course. Mr. Mussehl.

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

HOME POULTRYING. Elective, Division of Home Economics, winter term, open only for women. Class work, four hours for the first half of the term. Two credits. Professor Lippincott.

This course takes up the problems of poultry management for egg and meat production. The subjects of feeding, breeding, housing, incubating, brooding, and preparing for market are studied. It is given with the elective course in home dairying offered by the Department of Dairy Husbandry, in the last half of the term.

PRACTICE IN BROODING. Elective, spring term. Three times a day, seven days a week, for a period of four weeks, at hours outside the regular schedule. One to three credits. For one credit a group of at least fifty baby chicks must be successfully brooded for four weeks in any one of the several types of brooders. For further credits, broods must be handled successfully in two other types and complete records of feed consumption, rate of gain, and mortality kept. Students specializing in Poultry Husbandry must take three credits in this course. Mr. Mussehl.

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

PRACTICE IN MILK FEEDING. Elective, fall term. Twice a day, seven days a week, for a period of four weeks, at hours outside of the regular schedule. One credit. Mr. Mussehl.

This course consists in force-fattening poultry in crates by means of buttermilk. The time will be divided into periods of two weeks each, so that the student will have an opportunity to fatten two lots of birds. A financial statement is required.

PRACTICE IN CANDLING. Elective, fall term. Laboratory and lecture, two hours. One credit. Mr. Mussehl.

This course consists in making a first-hand study of the commercial grades of eggs. Particular attention is given to those forms of deterioration found in Kansas, including blood rings, spots, heats, and green whites, which are likely to be overlooked by egg buyers. A study is also made of the relative deterioration of fertile and infertile eggs. Methods of transferring and packing eggs for storage are studied.

POULTRY BREEDS AND TYPES. Elective, fall term. Class work, one hour; laboratory, four hours. Three credits. Mr. Mussehl.

In this course a historical study is made of the various breeds commonly found on Kansas farms. Particular attention is paid to tracing the evolution of the present breed types. The laboratory is given over largely to judging the different breeds and varieties, both by score card and by comparison.

ADVANCED POULTRY JUDGING. Elective, winter term. Laboratory and lecture, four hours. Two credits. Prerequisites: Poultry Breeds and Types. Offered every other year. Will be given 1917. Mr. Mussehl.

This course is a continuation of Poultry Breeds and Types, giving further practice in judging the more common varieties, and taking up some of the rarer breeds.

FOR GRADUATES AND UNDERGRADUATES

MARKET POULTRY. Elective, fall term. Lecture, one hour; laboratory, two hours. Two credits. Professor Lippincott and Mr. Mussehl.

In this course the lectures will cover the methods of handling market poultry alive and dressed. The laboratory work consists of practice work in caponizing, killing, bleeding, packing, cooling, and grading poultry for market.

POULTRY BREEDING. (In coöperation with the Department of Animal Husbandry.) Elective, Division of Agriculture, spring term. Conferences

and laboratory, four hours. Two credits. Prerequisite: Animal Breeding. Professors Wentworth and Lippincott.

The experimental work on inheritance in poultry is reviewed by means of assigned readings and laboratory experiments.

POULTRY FARM MANAGEMENT. See Advanced Farm Management, given elsewhere in the catalogue.

POULTRY BACTERIOLOGY. See elsewhere in the catalogue.

POULTRY RESEARCH. Elective, fall term. Credit, two to four hours. Prerequisite: Farm Poultry Production (or Poultry Management), Practice in Incubation, Brooding, and Feeding. Professor Lippincott.

In this course the student pursues a definite line of investigation concerning some phase of poultry work. Arrangement may be made to continue this work through three terms where the problem attacked can not be solved within the limits of a single term.

Veterinary Medicine

Professor SCHOENLEBER
Professor GOSS
Professor DYKSTRA
Assistant Professor BURT
Assistant Professor HASLAM
Instructor HOBBS
Instructor BENNER
Assistant FRANKLIN
Assistant HAGAN
Superintendent CHRISTIAN

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 classrooms, 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 furnished by the department free of charge.

For work in histology and pathology the department is exceedingly well provided. It has over thirty large microscopes, equipped with both high and low power, and several oil immersion objectives, microtomes, the best reflectoscope and projectoscope obtainable, besides 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 course of laboratory study.

For the 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 is an annex to the main Veterinary Building, seat-

ing over three hundred people, and 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, which gives ample material for study of internal medicine as well. The out-clinic 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 departments is that the science of veterinary medicine is the foundation, and the art merely supplementary. A thorough drill is given in the foundation studies, and later in the course practical application of these is made in actual field work. This result is a thoroughly scientific veterinary education.

In the arrangement of the schedule of the veterinary course it is implied that the course should be followed in its regular sequence, as each year's work depends upon the work done the previous year. Certain subjects, however, may be selected as electives if a student has the necessary prerequisites. These subjects are listed in the list of electives.

COURSES IN ANATOMY

FOR GRADUATES AND UNDERGRADUATES

This branch of veterinary medicine extends over the freshman and sophomore years for veterinary students, and one term is required in the course in agriculture.

The classroom instruction consists of lectures, quizzes and recitations and special dissection of the part under discussion, also a study of dissected specimens, various models, and the 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 formalin solution followed by a starch solution colored red, which fills and hardens within the arteries. Each half of the subject is divided into three parts, namely, the head and neck; fore limb and thorax; hind limb and posterior half of body. The students work in pairs, each pair dissecting one part before passing on to another part. The work is arranged so that bones are first studied, then the muscles and ligaments. This is followed by the dissection of the circulatory and nervous systems. The viscera of certain regions are studied by the students at work on those respective parts, *i. e.*, the abdominal organs are studied by the students at work on the hind limb, etc.

In addition to numerous atlases and charts furnished by the College, the student is required to have Sisson's *Veterinary Anatomy* as a textbook and Sisson's *Dissecting Guide* as a laboratory guide.

ANATOMY I. Freshman year, fall term. Class work, two hours; laboratory, nine hours. Six and one-half credits. Required in the course in veterinary medicine; elective in other courses. Doctor Burt.

This course consists of the osteology, or the study of the bones, of the horse in detail. Drawings of the bones are made by the student in order that he obtain a better mental picture of their shape and characteristic parts. The bones of the head are studied separately and collectively.

Careful attention is given to the sinuses of the head, and points of ossification.

ANATOMY II. Freshman year, winter term. Class work, two hours; dissection, nine hours. Six and one-half credits. Required in the course in veterinary medicine; elective in other courses. Prerequisite: Anatomy I. Doctor Burt.

This course deals with myology and arthrology, and as it can not be completed in one term it is arranged to extend over two terms and embraces Anatomy III. The student is required to make a careful dissection of the muscles of the body, learning their location, attachments and relations one to another as well as their relation to other important structures. After the muscles are dissected and learned the student dissects the different ligaments of the various joints. In this way he learns by actual contact and not by memorizing. The student also studies the viscera belonging to his respective part.

ANATOMY III. Freshman year, spring term. Class work, one hour; dissection, six hours. Four credits. Required in the course in veterinary medicine; elective in other courses. Prerequisite: Anatomy II. Doctor Burt.

This course is a continuation of Anatomy II, and the dissection of the muscles, ligaments and viscera is here completed.

ANATOMY IV. Sophomore year, fall term. Class work, one hour; dissection, six hours. Four credits. Required in the course in veterinary medicine, elective in other courses. Prerequisite: Anatomy III. Doctor Burt.

This course and Anatomy V consists of the study of angiology and neurology and all parts not previously studied. Having had osteology and myology, the student is now prepared to get an accurate mental picture of the distribution, location and relations of the blood vessels and nerves.

ANATOMY V. Sophomore year, winter term. Class work, one hour; dissection, six hours. Four credits. Required in the course in veterinary medicine; elective in other courses. Prerequisite: Anatomy IV. Doctor Burt.

This is a continuation of Anatomy IV and in addition to the dissection of the circulatory and nervous systems the student reviews Anatomy II and III. On completing this course the student will have dissected every part of the body, including the eye, brain, ear, etc.

ANATOMY VI. Sophomore year, spring term. Class work, one hour; dissection, six hours. Four credits. Required in the course in veterinary medicine; elective in other courses. Prerequisite: Anatomy V. Doctor Burt.

This course consists of a comparative study of the principal structural differences of all parts of the various domestic animals not studied concurrently with the previous courses.

ANATOMY. Sophomore year, fall term. Class work, three hours; laboratory, four hours. Five credits. Required in the course in agriculture. Doctor Burt and Doctor Benner.

This course is planned to give the agricultural students a general idea of the anatomy of farm animals, together with comparative references to many structures of the human body that are usually omitted in their general education. The course aims to aid them in understanding conformations by means of the study and dissection of the structures beneath the skin that modify it, at the same time observing the muscles of locomotion and the various levers, both as regards speed and power or draughting. Special attention is given to a thorough study of the foot,

to enable the student to understand its care and shoeing. Considerable time is given to the digestive organs, to give the student a clear conception of the known physiologico-anatomical phases of feeding, digestion, nutrition, and metabolism. Text, Strangeway's *Veterinary Anatomy.*

COURSES IN HISTOLOGY

FOR GRADUATES AND UNDERGRADUATES

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.

HISTOLOGY I. Freshman year, winter term. Class work, two hours; laboratory, four hours. Four credits. Required in the course in veterinary medicine; elective in the course in agriculture and in the course in general science. Prerequisite: Anatomy I. Doctor Goss and Doctor Hagan.

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 fibers, bubbles of air, and drops of oil, to enable the student to recognize these when they are accidentally mounted with tissue. The fundamental tissues are next studied: epithelial tissues with regard to form, structure, arrangement and location; connective tissues with regard to structure and location, including bone development and teeth and their development; muscular tissue, voluntary, involuntary, and cardiac; nerve tissue, the structures and forms of its cells, of medullated and nonmedullated nerve fibers; spinal cord; the blood vessels, heart, and lymphatic vessels. Blood corpuscles are studied with regard to size, shape, and structure, including each kind of white corpuscles. In this term the student studies and mounts sixty-five slides, some of which are teased, and many of which are sectioned in paraffin and çelloidin. Textbook, *Histology,* by Stohr.

HISTOLOGY II. Freshman year, spring term. Class work, two hours; laboratory, four hours. Four credits. Required in the course in veterinary medicine; elective in the course in agriculture and in the course in general science. Doctor Goss and Doctor Hagan.

This is a continuation of Histology I, beginning with the blood-forming organs, as bone-marrow, lymph glands, and spleen. The histology of the digestive tract is next studied, including a study of the mouth, the tongue, the taste buds, the parotid, the submaxillary and sublingual, the thyroid and thymus glands; the æsophagus; the stomachs on 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 microscope and makes drawings of the above-mentioned tissues. Some of the tissues studied are injected with gelatine mass to bring out the blood vessels. Textbook, *Histology,* by Stohr.

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 agriculture and in the course in general science. Doctor Goss and Doctor Hagan.

This is a continuation of Histology II, and includes the microscopic 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 female genital organs; the skin and its appendages; the suprarenal gland; the medulla; the cerebellum; the cerebrum; the eye; and the ear. In this course the student prepares thirty slides. Textbook, *Histology*, by Stohr.

COURSES IN PHYSIOLOGY

FOR GRADUATES AND UNDERGRADUATES

The courses in physiology are divided into Comparative Physiology, Animal Physiology, and Human Physiology.

COMPARATIVE PHYSIOLOGY I. Sophomore year, winter term. Class work, five hours; laboratory, four hours. Seven credits. Required in the course in veterinary medicine; elective in the course in agriculture and in the course in general science. Prerequisites: Anatomy I, Organic Chemistry, Histology I and II. Doctor Burt and Doctor Benner.

This course treats of the physiology of domestic animals, beginning with the study of the blood, heart, blood vessels, and continuing with the ductless glands and internal secretions, respirations, digestion, and absorption. Textbook, *A Manual of Veterinary Physiology*, by Fred Smith.

Laboratory.—The laboratory work consists of a practical application of the knowledge derived in the classroom. The laboratory is equipped with all necessary material and apparatus to make a detailed study of the composition and digestive action of the saliva, gastric juice, bile, pancreatic and intestinal juices. Hormones and other substances in relation to their influence upon the production and action of the digestive juices are also considered. The composition and properties of the blood are studied by the aid of chemical, microscopic and spectroscopic methods. Textbook, Halliburton's *Essentials of Chemical Physiology.*

COMPARATIVE PHYSIOLOGY II. Sophomore year, spring term. Class work, five hours; laboratory, four hours. Seven credits. Required in the course of veterinary medicine; elective in the course in agriculture and in the course in general science. Doctor Burt and Doctor Benner.

The work of this term is a continuation of Comparative Physiology I and treats of the urine and urinary system, nutrition, animal heat, muscular and nervous symptoms, locomotion, generation and development, growth and decay. Textbook, Smith's *A Manual of Veterinary Physiology.*

Laboratory.—The laboratory work consists of a study of the normal urine, determining the composition, quantitatively as well as qualitatively. Tests for the detection of abnormal constituents, such as bile, blood-sugar and albumen, are applied to normal and also pathological urine. Microscopic examination is made for blood casts, blood, etc. The laboratory work in practical physiology consists in studying the phenomena associated with the nervous, muscular, respiratory and circulatory systems, and making graphic records of the same. References, *Urine of the Horse and Man*, by Fish; *Practical Physiology*, by Hemmeter, *An Introduction to Physiology*, by Porter.

ANIMAL PHYSIOLOGY. Sophomore year, winter term. Class work, four hours. Four credits. Required in the course in agriculture. Prerequisite: Anatomy. Doctors Burt and Benner.

This course is intended to give the student a useful knowledge of the functions of the body of the various farm animals, so that he can realize and understand the benefits to be derived from the judicious application of proper breeding, feeding and care of farm stock. The course includes

the study of the composition and functions of the various digestive juices and the relation of the food to the production of heat, growth, and maintenance of health. The functions of the blood, respiratory, nervous and excretory systems are also carefully studied. Specimens, charts and various apparatus will be employed to demonstrate the facts presented during the lecture periods. Text, Fred Smith's *Manual of Veterinary Physiology.*

HUMAN PHYSIOLOGY. Junior year, fall term. Class work, four hours. Four credits. Required in the course in home economics; elective in the course in general science. Prerequisites: Chemistry III, Elementary Organic Chemistry. Doctors Burt and Benner.

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-mâché manikins, and models of the eye, ear, etc. Demonstrations relative to the subject under discussion are made as often as is practicable. Textbook, Martin's *Human Body.*

CHEMICAL AND EXPERIMENTAL PHYSIOLOGY. Elective, fall term. Class work, two hours; laboratory, four hours. Four credits. Prerequisites: Organic Chemistry, Human or Animal Physiology. Doctors Burt and Benner.

This course is intended to supplement the lectures in physiology, so that the student will make a practical application of the knowledge obtained in the classroom. It will embrace the study of the composition of the body tissues and of the secretions and excretions of the various glands; the various enzymes and their physiological relation to the digestion of the food substances; absorption, assimilation, and metabolism. The composition and properties of the blood will be studied by spectroscopic, microscopic and chemical methods. Graphic records of the blood pressure and of the pulse, as well as the phenomena that attend the contraction of muscles, will be made. Text, Halliburton's *Essentials of Chemical Physiology.*

PATHOLOGY

FOR GRADUATES AND UNDERGRADUATES

The laboratory is equipped with microscopes, microtomes, paraffin ovens, microphotographic and projection apparatus. Each student is furnished with a microscope, and locker containing staining dishes and stains. Material is furnished the student for embedding, sectioning and staining tissues for microscopic study. In addition, the student is furnished many mounted slides for study, which contain the pathological lesions to which the domestic animals are subject. In addition to this, the material from the post-mortem of animals and material sent to the College from over the State furnish ample material for laboratory diagnosis.

PATHOLOGY I. Junior year, fall term. Class work, five hours; laboratory, four hours. Seven credits. Required in the course in veterinary medicine; elective in the courses in agriculture and general science. Prerequisites: Histology, Physiology, and Bacteriology I. Doctor Goss and Doctor Hagan.

The course in general pathology treats of the history of pathology, predisposition, immunity, congenital and inherited disease; circulatory disturbances—cardiac difficulties, hyperæmia, hemmorrhage, dropsy, œdema, thrombosis, embolism, and alteration of the blood; disturbances

in metabolism—fever, necrosis, atrophy, cloudy swelling, fatty changes, inflammation, calcification, and concrement formation; and process of repair, tumors, and functional disturbances. Text, *Comparative General Pathology*, by Kitt.

PATHOLOGY II. Junior year, winter term. Class work, four hours; laboratory, six hours. Seven credits. Required in the course in veterinary medicine; elective in the courses in agriculture and general science. Doctor Goss and Doctor Hagan.

This course is devoted to pathological technique: collecting, fixing, hardening, embedding in celloidin and paraffin, sections of fresh, frozen, and embedded tissues; and a study of the method of preserving gross specimens. Considerable time is devoted to stains and the method of staining. This work 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, the pancreas, the lungs, digestive tract, the serous membranes, the vascular system, lymph nodes, the spleen, bone, skin, and genital organs. The students stain, mount, study, and make drawings of the above-mentioned tissues. Textbook, *Pathological Histology*, by Gaylord and Aschoff.

PATHOLOGY III. Junior year, spring term. Class work, four hours; laboratory, six hours. Seven credits. Required in the course in veterinary medicine; elective in the courses in agriculture and general science. Doctor Goss and Doctor Hagan.

This course is devoted to the pathology of the infectious diseases and to laboratory diagnosis. Post-mortem examinations are made on all animals dying in the hospital at the College barns and in the neighborhood. The students attend and take turn in holding the autopsy. Each student is expected to keep a written report of the pathological changes, also of the microscopic findings. The above work is done under the direction of the pathologist in charge. Text, *Pathology of Infectious Diseases*, by Moore.

FOR GRADUATES

PATHOLOGICAL TECHNIQUE AND DIAGNOSIS I. Any term. Laboratory, eight hours. Four credits. Elective. Prerequisite: Pathology III. Doctors Goss and Hagan.

This course consists of practice in post-mortem and laboratory diagnosis. The various methods of embedding and staining of tissues are carried out upon the large collection of material which the laboratory contains, as well as the material which is constantly coming into the laboratory from various parts of the State.

PATHOLOGICAL TECHNIQUE AND DIAGNOSIS II. Any term. Laboratory, eight hours. Four credits. Elective. Doctors Goss and Hagan.

This course is a continuation of Pathological Technique and Diagnosis I, with the same credits.

MATERIA MEDICA

FOR UNDERGRADUATES

MATERIA MEDICA I AND II. Junior year, fall and winter terms. Class work, four hours during the fall term, and two hours during the winter term. Doctor Benner.

The course includes definitions of terms, modes of action of drugs in general, their method and rapidity of absorption and elimination, physiological and chemical incompatibiles, etc. The drugs and medicinal agents are grouped according to their action. The lecturer discusses the origin, physical properties, active constituents, and official preparations of the medicinal agents.

THERAPEUTICS I AND II. Junior year, winter and spring terms. Class work, two hours winter term, and four hours spring term. Prerequisites: Materia Medica I and II. Doctor Benner.

The student is thoroughly drilled in the physiological action of the various drugs, or action on the healthy animal, and the therapeutic action, or action on the diseased animal. A course in toxicology is included in this work, taking up the symptoms and treatment of poisons frequently encountered in veterinary practice. The science of posology, or dosage, is considered of the utmost importance, and a liberal amount of time is devoted to it, taking up the proper dose of the crude drug and its preparation for the horse, cow, dog, cat, and swine. Reference works: Winslow's *Veterinary Materia Medica and Therapeutics; United States Dispensatory;* Wood's *Therapeutics, its Principles and Practice.*

PHARMACY. Junior year, fall term. Class work, one hour; laboratory, four hours. Three credits. Doctor Benner.

In the lectures the meaning of the various pharmaceutical terms are discussed. Various systems of weights and measures, and the conversion of one system into another, are taught. Official preparations and some unofficial ones, their strength and the mode of preparation of each, are studied in regular order. Particular stress is placed upon prescription writing, the student being taught to avoid incompatibilities, to give nouns the proper case endings, and to understand the meanings of certain Latin phrases. In the laboratory work the principles of filtration, percolation, hot-water and sand baths, etc., are taught. The student is required to prepare at least one of each of the following preparations: An infusion, a decoction, a tincture, a wine, a syrup, a fluid extract, a liniment, an emulsion, a liquor, an aqua, a spirit, a volus, an ointment, an electuary, and a cataplasm. In addition, a thorough course in the compounding of prescriptions is afforded at the clinic, where all medicines are prescribed and compounded by the students, under guidance of the instructor in charge. Reference works: *U. S. Pharmacopœia;* Maltbie's *Practical Pharmacy;* Remington's *Practice of Pharmacy;* Fish's *Exercises in Materia Medica and Pharmacy.*

COURSES IN SURGERY

FOR UNDERGRADUATES

SURGERY I. Junior year, fall term. Class work and laboratory, three hours. Three credits. Doctor Dykstra.

This course includes methods of restraint; asepsis and antisepsis; anæsthesia, both local and general; inoculations, bandaging, massage, controlling hemorrhage; division of tissues and the uniting of wounds; injections of medicines into the subcutaneous tissues, blood stream, trachea, spinal canal.

SURGERY II. Junior year, winter term. Class work and laboratory, three hours. Three credits. Doctor Dykstra.

This course is a continuation of Surgery I. Animal dentistry is taken up very thoroughly, in so far as it constitutes an important part of the veterinarian's work. The students have free access to a large number of museum specimens of abnormal teeth. Also, many dental patients are presented at the College hospital for treatment.

SURGERY III. Junior year, spring term. Class and laboratory, three hours. Three credits. Doctor Dykstra.

This course considers in regular order the surgical diseases of the head, neck, thorax, abdomen, stomach and bowels, urinary organs, and organs of generation.

SURGERY IV. Junior year, fall term. Class and laboratory, three hours. Three credits. Doctor Dykstra.

During this course particular attention is paid to causes, symptoms and treatment of lameness. It considers in detail fractures and their reduction, diseases of joints, tendons and sheaths, muscles and fascia, and surgical diseases of the foot.

SURGERY V. Senior year, winter term. Class and laboratory, three hours. Three credits. Doctor Dykstra.

Surgery as taught during this course includes special surgical operations, such as neurectomics, autoplastics, desmotomies, actual cauterization, tenotomies, myotomies, enteroctomy and interoanastomosis, and surgery of the eye.

SURGERY VI. Senior year, spring term. Class and laboratory, three hours. Three credits. Doctor Dykstra.

This is a continuation of Surgery V. Reference books: Dollar's *Regional Veterinary Surgery;* Merillat's *Veterinary Surgery,* Vols. I, II, and III; Williams' *Surgical Operations;* Fleming's *Operative Veterinary Surgery,* Parts I and II; White's *Restraint of Domestic Animals.*

OPERATIVE SURGERY I AND II. Senior year, fall and winter terms. Laboratory, four hours. Two credits each term. Doctor Dykstra.

Old horses are purchased by the department, placed on the operating table, anæsthetized, and over one hundred operations are performed on the animal. During this work the student is required to observe a careful technique, such as antisepsis, and, in fact, performs the operation as thoroughly and completely as possible. It is a very practical course and fits the student for surgical work in actual practice.

HORSESHOEING. Senior year, fall term. Class work, two hours. Two credits. Required in the course in veterinary medicine; elective in the course in agriculture. Doctor Dykstra.

The course is taught by means of lectures, recitations and demonstrations, taking up the various divisions in the following order: normal conformation in both limb and foot, the anatomy of these parts, physiological movements and correct normal shoeing. This is followed by a study of the proper shoeing for the correction of wry limbs and feet; diseases of the feet, and the relation of horseshoeing thereto. The course ends with a study of the shoeing of mules and oxen. Throughout the entire course the purpose is to instill in the mind of the student normal shoeing, in order that he may be able to correct abnormalities in the foot and limb in so far as this can be accomplished by shoeing. Reference books: Lungwitz's *Textbook of Horseshoeing;* Dollar's *Handbook of Horseshoeing.*

OBSTETRICS

FOR UNDERGRADUATES

OBSTETRICS I. Senior year, fall term. Class work, two hours. Two credits. Required in the course in veterinary medicine; elective in other courses. Prerequisites: Anatomy, Animal Physiology, and Embryology. Doctor Benner.

This course discusses in detail the physiology of pregnancy, anatomy of the generative organs, care and hygiene of pregnant animals, sterility, diseases incidental to pregnancy, diseases of new-born animals and care of new-born animals. References: *Williams' Veterinary Obstetrics. Williams' Surgical and Obstetrical Operations, De Bruin's Bovine Obstetrics, and Fleming's Veterinary Obstetrics.*

OBSTETRICS II. Senior year, winter term. Class work, two hours; laboratory, two hours. Three credits. Required in the course in veterinary medicine; elective in other courses. Prerequisites: Obstetrics I, and Pathology. Doctor Benner.

This course is devoted to a discussion of dystokis and surgical obstetrics. This work is supplemented by demonstrations, during the laboratory period, on an obstetrical phantom and fœtus; in addition, the college farm and surrounding agricultural territory furnish an abundance of actual material. References: Same as for Obstetrics I.

CONFORMATION AND SOUNDNESS

FOR GRADUATES AND UNDERGRADUATES

CONFORMATION AND SOUNDNESS OF THE HORSE. Senior year, spring term. Class work, two hours. Two credits. Doctor Dykstra.

A lecture course, during which the desirable conformation of the horse, together with a description of all blemishes, defects, unsoundnesses, faults and vices are discussed. During clinics ample opportunity is afforded for demonstration on the living animal. Reference books: Goubaux and Barrier's *Exterior of the Horse;* Captain Hayes' *Points of the Horse.*

COURSES IN MEDICINE

FOR UNDERGRADUATES

DIAGNOSIS. Jurior year, fall term. Class work, three hours. Three credits. Doctor Schoenleber.

This is a course preparatory to the study of medicine proper. It takes up in detail the different diagnostic methods employed for the detection of diseases, including auscultation, percussion, palpation, and inspection, and also treats of the normal and abnormal abdominal and thoracic sounds, and considers in detail the specific examination of the various organs, including diagnostic inoculations as an aid to the detection of disease.

MEDICINE I. Junior year, winter term. Class work, three hours. Three credits. Doctor Schoenleber.

The noninfectious diseases of the respiratory organs are studied in this course, taking up in regular order the nasal and accessory cavities, the larynx, bronchi, lungs, and pleura.

MEDICINE II. Junior year, spring term. Class work, three hours. Three credits. Doctor Schoenleber.

Devoted to noninfectious diseases of the mouth, salivary glands, œsophagus, stomach and intestines, liver, pancreas, and peritoneum. This is followed by diseases of the urinary organs, of the circulatory organs, and diseases of metabolism.

MEDICINE III. Senior year, fall term. Class work, three hours. Three credits. Doctor Schoenleber.

This course treats the noninfectious diseases of the nervous system, of the organs of locomotion, and of the skin.

INFECTIOUS DISEASES. Senior year, winter term. Class work, four hours. Four credits. Doctor Schoenleber.

In contradistinction to the preceding courses in medicine, the distinctly infectious and contagious diseases of domesticated animals are discussed. The following order is usually adopted: acute general infectious diseases, acute exanthematous infectious diseases, acute infectious diseases with localization in certain organs, infectious diseases with special involvement of the nervous system, chronic infectious diseases, infectious diseases produced by protozoa.

SANITARY MEDICINE. Senior year, spring term. Class work, four hours. Four credits. Doctor Schoenleber.

A continuation of the course in infectious diseases, in which particular attention is given to propagation and spread of infectious diseases, predisposing and exciting causes of disease, general sanitation, etc.

OPHTHALMOLOGY. Senior year, winter term. Class work, two hours. Two credits. Doctor Schoenleber.

This course discusses the method of conducting examinations of the eye by means of the ophthalmoscope, illumination of the eye, and the use of drugs as an aid to this process; and acute and chronic diseases of the eye.

Reference books for the courses in medicine: Hutyra and Marek's *Pathology of the Diseases of Domestic Animals,* Vols. I and II; Friedberger and Frohner's *Veterinary Pathology,* Vols. I and II; Law's *Veterinary Medicine,* Vols. I, II, III, IV, and V; Moussu and Dollar's *Diseases of Cattle;* Class's *Diseases of the Dog;* Cadiot's *Clinical Veterinary Medicine.*

JURISPRUDENCE. Senior year, spring term. Class work, two hours. Two credits. Doctor Schoenleber.

This course deals with the veterinarian's legal responsibilities, national and state live-stock laws, quarantine regulations, etc.

CLINICS

FOR UNDERGRADUATES

CLINICS. Junior and senior years, twelve hours or more each term. Doctor Schoenleber, Doctor Dykstra, and Doctor Burt.

A free clinic which affords an abundance of material is conducted. All species of domesticated animals are presented for treatment. These patients are assigned in regular order to the senior students for diagnosis and treatment; clinic sheets are provided, on which are recorded the history, symptoms, pulse, temperature, respiration, diagnosis, prognosis, treatment, and the unsoundness, defects or blemishes of the animal. The clinician in charge discusses all the abnormal conditions present in the patient, thus assisting the student to develop his powers of observation. The junior students assist the senior students and, in addition, are required to master, by practical experience, the restraint of animals, bandaging, etc. The compounding of prescriptions, the preparation of antiseptics and other medicinal agents, is taken in charge by the junior students.

Patients left at the hospital for treatment are assigned to seniors, who are required to administer all medicines, change dressings of surgical wounds, etc. All work is performed under the direct supervision of the clinician in charge. Numerous country calls are received by the veterinary department, which are taken care of by one of the clinicians, and who is always accompanied by one or more senior students. This phase of the work is particularly valuable, as it gives the student practical experience under actual conditions.

MEAT INSPECTION. Senior year, spring term. Class work, four hours. Four credits. Doctor Goss.

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 healthy animals, the diseases discernible at the time of slaughter, the disposition of the condemned from economic, hygienic and sanitary standpoints, and different preparations and methods of preservation, adulterations, sanitary laws and regulations, and all other points bearing upon the question of healthful meat production, are

considered. Visits are made to the local slaughtering establishments, and to the large packing plants in Topeka, Kansas City, or Wichita. Text, Edelman's *Meat Hygiene,* translated by Mohler and Eichorn.

FARM ANIMALS IN HEALTH AND DISEASE. Spring term. Class work, three hours; laboratory, two hours. Four credits. Elective in the course in agriculture. Prerequisites: Anatomy and Animal Physiology. Doctor Benner.

Study of the domestic animals in relation to their surroundings. First-aid treatment of diseases; contagious and noncontagious diseases; the sound horse. Text, Craig's *Common Diseases of Farm Animals.*

Short Winter Courses in Agriculture and Dairy Manufactures

The Agricultural College offers primarily four-year courses in agriculture, which give the student fundamental training in the sciences relating to agriculture, and their application to the production of crops and live 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.

Many young men with aspiration for an agricultural education in school are denied the opportunity of taking a complete college course. This institution offers to such persons a two-year short practical course in agriculture. Some young men desire to engage in the creamery business. To such the institution offers the creamery short course covering a period of ten weeks for one year only. These courses are offered during the winter months when most young men who really desire practical instruction are able to attend with little loss to the farm business.

GENERAL INFORMATION

REQUIREMENTS FOR ADMISSION

Students over seventeen years of age are admitted to the Farmers' Short Course or to the Creamery Short Course without examination. All students entering are required to be present at the beginning of the term.

CERTIFICATE

A certificate will be granted Farmers' Short Course students who satisfactorily complete forty-eight credit hours work of the first and second years, and to Creamery Short Course students who successfully complete the required ten-week course and who show satisfactory evidence of having spent at least six months successfully in actual work in a creamery either previous to or after the time the course is taken.

COST

The expenses for ten weeks need not exceed $70 or $75, exclusive of railroad fare. A fee of $3.50 is charged all students resident in Kansas, payable at enrollment; laboratory fees to cover the cost of material

used and broken should not exceed $3. Rubber-soled gymnasium shoes costing $1.25 will be required. Reference and textbooks will not cost more than $10. For information write President H. J. Waters, Box 27, Manhattan, Kansas.

SELF SUPPORT

These courses are primarily practical. They bring the student into actual contact with farm conditions and products. Besides the classroom work many hours each week are spent in the judging pavilion, laboratory, shop and barn. Altogether this leaves the student but little time for outside labor, and short-course students are advised to come provided with as nearly all the necessary funds for the term as possible.

DESCRIPTION OF THE COURSES

The Farmers' Short Course covers a period of twenty weeks, ten weeks for each two years. 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 live 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. The student who has not taken scientific work is not able to study agricultural subjects from the same standpoint as one trained in chemistry, physics, zoölogy, etc., but can get from his work in class and laboratory the art of doing these things properly. The farmer needs to know how to select stock and crops that will be best adapted to his environment, and the short course trains him to do this. He needs to know how to prepare his soil for the reception of the seed, and how to manage his feed so as to make the greatest gains in feeding his live stock. These things are taught successfully to short-course students.

Considerable liberty is given in the choice of electives. In the first year these are offered chiefly in the Division of Mechanic Arts; in the second year the student may elect further work along mechanical lines, or he may elect dairying or horticulture, or any combination of these electives. Thus he has opportunity to meet his individual interests and needs, and to acquire considerable practical efficiency with engines and automobiles, or with horticultural or dairy problems along with his prescribed practical general agricultural training. While the minimum work to be passed in each short course term is twenty-four credits (or credit hours), most of the successful students make twenty-six to twenty-nine credits each term.

The Creamery Short Course is for ten weeks only. Its aim is to combine theory and practice in butter, cheese and ice-cream making, and also the handling of market milk.

FARMERS' SHORT COURSE

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

FIRST YEAR

Required:

Crop Production	5 (4-2)
Judging Live Stock	3 (1-4)
Feeding Live Stock	3 (3-0)
Farm Horticulture	4 (3-2)
Dairying I	4 (2-4)
Poultry	1 (1-0)
Physical Training	1 (0-3)
Special Lectures	1 (1-0)

Electives:

Farm Machinery	1 (0-2)
Farm Carpentry I *or* Farm Blacksmithing I	2 (0-4)
Gas Engines *or* Traction Engines	3 (1-4)
Farm Forestry	1 (1-0)

SECOND YEAR

Required:

Breeding Live Stock	4 (2-4)
Live-stock Sanitation	3 (3-0)
Grain and Forage Crops	5 (4-2)
Farm Management	4 (3-2)
Soils	2 (1-2)
Special Lectures	1 (1-0)

Electives:

Rural Community Service	2 (2-0)
Dairying II	5 (3-4)
Fruit Growing	3 (2-2)
Insects and Spraying	1 (0-2)
Farm Blacksmithing I *or* Farm Blacksmithing II	2 (0-4)
Farm Carpentry I *or* Farm Carpentry II	1 (1-0)
Gas Engines *or* Traction Engines	3 (1-4)

CREAMERY SHORT COURSE

Required:

Creamery Management	2 (2-0)
Creamery Butter Making	8 (4-8)
Market Milk	2 (2-0)
Dairy Bacteriology	2 (2-0)
Cheese and Ice Cream Making	4 (1-6)
Judging Dairy Products	1 (0-2)
Dairying II	5 (3-4)
Dairy Mechanics and Refrigeration	2 (0-4)

SUBJECTS TAUGHT IN THE SHORT COURSE

AGRONOMY

CROP PRODUCTION. Class work, four hours; laboratory, two hours. Five credits. Professor Call, Associate Professor Salmon, Assistant Professors Throckmorton, and Kenney.

In this course the production of the common farm crops is studied with particular reference to the time, depth and manner of plowing, the proper preparation of the seed bed, the selection of seed, the time, rate and method of seeding the various crops, and proper system of cultivation and rotation for the different sections of Kansas. In connection with the discussions of seed selection, practice in judging the best types of the common grains is given.

GRAIN AND FORAGE CROPS. Class work, four hours; laboratory, two hours. Five credits. Associate Professor Salmon and Assistant Professor Kenney.

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.

SOILS. Class work, one hour; laboratory, two hours. Two credits. Mr. Sewell.

The student is trained to recognize the different kinds and types of soils, how the management of the different types differ with regard to cropping, tillage and drainage, and the maintenance of fertility through the proper preservation and application of barnyard manure.

FARM MANAGEMENT. Class work, three hours; laboratory, two hours. Four credits. Assistant Professor Grimes.

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. Various farm accounting systems are studied to acquaint the student with the better systems and methods of keeping farm records and accounts. The farm lay-out 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 different 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.

ANIMAL HUSBANDRY

JUDGING LIVE STOCK. Class work, one hour; laboratory, four hours. Three credits. Assistant Professor Vestal, Mr. Gatewood, Mr. Paterson, and Mr. Gray.

This work includes careful drill in judging and showing horses, beef cattle, dairy cattle, sheep and hogs. The student first becomes familiar with the leading types by use of the score card, and later learns to judge by comparison. The aim throughout this work is not so much to make judges of the students as to render them so familiar with the best types that they may be able to select stock that will give the best returns from every standpoint. Text, Gay's *Principles and Practice of Judging Live Stock.*

FEEDING LIVE STOCK. Class work, three hours. Three credits. Professor Cochel.

The work in feeding comprises (1) a study of all the common feedstuffs of Kansas, including mill feeds and factory by-products as well as those grown on the average farm; and (2) a survey of the best feeding practices for the production of meat, milk and work. In connection with the former, a rather detailed study of the composition of the feedstuffs is made, and with the latter a study of their effect upon the products sought. Text, Henry's *Feeds and Feeding.*

BREEDING LIVE STOCK. Class work, two hours; laboratory, four hours. Four credits. Professor Wentworth and Assistant Professor McCampbell.

In the class work studies are made for the purpose of determining ways and means of preventing the birth of individuals, not highly efficient as producers of human food or for work. Some of the topics discussed are, crossing, hybridization, grading, line breeding, inbreeding and prepotency.

In the laboratory studies are made of the types and classes of horses, cattle, sheep and swine from the standpoint of both grade and pure-bred animals used for breeding purposes.

DAIRY HUSBANDRY

DAIRYING I. Class work, two hours; laboratory, four hours. Four credits. Professor Reed, Associate Professor Fitch, Mr. Olson, Mr. Tomson and Mr. Cave.

A general course in farm dairying, consisting of lectures and laboratory work 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; the handling of milk, feeding the dairy cow, and selecting and breeding the dairy herd.

DAIRYING II. Class work, three hours; laboratory, four hours. Five credits. Associate Professor Fitch.

Instruction is given in keeping records and accounts of dairy-farm business; in building up a dairy herd; concerning buildings on a dairy farm; concerning silos and silage; on the fertility account of the dairy; on cow-testing associations; the coöperative ownership of dairy sires, and the making of detailed plans for the management of the dairy farm.

Laboratory.—In the laboratory dairy stock is judged 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 dairy animals.

CREAMERY MANAGEMENT. Class work, two hours. Two credits. Mr. Olson.

This course includes the advisability of starting a creamery, forms of organizations (copartnership, corporation, coöperative and joint-stock companies), creamery construction, sewage disposal, refrigeration, labor, purchase of milk and cream, the purchase of equipment and supplies. Also the overrun and manufacturing losses, cost of power (steam, gas, kerosene and motor), pasteurization costs, marketing, advertising, salesmanship, business correspondence, credits and collections and bookkeeping. No text.

CREAMERY BUTTER MAKING. Class work, four hours; laboratory, eight hours. Eight credits. Mr. Olson.

Lectures are given 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. The laboratory work comprises 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.

CHEESE AND ICE CREAM MAKING. Class work, one hour; laboratory, six hours. Four credits. Mr. Tomson.

This course deals with the making of cheese on the farm for home use and for sale. All 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. 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.

MARKET MILK. Class work, two hours. Two credits. Mr. Olson. This course is a study of the methods of managing the handling of milk in a city milk plant.

JUDGING DAIRY PRODUCTS. Laboratory, two hours. One credit. Mr. Olson.

This course comprises scoring and judging butter, cheese, milk and ice cream. It is laboratory work supplemented by occasional lectures.

HORTICULTURE

FARM HORTICULTURE. Class work, three hours; laboratory, two hours. Four credits. Professor Dickens and Mr. Merrill.

The purpose of this course is to acquaint the student with those horticultural principles and practices which are concerned in making the farm a better place for a home. The planning of the farmstead and the improvement of its appearance by the use of trees, shrubs and flowers is first considered. The possibilities of the vegetable garden, the fruit garden and the orchard in furnishing a more varied and more healthful diet for the farm home, and the means of securing these products, are among the subjects considered. The economic consideration of the cost of production and methods of handling and marketing products are briefly discussed.

FRUIT GROWING. Class work, two hours; laboratory, two hours. Three credits. Mr. Dale.

A consideration of the possibilities of fruit growing on a commercial basis is the aim of this course. Types of soil best adapted to fruit crops, the question of sites, air drainage, planting, cropping and caring for the plantations, fertilizers, pruning, harvesting and marketing are all given brief consideration.

INSECTS AND SPRAYING. Laboratory, two hours. One credit. The student is given opportunity to become acquainted with the principal insect pests of field, garden and orchard. The life history of each is briefly discussed and means of control considered. The student has opportunity to familiarize himself with spraying materials and to use the various types of spraying machinery. Assistant Professor Lewis.

ADDITIONAL COURSES

RURAL COMMUNITY SERVICE. Class work, two hours. Two credits. Dean Jardine and Mr. Durham.

The purpose of this course is to help students become acquainted with the essentials of a prosperous rural community, especially those concerned with better business and better living. The deficiencies of rural life and their remedies; the country town; rural organization and coöperation along economic, social, educational, moral and religious lines; tenancy and rural credit and leadership, are among the subjects considered.

LIVE-STOCK SANITATION. Class work, one hour; laboratory, four hours. Three credits. Doctor Hagan.

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. Methods of 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.

FARM MACHINERY. Laboratory, two hours. One credit. Mr. Wirt and Mr. Wiseman.

The use of farm machinery is becoming more extensive every year, and there is probably a greater waste on farms from lack of knowledge of the kind of machinery to use, and the way to care for it, than from any other cause. The purpose of this course is to acquaint the student with the factors underlying wise selection and proper care of farm machines. Rope work, splicing and methods of operation of as many important machines as possible are studied. Fences and the farm power plant are also taken up. This work is given in the form of illustrated lectures and laboratory demonstrations.

FARM BLACKSMITHING I. Laboratory, four hours. Two credits. Mr. Lynch and Mr. Henry.

This course consists of exercises in general forging operations, such as drawing, upsetting, welding, binding, twisting, hot and cold punching, and instruction in the use of fuel and fire, and the selection and care of tools. The course is such as will be of practical use to the man on the farm.

FARM BLACKSMITHING II. Laboratory, four hours. Two credits. Mr. Lynch, Mr. Swenson and Mr. Henry.

A continuation of Farm Blacksmithing I, which consists of carefully selected work in iron and mild steel such as will be of benefit to the man in the shop on the farm. Some work will be given on the correct methods of making the various tools used in the shop.

FARM CARPENTRY I. Laboratory, four hours. Two credits. Mr. Parket and Mr. Ball.

This is a course of exercises in joinery that are so graded as to give the student the principles of general carpenter work, and training in the proper use of tools and in the reading of drawings and blue-prints. Some work is given to bring out the principles of framing and building operations, and practice in the use of paints and varnishes as protective coverings for woodwork.

FARM CARPENTRY II. Laboratory, four hours. Two credits. Mr. Parker and Mr. Ball.

This course is a continuation of Farm Carpentry I. The work is of such a nature as to be especially helpful to those on the farm.

GAS ENGINES. Class work, one hour; laboratory, four hours. Three credits. Mr. Shutt and Mr. Collins.

A study of the two-stroke cycle and of the four-stroke cycle oil engine, with special reference to agricultural applications; also fundamental details of automobiles.

TRACTION ENGINES. Class work, one hour; laboratory, four hours. Three credits. Mr. Sanders and assistants.

A study of steam and gas traction engines, including the selection, care and repair of the various types.

FORESTRY. Class work, one hour. One credit. Forester Scott.
This course includes a study of farm woodlot conditions, methods of improving the stand, and the species suitable for planting in the several sections of the State; the composition and location of windbreaks and their value as a protection to the home, to growing crops and cultivated fields.

POULTRY. Class work, one hour. One credit. Professor Lippincott.
This work consists of lectures on the management of the farm poultry flock. The topics discussed are feeding, breeding, incubating, brooding, housing, and caponizing.

PHYSICAL TRAINING. Two hours a week. One credit. Professor Lowman.
This course consists of systematic instruction in physical training and community games.

SPECIAL LECTURES. One hour a week. One credit.
At least once each week during the ten weeks of the short course special lectures on subjects of timely interest are given by persons connected with the College or well known as agricultural leaders.

DAIRY MECHANICS AND REFRIGERATION. Laboratory, four hours. Two credits. Assistant Professor Simmering.
A study of the compression systems of refrigeration; also operation, care and repair of refrigerating machinery and auxiliaries.

DAIRY BACTERIOLOGY. Class work, two hours. Two credits. Assistant Professor Hunter.
This course is designed for students who have had no training in chemistry and biology and is a general study of the bacteriology of milk and milk products. Bacterial contaminations of milk from air, water, utensils, the cow, the milker, etc., are discussed. Normal and abnormal fermentations, their significance and control in milk, butter, cheese, and special dairy products are considered.

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 law of the state 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.

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. The article in this catalogue on the Summer School gives brief information.

Division of Mechanic Arts

ANDREY ABRAHAM POTTER, *Dean*

The Division of Mechanic Arts includes courses in agricultural engineering, architecture, civil and highway engineering, electrical engineering, and mechanical engineering, 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; and except for minor differences the work of the sophomore year is the same for all the engineering courses. For the course in architecture the plan of studies for the sophomore year is somewhat further modified.

While the courses offered are believed to be sufficient to cover the needs of the average young man, 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. With the permission of the dean of the division, students desiring to do so may substitute work in military engineering for certain subjects in any of the courses of the division.

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 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.

Besides the four-year professional courses, the Division of Mechanic Arts offers:

A three-year course in mechanic arts in the School of Agriculture, with trade practice options in blacksmithing, carpentry, concrete construction and stationary and traction engines, and

Short winter courses of ten weeks each in concrete construction, in road building, in irrigation and drainage, in shop work, and in steam and gas traction engines.

These courses are all discussed elsewhere in this catalogue.

COURSE IN AGRICULTURAL ENGINEERING

The course in agricultural engineering with its three options is designed to fit men as irrigation engineers, as designers of farm machinery and motors, or as flour-mill engineers and designers.

The work of the first year is the same as in the other engineering courses. During the second, third, and fourth years, students choosing the farm machinery option take considerable shop work, mechanics, kinematics, farm motors, farm machinery, hydraulics, and designing, besides such fundamental agricultural subjects as crops, soils, and farm management. In the irrigation and drainage engineering option the work of the second, third, and fourth years includes fundamental civil engineering subjects, such as surveying, civil engineering drawing, masonry and concrete design, and structures. Considerable time is also devoted to problems in irrigation and drainage engineering, supplemented by courses in shop work, hydraulics, mechanics, crops, and soils. In the flour-milling option considerable time is devoted to chemistry, flour-mill design, crops, grain inspection, wheat and flour testing, and milling practice. The student, in this option, is given the fundamental subjects in the mechanical engineering course, including shop work, mechanical drawing, applied mechanics, hydraulics, and steam and gas engineering.

No student taking the course in agricultural engineering will be allowed to graduate who has not had at least six months' practical experience in the work of the option selected.

COURSE IN ARCHITECTURE

The course in architecture was organized to train men in the general field of architecture, and also to relate the principles of architecture to farm buildings and grounds. The rapid increase in wealth in the State creates a demand for designers and builders of every type.

The freshman year of this course 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 concrete construction, and rural landscape architecture. The course aims to develop the creative powers of the student in the fields of original composition. From ten to sixteen hours a week, for the last three years of the course, are given to work of this kind over the drawing table.

The College is well equipped for the maintenance of a course in architecture. It owns a 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 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 CIVIL AND HIGHWAY ENGINEERING

The aim of this course in civil engineering, with options in highway 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, and 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.

In view of the growing importance of municipal problems, such as paving, sewerage and water-supply, the course in civil engineering includes required courses in these subjects, supplemented by courses in sanitary biology and chemistry.

The work in highway engineering affords time for an unusually thorough course in this subject, which is of such great importance at the present time. It includes courses in road machinery, and road building.

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 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 students 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.

COURSE IN MECHANICAL ENGINEERING

The course in mechanical engineering prepares for the successful management and superintendence of factories and power plants; for the design of power and machinery installation; for the design and construction of machine tools, steam and gas engines, compressors, hydraulic machinery, etc.; and for the design and erection of engineering buildings and factories, including the selection, purchasing and location of the equipment.

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 endow him with an understanding of the scientific and economic principles necessary for the solution of engineering and industrial problems.

Throughout the whole course the theoretical studies in the classroom are supplemented by the practical work in the laboratories in such a manner as to very materially strengthen both. In the materials and machinery testing laboratories the work does not end when the test is completed, but the entire problem must be written up in such a manner as would be approved in the best commercial testing laboratories. The laboratory work in the shops not only gives the student practice in performing the machining and various other mechanical operations, but includes a scientific study of the factors of production, so that the loss of material and the expenditure of human effort will be a minimum.

Students pursuing a mechanical engineering course are urged to spend at least two summers in some shop or commercial plant in order to broaden their training.

Course in Agricultural Engineering

Option 1—Farm Machinery
Option 2—Irrigation and Drainage Engineering
Option 3—Flour Milling

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

FRESHMAN

FALL	WINTER	SPRING
English I 4 (4-0)	English II 4 (4-0)	English Literature 4 (4-0)
Chemistry I 4 (3-2)	Chemistry II 4 (2-4)	Chemistry III 4 (3-2)
Plane Trigonometry 4 (4-0)	College Algebra 4 (4-0)	Plane Analytical Geometry 4 (4-0)
General Drawing 3 (0-6)	Descriptive Geometry I 3 (1-4)	Descriptive Geometry II 3 (1-4)
Library Methods E 1 (0-2)		
Woodwork 2 (0-4)	Foundry Practice I 3 (1-4)	Forging I 3 (1-4)
Military Science (0-3)	Military Science (0-3)	Military Science (0-3)

SOPHOMORE

Engineering Physics I 5 (4-2)	Engineering Physics II 5 (4-2)	Engineering Physics III 5 (4-2)
Calculus I 4 (4-0)	Calculus II 4 (4-0)	Calculus III 4 (4-0)
Mechanical Drawing I 2 (1-2)	Mechanical Drawing II 3 (1-4)	Machine Tool Work I 2 (0-4)
	Extempore Speech 2 (2-0)	
Military Science (0-3)	Military Science (0-3)	Military Science (0-3)
Option I	*Options I and II*	*Option I*

AGRICULTURAL ENGINEERING—*continued*

SOPHOMORE

FALL	WINTER	SPRING
Pattern Making I 3 (1-4)	Advanced Industrial History 4 (4-0)	Farm Machinery I 4 (2-4)
Kinematics I 4 (4-0)		Mechanical Drawing III 3 (0-6)
Option II		*Option II*
Surveying I 7 (4-6)		Sanitary Biology 4 (2-4)
		Agricultural Chemistry 2 (2-0)
Option III	*Option III*	*Option III*
Pattern Making I 3 (1-4)	Kinematics I 4 (4-0)	Quantitative Analysis 3 (0-6)
Qualitative Analysis 4 (2-4)		Mechanical Drawing III 3 (0-6)

JUNIOR

Applied Mechanics I 5 (4-2)	Applied Mechanics II 6 (4-4)	Hydraulics 4 (3-2)
Cereal Crop Production 5 (3-4)		Economics 4 (4-0)
Machine Tool Work II 3 (0-6)		
Options I and II	*Options I and II*	*Option I*
General Geology 4 (4-0)	Farm Motors I 4 (2-4)	Farm Motors II 3 (2-2)
Elective (-)	Soils 5 (3-4)	Machine Tool Work III 3 (1-4)
	Option I	Surveying 3 (1-4)
	Farm Machinery II 3 (2-2)	
	Option II	*Option II*
	Graphic Statics 2 (0-4)	Farm Motors II 3 (2-2)
	C. E. Drawing I 2 (0-4)	Farm Machinery I 4 (2-4)
		Foundations 4 (4-0)
Option III	*Option III*	*Option III*
Quantitative Analysis II 2 (0-4)	Quantitative Analysis II 2 (0-4)	Electrical Engineering C 4 (3-2)
Commercial Grain and Grain Inspection 4 (3-2)	Advanced Industrial History 4 (4-0)	Machine Tool Work III 3 (1-4)
	Grain Products 4 (3-2)	Experimental Milling 2 (0-4)
	Business Law 2 (2-0)	

SENIOR

Options I and II	*Options I and II*	*Options I and II*
Hydraulic Machinery 3 (2-2)	Farm Management 4 (3-2)	Electrical Engineering C 4 (3-2)
Seminar	Seminar	Business Organization 2 (2-0)
Thesis	Thesis	Highway Engineering 3 (3-0)
		Concrete Construction 3 (1-4)
		Business Law 2 (2-0)
		Seminar
		Thesis
Option I	*Option I*	*Option I*
Farm Machinery III 2 (0-4)	Farm Buildings and Equipment 5 (2-6)	Factory Design 2 (0-4)

AGRICULTURAL ENGINEERING—*continued*

SENIOR

FALL	WINTER	SPRING
Option I	*Option I*	*Option I*
Farm Motors III 3 (0-6)	Factory Engineering 2 (2-0)	
Machine Design I 3 (1-4)	Machine Design A-II 2 (0-4)	
Elective 7 (-)	Elective 5 (-)	
Option II	*Option II*	*Option II*
Drainage and Irrigation I 3 (3-0)	Drainage and Irrigation II 3 (1-4)	Drainage and Irrigation III 3 (0-6)
Surveying II 7 (4-6)	Structures 6 (3-6)	
Electives 4 (4-0)	Masonry and Concrete 5 (3-4)	
Option III	*Option III*	*Option III*
Flour Mill Design I 5 (2-6)	Flour Mill Design II 3 (0-6)	Heating and Ventilation 3 (2-2)
Steam and Gas Engr. E-I 5 (4-2)	Steam and Gas Engr. E-II 5 (4-2)	Milling Entomology 2 (2-0)
Advanced Exper. Milling 4 (0-8)	Wheat and Flour Testing 4 (1-6)	Experimental Baking A 4 (0-8)
General Entomology 4 (3-2)	Factory Engineering 2 (2-0)	Milling Practice 4 (0-8)
	Business Organization 2 (2-0)	Factory Design 2 (0-4)
	Machine Tool Work IV 2 (0-4)	
Seminar	Seminar	Seminar
Thesis	Thesis	Thesis

Course in Architecture

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

FRESHMAN

FALL	WINTER	SPRING
English I 4 (4-0)	English II 4 (4-0)	English Literature 4 (4-0)
Chemistry I 4 (3-2)	Chemistry II 4 (2-4)	Chemistry III 4 (3-2)
Plane Trigonometry 4 (4-0)	College Algebra 4 (4-0)	Plane Analytical Geometry 4 (4-0)
General Drawing 3 (0-6)	Descriptive Geometry I 3 (1-4)	Descriptive Geometry II 3 (1-4)
Library Methods E 1 (0-2)		
Woodwork 2 (0-4)	Foundry Practice I 3 (1-4)	Forging I 3 (1-4)
Military Science (0-3)	Military Science (0-3)	Military Science (0-3)

SOPHOMORE

Engineering Physics I 5 (4-2)	Engineering Physics II 5 (4-2)	Engineering Physics III 5 (4-2)
Advanced Ind. History 4 (4-0)	Calculus I 4 (4-0)	Calculus II 4 (4-0)
Residences 4 (4-0)	Historic Ornament 4 (4-0)	Extempore Speech 2 (2-0)
Shades and Shadows 2 (0-4)	Linear Perspective 2 (0-4)	Surveying 3 (1-4)

ARCHITECTURE—*continued*

SOPHOMORE

FALL	WINTER	SPRING
Architectural Drawing I 3 (0-6)	Architectural Drawing II 3 (0-6)	Architectural Drawing III 3 (0-6)
Military Science (0-3)	Military Science (0-3)	Military Science (0-3)

JUNIOR

History of Architecture I 4 (4-0)	History of Architecture II 4 (4-0)	History of Architecture III 4 (4-0)
Economics 4 (4-0)	Business Law 2 (2-0)	Graphic Statics 2 (0-4)
Acoustics 1 (1-0)	Business Organization 2 (2-0)	
Woodwork IV 3 (1-4)	Applied Mechanics I 5 (4-2)	Applied Mechanics I 6 (4-4)
Color and Decoration 3 (0-6)	Mural Decoration 2 (0-4)	Clay Modeling 3 (0-6)
Architectural Com. I 3 (0-6)	Architectural Com. II 3 (0-6)	Architectural Com. III 3 (0-6)

SENIOR

General Bacteriology 4 (2-4)	Engineering English 4 (4-0)	Landscape Gardening 4 (2-4)
Beams and Arches 3 (1-4)	Trusses 4 (2-4)	Landscape Design 4 (0-8)
Water Supply and Sewerage 4 (4-0)	Architectural Seminar 4 (4-0)	Electrical Engr. C 4 (3-2)
Specifications 2 (2-0)	Color Rendering 2 (0-4)	Heating and Ventilation 3 (2-2)
Architectural Com. IV 3 (0-6)	Architectural Com. V 3 (0-6)	
Ink Rendering 2 (0-4)	Architectural Thesis 1 (0-2)	Architectural Thesis 3 (0-6)

Course in Civil and Highway Engineering

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

FRESHMAN

FALL	WINTER	SPRING
English I 4 (4-0)	English II 4 (4-0)	English Literature 4 (4-0)
Chemistry I 4 (3-2)	Chemistry II 4 (2-4)	Chemistry III 4 (3-2)
Plane Trigonometry 4 (4-0)	College Algebra 4 (4-0)	Plane Analytical Geometry 4 (4-0)
General Drawing 3 (0-6)	Descriptive Geometry I 3 (1-4)	Descriptive Geometry II 3 (1-4)
Library Methods E 1 (0-2)		
Woodwork I 2 (0-4)	Foundry Practice I 3 (1-4)	Forging I 3 (1-4)
Military Science (0-3)	Military Science (0-3)	Military Science (0-3)

SOPHOMORE

Calculus I 4 (4-0)	Calculus II 4 (4-0)	Calculus III 4 (4-0)
Engineering Physics I 5 (4-2)	Engineering Physics II 5 (4-2)	Engineering Physics III 5 (4-2)
Mechanical Drawing I 2 (1-2)	Foundations 4 (4-0)	Sanitary Biology 4 (2-4)

CIVIL AND HIGHWAY ENGINEERING—*continued*

SOPHOMORE

FALL	WINTER	SPRING
Surveying I 7 (4-6)	Chemistry C 5 (1-8)	Extempore Speech 2 (2-0)
		Mechanical Drawing II 3 (1-4)
Military Science (0-3)	Military Science (0-3)	Military Science (0-3)

JUNIOR

Economics 4 (4-0)	Business Law 2 (2-0)	Engineering Geology 6 (4-4)
Surveying II 7 (4-6)	Business Organization 2 (2-0)	Hydraulics 4 (3-2)
Applied Mechanics I 5 (4-2)	Applied Mechanics II 6 (4-4)	Applied Mechanics III 4 (3-2)
Spherical Trigonometry 2 (2-0)	Advanced Industrial History 4 (4-0)	C. E. Drawing II 4 (0-8)
	Graphic Statics 2 (0-4)	
	C. E. Drawing I 2 (0-4)	
Seminar	Seminar	Seminar

SENIOR

Bridge Stresses 4 (4-0)	Bridge Design 6 (3-6)	Electrical Engineering C 4 (3-2)
Steam and Gas Engr. C 4 (3-2)	Railways I 3 (3-0)	
Drainage and Irrigation I 3 (3-0)	Masonry and Concrete 5 (3-4)	
Thesis	Thesis	Thesis
Seminar	Seminar	Seminar
Option I	*Option I*	*Option I*
Water Supply and Sewerage 4 (4-0)	Astronomy 3 (2-2)	Railways II 4 (0-8)
Hydraulic Machinery 3 (2-2)		Geodesy 4 (2-4)
		Highway Engineering 3 (3-0)
Option II	*Option II*	*Option II*
Highway Engineering I 7 (4-6)	Highway Engineering II 4 (4-0)	Concrete Construction 3 (1-4)
		Specifications and Inspection 2 (2-0)
		Highway Engineering III 7 (3-8)

Course in Electrical Engineering

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

FRESHMAN

FALL	WINTER	SPRING
English I 4 (4-0)	English II 4 (4-0)	English Literature 4 (4-0)
Chemistry I 4 (3-2)	Chemistry II 4 (2-4)	Chemistry III 4 (3-2)
Plane Trigonometry 4 (4-0)	College Algebra 4 (4-0)	Plane Analytical Geometry 4 (4-0)
General Drawing 3 (0-6)	Descriptive Geometry I 3 (1-4)	Descriptive Geometry II 3 (1-4)
Library Methods E 1 (0-2)		

ELECTRICAL ENGINEERING—*continued*

FRESHMAN

FALL	WINTER	SPRING
Woodwork 2 (0-4)	Foundry Practice I 3 (1-4)	Forging I 3 (1-4)
Military Science (0-3)	Military Science (0-3)	Military Science (0-3)

SOPHOMORE

Advanced Industrial History 4 (4-0)	Kinematics I 4 (4-0)	Surveying 3 (1-4)
Engineering Physics I 5 (4-2)	Engineering Physics II 5 (4-2)	Engineering Physics III 5 (4-2)
Calculus I 4 (4-0)	Calculus II 4 (4-0)	Calculus III 4 (4-0)
Mechanical Drawing I 2 (1-2)	Mechanical Drawing II 3 (1-4)	Mechanical Drawing III 3 (0-6)
Forging II 3 (1-4)	Extempore Speech 2 (2-0)	Pattern Making 3 (1-4)
Military Science (0-3)	Military Science (0-3)	Military Science (0-3)

JUNIOR

Economics 4 (4-0)	American Government 4 (4-0)	
Business Law 2 (2-0)	Business Organization 2 (2-0)	Graphic Statics 2 (0-4)
Applied Mechanics I 5 (4-2)	Applied Mechanics II 6 (4-4)	Electrical Instruments and Calibration 3 (2-2)
		Hydraulics 4 (3-2)
Theory of Electricity 5 (4-2)	D. C. Machines I 6 (4-4)	D. C. Machines II 6 (4-4)
Machine Tool Work I 2 (0-4)		Machine Tool Work II 3 (0-6)
Seminar	Seminar	Seminar

SENIOR

Telephone Engineering 4 (3-2)	D. C. Machine Design 2 (0-4)	A. C. Machine Design 2 (0-4)
Steam and Gas Engr. E-I 5 (4-2)	Steam and Gas Engr. E-II 5 (4-2)	Refrigeration 3 (2-2)
A. C. Machines I 6 (4-4)	A. C. Machines II 6 (4-4)	Generation and Distribution of Elec. Energy 4 (4-0)
Hydraulic Machinery 3 (2-2)		Illuminating Engineering 4 (4-0)
	Engineering English 4 (4-0)	Machine Tool Work III 3 (1-4)
Seminar	Seminar	Seminar
Thesis	Thesis	Thesis

Course in Mechanical Engineering

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

FRESHMAN

FALL	WINTER	SPRING
English I 4 (4-0)	English II 4 (4-0)	English Literature 4 (4-0)
Chemistry I 4 (3-2)	Chemistry II 4 (2-4)	Chemistry III 4 (3-2)
Plane Trigonometry 4 (4-0)	College Algebra 4 (4-0)	Plane Analytical Geometry 4 (4-0)
General Drawing 3 (0-6)	Descriptive Geometry I 3-(1-4)	Descriptive Geometry II 3 (1-4)
Library Methods E 1 (0-2)		
Woodwork 2 (0-4)	Foundry Practice I 3 (1-4)	Forging I 3 (1-4)
Military Science (0-3)	Military Science (0-3)	Military Science (0-3)

SOPHOMORE

Advanced Industrial History 4 (4-0)	Kinematics I 4 (4-0)	Surveying 3 (1-4)
Engineering Physics I 5 (4-2)	Engineering Physics II 5 (4-2)	Engineering Physics III 5 (4-2)
Calculus I 4 (4-0)	Calculus II 4 (4-0)	Calculus III 4 (4-0)
Mechanical Drawing I 2 (1-2)	Mechanical Drawing II 3 (1-4)	Mechanical Drawing III 3 (0-6)
Forging II 3 (1-4)	Extempore Speech 2 (2-0)	Pattern Making 3 (1-4)
Military Science (0-3)	Military Science (0-3)	Military Science (0-3)

JUNIOR

Economics 4 (4-0)	Business Law 2 (2-0)	American Government 4 (4-0)
	Business Organization 2 (2-0)	
Applied Mechanics I 5 (4-2)	Applied Mechanics II 6 (4-4)	Applied Mechanics III 4 (3-2)
Steam and Gas Engr. I 5 (4-2)	Steam and Gas Engr. II 4 (3-2)	Steam and Gas Engr. III 5 (4-2)
Mechanical Drawing IV 2 (0-4)	Hydraulics 4 (3-2)	Graphic Statics 2 (0-4)
Machine Tool Work I 2 (0-4)		Machine Tool Work II 3 (0-6)
Seminar	Seminar	Seminar

SENIOR

Hydraulic Machinery 3 (2-2)	Applied Mechanics IV 2 (2-0)	Refrigeration 3 (2-2)
Steam and Gas Engr. IV 4 (2-4)	Factory Engineering 2 (2-0)	Factory Design 2 (0-4)
	Power Plant Engineering 4 (2-4)	Engineering English 4 (4-0)
Electrical Engr. M-I 5 (4-2)	Electrical Engr. M-II 5 (4-2)	Heating and Ventilation 3 (2-2)
Machine Design I 3 (1-4)	Machine Design II 2 (0-4)	Machine Design III 3 (0-6)
Machine Tool Work III 3 (1-4)	Machine Tool Work IV 2 (0-4)	Machine Tool Work V 2 (0-4)
Seminar	Seminar	Seminar
Thesis	Thesis	Thesis

Applied Mechanics and Machine Design

Professor SEATON
Assistant Professor FREEMAN
Instructor BOWERMAN
Instructor TAYLOR

The courses in applied mechanics are designed primarily to teach the graphical and analytical methods of determination of the forces acting on the parts of structures and machines, and of the effect of these forces on the parts. 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. The textbooks in several of the courses are supplemented by notes and assigned reference work.

All laboratory tests of a commercial character are conducted in accordance with the standard methods prescribed by the national societies. Complete reports are required of the students on all laboratory exercises.

APPLIED MECHANICS LABORATORY

For testing the strength of materials this laboratory is provided with a 50,000-pound and a 100,000-pound Riehle universal testing machine, a 200,000-pound Olsen universal testing machine adapted for receiving columns up to 15 feet in height and beams up to 20 feet in length, a 250,000-inch-pound torsion testing machine, a 10,000-pound beam testing machine, and the auxiliary apparatus usually found in such laboratories.

This laboratory also contains transmission and absorption dynamometers, a scleroscope, screws, jacks, hoists, scales, gauges and other small instruments for taking weights and measurements. There is a full equipment of apparatus for making standard cement and concrete tests, a concrete building-block machine, and molds for various concrete products, such as drainage tile and fence posts.

The road materials laboratory contains an Olsen standard rattler for testing paving brick, a ball mill, a briquette former, impact machines, an abrasion machine, a hardness testing machine, a diamond saw, a core drill, and the usual auxiliary apparatus, such as scales and ovens.

HYDRAULICS LABORATORY

The hydraulics laboratory contains two hydraulic pits of 25,000 gallons capacity, each equipped with rectangular, triangular and trapezoidal weirs, an air-pressure tank, two hydraulic rams, two 4-inch volute centrifugal pumps, one 6-inch Hill-Tripp centrifugal pump, one 15-inch Layne and Bowler three-stage deep-well centrifugal pump, one positive rotary pump, one deep-well reciprocating pump, a water motor, a Pelton-Doble water wheel, a Trump water turbine, a small Price current meter, a Haskell current meter, electric motors for driving the pumps, and many pieces of small apparatus, such as an orifice tank, weirs, scales, tanks, hook gauges, pressure gauges, pressure regulators, water meters, including a 6-inch Venturi meter, and manometers.

COURSES IN APPLIED MECHANICS

FOR UNDERGRADUATES

APPLIED MECHANICS I. Junior year, fall and winter terms. Class work, four hours; laboratory, two hours. Five credits. Prerequisites: Calculus III, Engineering Physics III. Professor Seaton, Assistant Professor Freeman, Mr. Bowerman, and Mr. Taylor.

This course includes a study of the 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 solution of problems in statics. Text, Hancock's *Applied Mechanics for Engineers.*

Laboratory.—This course consists of the calibration and use of laboratory measuring instruments and apparatus, such as micrometers, planimeters, dynamometers, platform scales, jacks, hoists and various types of testing machines. Text, Carpenter and Diederichs' *Experimental Engineering.* (This text is also used in the subsequent laboratory courses in Applied Mechanics, and Hydraulics, and also in Steam and Gas Engineering.) Assistant Professor Freeman and Mr. Taylor.

APPLIED MECHANICS II. Junior year, winter and spring terms. Class work, four hours; laboratory, four hours. Six credits. Prerequisite: Applied Mechanics I. Professor Seaton, Assistant Professor Freeman, Mr. Bowerman, and Mr. Taylor.

This course treats of the following: 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 iron, steel, and reinforced concrete; design of built-up beams and box girders; resilience of beams; stresses in columns and hooks; and the design of columns of wood, cast iron, steel, and reinforced concrete. Text, Boyd's *Strength of Materials.* The Carnegie Steel Company's *Pocket Companion* is used for reference.

Laboratory.—Tension, compression, shear and bending tests are made on specimens of iron, steel, wood and concrete. These include both standard commercial tests and tests to determine the elastic properties of the materials. Torsion tests are also made on steel shafting. Standard tests are made on cement and fine and coarse aggregates for concrete.

GRAPHIC STATICS. Junior year, winter and spring terms. Drafting-room practice, supplemented by lectures, four hours. Two credits. Prerequisite: Applied Mechanics II; or the two courses may be taken together. Professor Seaton, Mr. Bowerman, and Mr. Taylor.

The graphical solution of stresses existing in a number of typical trusses, with a detail design of one of the simpler forms of roof trusses.

HYDRAULICS. Junior year, winter and spring terms. Class work, three hours; laboratory, two hours. Four credits. Prerequisite: Applied Mechanics I. Professor Seaton, Assistant Professor Freeman, Mr. Bowerman, and Mr. Taylor.

This course includes a study of fluid pressure, stresses in containing vessels and pipes, center of pressure, 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 its measurement; Kutter's formula; impulse and reaction of a jet; power of jets; plates moving in fluids. Text, Russell's *Textbook on Hydraulics.*

Laboratory. This course includes tests to determine the coefficients of weirs, orifices, tubes, and pipes, use and calibration of water meters;

tests to determine loss of head in pipes due to various causes, and the measurement of water in open streams. Assistant Professor Freeman and Mr. Taylor.

HYDRAULIC MACHINERY. Senior year, fall term. Class work, two hours; laboratory, two hours. Three credits. Prerequisite: Hydraulics. Professor Seaton.

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. Text, Daugherty's *Hydraulic Turbines.*

Laboratory. This course includes tests on water wheels, water turbines, rams, and pumps. Professor Seaton, Assistant Professor Freeman, and Mr. Taylor.

CONCRETE CONSTRUCTION. Elective, fall or spring term. Lectures, one hour; laboratory, four hours. Three credits. Assistant Professor Freeman and Mr. Taylor.

This course gives instruction in the selection of materials and proportions for different kinds of concrete construction, and in the essential principles of building forms and mixing and placing concrete, with special reference to machine and building foundations, sidewalks, and floors.

Laboratory. This consists of practice in the construction of such objects as mentioned above, and of various laboratory tests of concrete.

STRENGTH OF MATERIALS I. Elective, winter term. Class work, three hours. Three credits. Mr. Bowerman and Mr. Taylor.

The reactions, bending moments, shears and stresses in simple structures are determined. This course is a preparation for Strength of Materials II.

STRENGTH OF MATERIALS II. Elective, spring term. Class work, three hours. Three credits. Prerequisite: Strength of Materials I. Mr. Bowerman and Mr. Taylor.

This course embraces a study of the behavior of wood, steel and concrete when under stress, with the principles of design of structural elements, especially of concrete, wood, and steel.

STRUCTURAL MATERIALS TESTS. Elective, spring term. Laboratory, four hours. Two credits. Prerequisite: Strength of Materials II must accompany or precede this course. Mr. Taylor.

Tension, compression and bending tests are made on wood, steel, and concrete.

FOR GRADUATES OR UNDERGRADUATES

APPLIED MECHANICS III. Junior year, spring term. Class work, three hours; laboratory, two hours. Four credits. Prerequisite: Applied Mechanics II. Professor Seaton.

This course treats of stresses in continuous beams, built-up beams, and nonprismatic beams; resilience in bending and torsion; springs; effect of repeated stresses; 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. Text, Boyd's *Strength of Materials,* and Turneaure and Maurer's *Principles of Reinforced Concrete Construction.*

Laboratory. This is a continuation of the work of the preceding term, with tests of full-size columns and beams, use of the strain gauge in determining the elastic stresses in structures, and tests of building brick, stone, and concrete, and of road materials. Assistant Professor Freeman and Mr. Taylor.

APPLIED MECHANICS IV. Senior year, winter term. Class work, two hours. Two credits. Prerequisite: Applied Mechanics III. Professor Seaton.

This course considers the action of the reciprocating parts of steam and gas engines with particular reference to the effect of the inertia of these parts upon the distribution of the rotative effort at the crank shaft and the size of flywheels required for a given degree of speed regulation; stresses in solid and built-up flywheels, connecting rods and other moving parts; balancing of rotating and reciprocating masses; pendulum and flywheel governors; the critical speed of shafting; and dynamotors and the measurement of power. Text, Lanza's *Dynamics of Machines.*

COURSES IN MECHANICAL DRAWING AND MACHINE DESIGN

FOR UNDERGRADUATES

MECHANICAL DRAWING I. Sophomore year, fall and winter terms. Lectures and recitations, one hour; drafting-room practice, two hours. Two credits. Prerequisite: Descriptive Geometry I. Mr. Bowerman and Mr. Taylor.

The course includes the use and care of drawing instruments, with 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. The following supplies are 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. Text, French's *Engineering Drawing.*

MECHANICAL DRAWING II. Sophomore year, winter and spring terms. Lectures and recitation, one hour; drafting-room practice, four hours. Three credits. Prerequisites: Mechanical Drawing I; Descriptive Geometry II. Mr. Bowerman and Mr. Taylor.

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. Text, French's *Engineering Drawing.*

KINEMATICS I. Sophomore year, fall and winter terms. Lectures and recitations, four hours. Four credits. Prerequisites: Plane Trigonometry; Descriptive Geometry II. Professor Seaton and Mr. Bowerman.

An analysis of the motions and forms of the parts of machines constitutes this course. Among the subjects discussed are: bearings, screws, worm and wheel, rolling cylinders, cones, and other surfaces; belts, cords and chains, levers, cams and linkwork, with the velocity and motion diagrams; quick returns, straight-line motions, and other special forms of linkages; gearing and combinations of mechanisms. The solution of a large number of graphical and mathematical problems is required in this course. Text, Schwamb and Merrill's *Elements of Mechanism.*

MECHANICAL DRAWING III. Sophomore year, spring term. Drafting-room practice, six hours. Three credits. Prerequisite: Mechanical Drawing II. Kinematics I must accompany or precede this course. Mr. Bowerman.

The work in the first part of the term is a continuation of that given in Mechanical Drawing II. This is followed by the design of cams, gears, and quick returns to fulfill special conditions. Center-line drawings are first made, embodying the solution of the problems, and upon these are

built working drawings of 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.

MECHANICAL DRAWING IV. Junior year, fall term. Drafting-room practice, four hours. Two credits. Prerequisite: Steam Engineering I must accompany or precede this course. Professor Seaton and Mr. Bowerman.

This includes the solution of a problem on the slide valves by the Zeuner diagram, followed by the design, mostly by empirical methods, of the cylinder, piston, steam chest, and valve of a steam engine. Kent's *Mechanical Engineer's Pocketbook* is extensively used for reference, and each student is expected to have a copy.

MECHANICAL DRAWING E-I. Elective, fall term. One hour of lectures and recitations and four hours of drafting-room practice a week. Three credits. Mr. Bowerman and Mr. Taylor.

A study of the fundamental principles of lettering, and the use of drawing instruments. Orthographic projection in its relation to working drawings. Simple exercises leading up to the study of working drawings in the succeeding terms.

MECHANICAL DRAWING E-II. Elective, winter term. One hour of lectures and recitations and four hours of drafting-room practice a week. Three credits. Prerequisite: Mechanical Drawing E-I. Mr. Bowerman and Mr. Taylor.

A continuation of the preceding course, with more difficult exercises. In the latter part of the term free-hand sketches are made of simple structures and machine parts, and working drawings are made from these sketches. Practice is also given in making blue-prints.

MECHANICAL DRAWING E-III. Elective, spring term. One hour of lectures and recitations and four hours of drafting-room practice a week. Three credits. Prerequisite: Mechanical Drawing E-II. Mr. Bowerman and Mr. Taylor.

Practice is given in the construction of isometric and other oblique projections, and in the development of patterns for sheet-metal work. The plotting of curves and other graphical representations of the relations between two or more variables is considered in some detail.

MECHANICAL DRAWING. Elective, winter term. Drafting-room practice, four hours. Two credits. Mr. Bowerman and Mr. Taylor.

An elementary course in mechanical drawing designed to teach students to read and interpret simple working drawings, and to make working drawings of simple objects or designs. Some attention is devoted to the use of the triangles, T-square, and drawing instruments, and the principles of orthographic projection.

FOR GRADUATES AND UNDERGRADUATES

MACHINE DESIGN I. Senior year, fall term. Lectures and recitation, one hour; drafting-room practice, four hours. Three credits. Prerequisites; Mechanical Drawing III; Applied Mechanics II; and Steam Engineering II or Farm Motors II. Professor Seaton and Mr. Bowerman.

This course includes a careful study of the fundamentals of machine design. The energy and force problems and the straining action in machine elements are considered, together with the design of these elements to meet specific conditions as to strength and rigidity.

The drafting-room practice consists of the solution of several problems in design based on the principles already learned in Applied Mechanics. In the latter part of the term work is begun on the design of a steam

boiler. Calculations are made to determine the dimensions of all parts, and working drawings are made. Text, Kimball and Barr's *Elements of Machine Design.*

MACHINE DESIGN II AND A-II. Senior year, winter term. Drafting-room practice, four hours. Two credits. Prerequisite: Machine Design I. Professor Seaton and Mr. Bowerman.

This is a continuation of the work of the fall term. The design of the steam boiler is completed, and work is begun on the design of a power shear by the mechanical engineering students, while the agricultural engineering students devote the remainder of the term to the design of farm machinery.

MACHINE DESIGN III. Senior year, spring term. Drafting-room practice, six hours. Three credits. Prerequisite: Machine Design II. Professor Seaton and Mr. Bowerman.

This is a continuation of the work of the winter term, covering the completion of the design of the power shear.

FLOUR MILL DESIGN I. Senior year, fall term. Lectures, two hours; drafting-room practice, six hours. Five credits. Prerequisites: Mechanical Drawing III, and Applied Mechanics II. Advanced Experimental Milling I must accompany or precede this course. Professor Seaton and Mr. ————.

Lectures are given on the fundamental principles of the design and selection of machinery for flour mills. Drafting-room practice is had in the design of machines and in planning the arrangement of machines in flour mills.

FLOUR MILL DESIGN II. Senior year, winter term. Drafting-room practice, six hours. Three credits. Professor Seaton and Mr. ————

This is a continuation of the work of the preceding term, and includes the layout of flow sheets and the diagram of mills.

Architecture and Drawing

Professor WALTERS
Professor ETHERTON
Instructor HARRIS
Assistant SMITH

The educational and practical value of a systematic course in the various branches of 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 acquirement of skill in handling drawing tools.

The instruction offered in architecture is intended to supply the preliminary training required for the practice of architecture. 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 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 mechanics, heating and plumbing, concrete construction, steel construction, and electric lighting, also by the preparation of building specifications and by investigations of

the legal and ethical relation of architect, owner, and contractor. The second involves the teaching of correct perception and analysis of form. An average of twelve hours a week throughout the four years is given to projection drawing, descriptive geometry, isometric drawing, linear perspective, shades and shadows, sketching from casts and from life, architectural drawing, and architectural composition. The development of correct taste is sought by offering much work in sketching and rendering, mural decoration, landscape architecture, architectural criticism, and architectural composition. Five terms are devoted to the study of the fundamental principles of design and the styles of the past. Considerable emphasis is also laid on the problems of architecture as related to the needs of rural communities.

COURSES IN ARCHITECTURE AND DRAWING

FOR UNDERGRADUATES

OBJECT DRAWING. Freshman year, fall term. Drafting-room practice, four hours. Two credits. Professor Walters and Mr. Smith.

The course comprises drawing from models and simple objects, and exercises in shading from the object and from imagination.

GEOMETRICAL DRAWING. Freshman year, winter term. Drafting-room practice, four hours. Two credits. Professor Walters and Mr. Smith.

In this course are taught the construction of perpendiculars, parallels, angles, polygons, tangent connections, etc.; construction of the ovoid, the oval, the ellipse, and the spiral; the use of the T-square, triangles, the drawing-board, and India ink; lettering.

GENERAL DRAWING. Freshman year, fall term. Drafting-room practice, six hours. Three credits. Mr. Harris and Mr. Smith.

This course includes the fundamentals of free-hand drawing, geometrical drawing, isometric and other axonometric projections; and lettering.

DESCRIPTIVE GEOMETRY I. Freshman year, winter term. Lectures, one hour; drafting-room practice, four hours. Three credits. Prerequisite: General Drawing. Mr. Harris and Mr. Smith.

This is a continuation of the preceding course and includes the fundamentals of descriptive geometry, involving the point, line, and plane, and the intersection and development of the surfaces of geometric solids.

DESCRIPTIVE GEOMETRY II. Freshman year, spring term. Lectures, one hour; drafting-room practice, four hours. Three credits. Prerequisite: Descriptive Geometry I. Mr. Harris and Mr. Smith.

The single and double curved surfaces of revolution; their tangents and tangent planes; development of surfaces of revolution; sections and interpenetrations of the geometric solids, construction and sections of the hyperboloid of revolution and of the paraboloid form the matter of the course.

SHADES AND SHADOWS. Sophomore year, fall term. Drafting-room practice, four hours. Two credits. Prerequisite: Descriptive Geometry II. Professor Walters and Mr. Smith.

Shadows upon the planes of projection, shadows upon oblique planes and curved surfaces, shades and exercises in brush shading, constitute the subject matter of the course.

RESIDENCES. Sophomore year, fall term. Class work, four hours. Four credits. Professor Walters.

The course comprises lectures on location, arrangement, construction, decoration, and sanitation of residences; study of modern residence

styles; drawing to scale of plans, elevations, sections, and details of characteristic residences, involving construction in lumber, brick, stone, and concrete.

ARCHITECTURAL DRAWING I, II, and III. Sophomore year, fall, winter, and spring terms, respectively. Drafting-room practice, six hours. Three credits. Prerequisite: Descriptive Geometry I. Professor Walters.

The first term is given to the study of Gothic and Romanesque ornaments, tracery windows, and other details, from plaster models and blueprints. The second term takes up the analysis and study of standard forms of the five orders. The third is devoted to the study of the modern residence and the school building.

HISTORIC ORNAMENT. Sophomore year, winter term. Class work, four hours. Four credits. Professor Walters.

This is a course of illustrated lectures on the standard forms of Greek, Roman, and Gothic moldings; the Tuscan, Doric, Ionic, Corinthian, and composite columns and their entablatures; the lotus, anthemion, acanthus, and laurel ornament; Roman, medieval, and modern lettering; the ornament of the Gothic period.

INK RENDERING I. Freshman year, spring term. Drafting-room practice, four hours. Two credits. Professor Walters.

This course includes consideration of form analysis, projection methods, free-hand perspective, shades and shadows from objects and models. Different methods of pencil, crayon and pen rendering are studied.

INK RENDERING II. Sophomore year, fall term. Drafting-room practice, four hours. Two credits. Professor Walters.

Individual instruction is given in sketching from models and natural objects. Different methods of ink rendering are studied. Drawings are prepared for photo-engraved plates used in bulletins, magazines, and books.

MURAL DECORATION. Junior year, winter term. Drafting-room practice, four hours. Two credits. Prerequisite: Color and Decoration. Professor Walters.

Each student is required to make a series of large water-color studies of interior wall-decoration schemes, including original designs for borders and centerpieces.

CLAY MODELING. Junior year, spring term. Laboratory, six hours. Three credits. Mr. Harris.

This course includes clay and plaster modeling of architectural details, historic ornaments, and decorative statuary; also methods of making plaster casts.

ARCHITECTURAL COMPOSITION I, II, III, IV, V. Beginning with the fall term of the junior year and extending through five consecutive terms. Drafting-room practice, six hours a week. Three credits each term. Prerequisite: Architectural Drawing III. Professor Walters.

The first term is given to the planning of a residence, and involves the preparation of a complete set of plans and elevations, sections and detail drawings. The second term takes up the planning of a Gothic church. The third is given to the planning of a Romanesque school building. The fourth takes up the planning of a small public building in the modern Renaissance. The fifth is given to work in modern steel and concrete architecture of a monumental style. Sets of blue-prints of all finished work must be left with the department, if required by the professor in charge of the work.

BEAMS AND ARCHES. Senior year, fall term. Class work, one hour; drafting-room practice, four hours. Three credits. Prerequisite: Graphic Statics. Mr. Harris.

This is a course of lectures on the statics of steel and wood beams, posts, and struts, stone lintels, arches, concrete and reinforced concrete construction. Text, Kidder's *Handbook for Architects.*

SPECIFICATIONS. Senior year, fall term. Class work, two hours. Two credits. Professor Walters.

The course comprises 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; discussion of the principles and form of building contracts; study of the legal relation of the architect, the owner, and the contractor; discussion of state laws concerning the erection of public buildings; labor laws; lien laws; city ordinances; building permits; building insurance; contracts and bonds.

TRUSSES. Senior year, winter term. Class work, two hours; laboratory, four hours. Four credits. Prerequisite: Beams and Arches. Mr. Harris.

The course deals with methods of construction and graphic analysis of standard wood and steel trusses. Text, Kidder's *Handbook for Architects.*

ARCHITECTURAL SEMINAR. Senior year, winter term. Class work, four hours. Four credits. Professor Walters.

The course includes a critical study of public buildings, such as the Manhattan library, the Riley county courthouse, the buildings of the College, etc., as well as study and discussion of the work of American architects, such as Smithmeyer, Upjohn, and Richardson. A critical study is made of the competitive designs for the Cathedral of St. John the Divine, New York, the building of the University of California, etc.

ARCHITECTURAL THESIS. Senior year, winter and spring term. Drafting-room practice, eight hours. Four credits. Professor Walters.

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.

HOME ARCHITECTURE. Senior year, winter term. Drafting-room practice, eight hours. Four credits. Required in the course in home economics. Professor Etherton.

This is a study, and drawing in ink, of floor plans, details, and front elevations of modern residences.

FARM BUILDINGS AND EQUIPMENT. Elective, winter term. Class work, two hours; drafting-room practice, six hours. Five credits. Professor Etherton.

The course comprises the preparation of drawings and specifications for barns, dairy stables, and other farm buildings, and includes also a study of the equipment of the same.

FARM ARCHITECTURE. Elective, spring term. Drafting-room practice, eight hours. Four credits. Professor Etherton.

The course comprises the preparation of drawings and specifications for barns, dairy stables, and other farm buildings.

FOR GRADUATES OR UNDERGRADUATES

LINEAR PERSPECTIVE. Sophomore year, winter term. Drafting-room practice, four hours. Two credits. Prerequisite: Descriptive Geometry II. Mr. Smith.

Vanishing points, vanishing traces, measuring points, cylindric perspective and perspective corrections, are emphasized, and various exercises in representing geometric solids are given.

HISTORY OF ARCHITECTURE I. Junior year, fall term. Class work, four hours. Four credits. Prerequisite: Historic Ornament. Professor Walters.

This study is taught by lectures, illustrated by photographs, plaster models, and stereopticon views. It deals with the development of the architecture of the ancient Egyptians, Chaldeans, Greeks, and Romans.

HISTORY OF ARCHITECTURE II. Junior year, winter term. Class work, four hours. Four credits. Professor Walters.

This course comprises a study of the architecture of the medieval and Renaissance periods—Byzantine, Romanesque, Moorish, Gothic, and Renaissance.

HISTORY OF ARCHITECTURE III. Junior year, spring term. Class work, four hours. Four credits. Professor Walters.

A study is made of the neo-Greek and the neo-Roman architecture; the revival of the Gothic and the Romanesque; the Colonial, the Mission, and modern American architecture.

COLOR AND DECORATION. Junior year, fall term. Laboratory, six hours. Three credits. Professor Walters.

A study of the principles that underlie good design and harmonious color combinations. Rendering in color of building elevations and perspectives.

INK RENDERING. SENIOR year, fall term. Drafting-room practice, four hours. Two credits. Prerequisite: Linear Perspective. Professor Walters.

The course includes perspectives of buildings and ornamental details; rendering in ink; studio methods.

COLOR RENDERING. Senior year, winter term. Drafting-room practice, four hours. Two credits. Prerequisite: Mural Decoration. Professor Walters.

This is a course in rendering of buildings with their landscape environments, by means of ink or sepia washes, or in water color.

LANDSCAPE DESIGN. Senior year, spring term. Drafting-room practice, eight hours. Four credits. Landscape Gardening must accompany or precede this course. Professor Walters.

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.

Civil and Highway Engineering

Professor CONRAD
Professor GEARHART
Associate Professor WALKER
Assistant Professor FRAZIER

The instruction in civil and highway engineering is given by means of lectures and recitations, and by the practice in the field, in the drafting room, and in the laboratory. The technical work begins in the fall term of the sophomore year, in which the work in surveying is started. The heaviest technical 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 and

framed structures, structural design, drainage and irrigation engineering, construction and design in masonry and concrete, railways, highway engineering, astronomy, and geodesy. During the entire senior year considerable time is devoted to thesis work.

The seminar, coming once each week, affords the junior and senior students an opportunity to become acquainted with modern engineering practice through discussions and references to current periodicals.

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 and Highway Engineering possesses a good assortment of transits, levels, plane tables, tapes, and chains. The department also owns a precise level, a direction theodolite, a repeating theodolite, and a base-line outfit.

COURSES IN CIVIL ENGINEERING

FOR UNDERGRADUATES

SURVEYING. Sophomore year, fall and spring terms. Class work, one hour; field work, four hours. Three credits. Elective for students of other divisions. Prerequisite: Trigonometry. Assistant Professor Frazier.

This is a brief course in the care and use of engineer's surveying instruments. The greater part of the time is devoted to exercises and practical problems involving the use of the transit and level. Text, Pence and Ketchum's *Surveying Manual.*

SURVEYING I. Sophomore year, fall term. Class work, four hours; field and drafting-room work, six hours. Seven credits. Prerequisite: Trigonometry. Assistant Professor Frazier.

The textbook work in this course deals with the use and care of instruments, land topographic and hydrographic surveying. The field and drafting work is devoted to exercises in the use of engineer's surveying instruments and plotting plane surveys. Text, J. B. Johnson's *Theory and Practice of Surveying.*

FOUNDATIONS. Sophomore year, winter term. Class work, four hours. Four credits. Professor Conrad.

This course is devoted to a study of the principles underlying the design and construction of foundations of all characters in common use at the present time. Text, Fowler's *Ordinary Foundations.*

SURVEYING II. Junior or senior year, fall term. Class work, four hours; field and drafting-room work, six hours. Seven credits. Prerequisite: Surveying I. Assistant Professor Frazier.

Recitation work in this course deals with city and mine surveying, computations of volumes, and railroad curves. The field and drafting work is devoted principally to topographical surveying and plotting. Text, J. B. Johnson's *Theory and Practice of Surveying,* and Allen's *Railroad Curves and Earthworks, with Tables.*

CIVIL ENGINEERING DRAWING I. Junior year, winter term. Drafting-room work, four hours. Two credits. Prerequisite: Mechanical Drawing I and II. Assistant Professor Frazier.

This course 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 the purpose. No text book is used.

RAILWAYS II. Senior year, spring term. Drafting-room or field exercises, eight hours. Four credits. Prerequisite: Railway Engineering I. Professor Conrad.

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. Texts, Raymond's *Elements of Railroad Engineering*, and Allen's *Railroad Curves and Earthworks, with Tables.*

FOR GRADUATES AND UNDERGRADUATES

CIVIL ENGINEERING DRAWING II. Junior year, spring term. Drafting-room work, eight hours. Four credits. Prerequisite: Civil Engineering Drawing I. Professor Conrad.

This is, during the first part of the term, a continuation of the course in graphic statics. About three-fourths of the term is devoted to the design of roof trusses of timber and steel.

BRIDGE STRESSES. Senior year, fall term. Class work, four hours. Four credits. Prerequisites: Applied Mechanics I and II. Professor Conrad.

This course involves the study of the algebraic method of computing the stresses in bridges and buildings, leading up to the subject of structural design the following term. Text, Merriman and Jacoby's *Roofs and Bridges*, Part I.

WATER SUPPLY AND SEWERAGE. Senior year, fall term. Class work, four hours. Four credits. Prerequisite: Hydraulics. Assistant Professor Frazier.

This course deals briefly with the problems of designing and constructing sewer systems and disposal plants for cities of moderate size. Water supply for cities is studied from the standpoints of consumption, collection, storage, distribution, and purification. Texts, Turneaure & Russell's *Public Water Supplies*, and Folwell's *Sewerage.*

BRIDGE DESIGN. Senior year, winter term. Class work, three hours; drafting-room exercises, six hours. Six credits. Prerequisites: Bridge Stresses and Civil Engineering Drawing II. Professor Conrad.

This is a study of the design of timber and of metal structures. In the drafting room the time is devoted chiefly to working out the details of a plate girder and of a railroad or highway bridge. Text, Merriman and Jacoby's *Roofs and Bridges*, Part III.

RAILWAYS I. Senior year, winter term. Class work, three hours. Three credits. Prerequisites: Surveying I and II. Assistant Professor Frazier.

This is a short course in the theory of railroad engineering based on Wellington's economic theory. Considerable time is also devoted to the study of track construction and maintenance, and of the design of the yards and terminals. Text, Raymond's *Elements of Railroad Engineering*, and Allen's *Railroad Curves and Earthwork, with Tables.*

MASONRY AND CONCRETE. Senior year, winter term. Class work, three hours; drafting-room work, four hours. Five credits. Prerequisites: Applied Mechanics I, II, and III. Professor Conrad.

The classroom work takes up the study of the design and construction of structures of masonry and concrete, both plain and reinforced. The time spent in the drafting room is devoted to the design of concrete and masonry retaining walls, dams, arches, slab and girder bridges. Text, Taylor and Thompson's *Concrete.*

STRUCTURES. Senior year, winter term. Class work, three hours; drafting-room work, six hours. Six credits. Prerequisites: Applied Machanics II, and Drainage and Irrigation I. Professor Conrad.

This course is devoted to a study of the design and construction of

the various structures of timber, steel, masonry and concrete with which the irrigation engineer has to deal.

ASTRONOMY. Senior year, winter term. Class work, two hours; laboratory, two hours. Three credits. Prerequisites: Trigonometry; Surveying II. Assistant Professor Frazier.

This course is given 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 engineer's surveying instruments. Text, Hosmer's *Practical Astronomy.*

GEODESY. Senior year, spring term. Class work, two hours; field work, four hours. Four credits. Prerequisites: Surveying I and II; Astronomy. Professor Conrad.

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. Text, J. B. Johnson's *Theory and Practice of Surveying.*

FARM SANITATION AND WATER SUPPLY. Elective, winter term. Class work, two hours. Two credits. Professor Conrad.

This course comprises a study of well drilling, installation of water supply for the farm home, and farm sanitation.

COURSES IN HIGHWAY ENGINEERING

FOR UNDERGRADUATES

HIGHWAY ENGINEERING I. Senior year, fall term. Class work, four hours; laboratory, six hours. Seven credits. Professor Gearhart.

The recitation work deals with the economics of highway location, construction and maintenance, dealing principally with country highways.

The laboratory work is devoted to a study of the characteristics of the principal road-building materials and the standard methods of testing. Text to be selected.

HIGHWAY ENGINEERING II. Senior year, winter term. Class work, four hours. Four credits. Prerequisite: Highway Engineering I. Professor Gearhart.

This course is devoted principally to a study of the construction and maintenance of modern types of improved surfaces for roads and pavements. Texts to be selected.

HIGHWAY ENGINEERING III. Senior year, spring term. Class work, three hours; field and drawing-room work, eight hours. Seven credits. Prerequisite: Highway Engineering II. Professor Gearhart.

The recitation work is devoted to a study of road laws and administration in the various sections of the United States and Europe. The field and drawing-room work aims to give the student practice in making surveys for highways, mapping, making estimates and drawing up specifications. Texts to be selected.

SPECIFICATIONS AND INSPECTIONS. Senior year, spring term. Class work, two hours. Two credits. Prerequisite: Highway Engineering II. Professor Gearhart.

This is a course dealing with the matter of drawing specifications for various standard types of road construction and the inspections of materials and construction work. Text to be selected.

FOR GRADUATES AND UNDERGRADUATES

HIGHWAY ENGINEERING. Senior year, spring term. Class work, three hours. Three credits. Professors Conrad and Gearhart.

The work in the classroom is devoted to a study of the theory and

practice of economic highway and pavement construction and maintenance, including a study of the needs of traffic, of its effect on the road surface, and the materials of construction. Text, Blanchard and Drown's *Elements of Highway Engineering.*

COURSES IN IRRIGATION AND DRAINAGE ENGINEERING

FOR UNDERGRADUATES

DRAINAGE AND IRRIGATION II. Senior year, winter term. Class work, one hour; field and drafting-room, four hours. Three credits. Prerequisite: Drainage and Irrigation I. Associate Professor Walker.

This is a library and textbook course dealing primarily with the agricultural side of drainage and irrigation. Among the questions considered are the amount of water required by different crops, the best time to apply water for different crops, the effect on various crops of the depth below the surface of ground water, methods of preventing the deposits of salts injurious to vegetation and of removing existing deposits of such salts. Text to be selected.

DRAINAGE AND IRRIGATION III. Senior year, spring term. Field and drafting-room, six hours. Three credits. Associate Professor Walker.

It is the aim of this course to give the student practice in the surveys for drainage and irrigation projects, plotting maps and drawing up specifications and estimates.

IRRIGATION AND DRAINAGE. Spring term. Class work, two hours; field work, four hours. Four credits. Prerequisite: none. Professor Conrad and Associate Professor Walker.

This course is elective for Agricultural students and comprises a brief treatment of the subjects from the agriculturist's point of view. Texts, Elliott's *Engineering for Land Drainage* and Fortier's *Use of Water in Irrigation.*

FOR GRADUATES AND UNDERGRADUATES

DRAINAGE AND IRRIGATION I. Senior year, fall and spring terms. Class work, three hours. Three credits. Prerequisite for engineering students: Hydraulics. Professor Conrad and Associate Professor Walker.

In this course 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. Texts, Elliott's *Engineering for Land Drainage,* and Newel and Murphy's *Principles of Irrigation Engineering.*

Electrical Engineering

Professor REID
Instructor MCNAIR

Instruction in this course is given by means of textbooks, lectures, reference work, and laboratory periods. The class work is carefully illustrated by means of demonstration apparatus and the projection lantern. The course is designed to provide the necessary preparation for young men who desire to engage in the practical field of electrical engineering, or for those who desire to assume the control of central stations as managers, as superintendents, or as consulting engineers.

The electrical laboratory for the work of the third year is provided with standard instruments of measurements, including standards of resist-

ance, self-induction, capacity, etc. A complete line of standard makes of ammeters, voltmeters, wattmeters, and galvanometers is also provided. The different laboratories of the department are supplied with electric current from the following sources: 120-volt storage-battery circuit; 110-volt direct-current circuit; 110-volt alternating-current circuit; 220-volt direct-current circuit. Voltages up to 60,000 can be produced in the dynamo laboratory for testing purposes.

The electrical engineering laboratory is provided with a number of standard commercial machines, among them a 30-kilowatt 2300-volt polyphase alternating-current generator, a 15-kilowatt 125-volt alternating-current generator, which may be connected as a single-phase, two-phase, three-phase, six-phase or twelve-phase machine; a 7½-kilowatt synchronous converter, which may be used as a one-, two-, three-, or four-phase motor; single- and three-phase induction motors; a 5-horsepower phase-wound induction motor; a 20-horsepower auxiliary pole 220-volt direct-current motor, with a speed range from 250 to 1000 R. P. M.; a 26-horsepower 220-volt direct-current motor; a 15-kilowatt direct-current generator, a Wood arc machine, a 4½-kilowatt 125-volt direct-current generator, and several smaller machines; a 60-cell 160-ampere-hour storage battery, current transformers, arc lamps, constant potential transformers, 20,000- and 60,000-volt testing transformers, marble and slate switchboards, a Tirrel regulator, speed controllers, and a full line of ammeters, voltmeters, wattmeters, etc., for testing purposes.

Recent additions to the laboratory include a 3-movement oscillograph with photographing attachments, with which simultaneous waves of three quantities may be observed and photographed; and a phase-changing set consisting of two 7½-kilowatt alternating-current generators and two 15-horsepower direct-current motors, speed variable from 600 to 1800 revolutions per minute. All four machines are mounted on the same bedplate, and by means of flanged couplings can be run in any combination of two, three, or four machines. The generator armature windings are brought out to 12 terminals and may be connected for single-, 2- and 3-phase Y, or delta 6-phase and 12-phase, and when running in synchronism the armatures of the two machines may be turned, with reference to each other, through 180 degrees, so that any phase difference that is desired may be obtained. The generators may be used in parallel, as synchronous motors, and in any other desired combinations.

The equipment includes also two compound-wound direct-current generators on the same sub-base, to illustrate generators in parallel operation, Edison 3-wire system, "pump-back" factory efficiency tests, etc.; a 10 kw. special rotary converter, designed for use in single, three- or six-phase operation, having amortisseur winding speed-limiting and oscillating devices and commutating poles. Three 5 kw. transformers are accessories of this machine. A pair of 6 kw. compound-wound generators will be used to furnish the laboratory with a 110-220-volt 3-wire system from the 220-volt lines supplied by the power plant, and to illustrate commercial use of such systems. The Electric Controller and Manufacturing Company, of Cleveland, have donated a valuable automatic motor starter and controller, such as is used with motors driving machine tools.

COURSES IN ELECTRICAL ENGINEERING

FOR UNDERGRADUATES

THEORY OF ELECTRICITY. Junior year, fall term. Recitations and lectures, four hours; laboratory, two hours. Five credits. Prerequisites: Engineering Physics II; Calculus III.

This course is an extension of the work in electricity in Engineering Physics II, and is a prerequisite to work in electrical engineering proper. A study is made of the phenomena and fundamental laws and principles of static electricity, the galvanic current, magnetism, and electromagnetism. Emphasis is laid upon the ultimate importance to the student of a thorough understanding of these subjects. Text, Franklin and Macnutt's *Elements of Electricity and Magnetism.* Professor Reid.

Laboratory. The laboratory course continues the work of the classroom in giving the application of the fundamental principles, the experiments being so arranged as to follow the theoretical development of the subject. Mr. McNair.

DIRECT-CURRENT MACHINES I. Junior year, winter term. Recitations or lectures, four hours; laboratory, four hours. Six credits. Prerequisite: Theory of Electricity.

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 work in the electrical engineering laboratory. Text, Franklin and Estey's *Elements of Electrical Engineering,* Vol. I. Professor Reid.

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. Mr. McNair.

DIRECT-CURRENT MACHINES II. Junior year, spring term. Lectures or recitations, four hours; electrical engineering laboratory, four hours. Six credits. Prerequisite: Direct-current Machines I.

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. Text, Franklin and Estey's *Elements of Electrical Engineering,* Vol. I. Professor Reid.

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. Professor Reid and Mr. McNair.

ELECTRICAL INSTRUMENTS AND CALIBRATION. Junior year, spring term. Lectures and recitations, two hours; calibration laboratory, two hours. Three credits. Prerequisites: Theory of Electricity and Direct-current Machines I. Mr. McNair.

This course includes a study of the different types of electrical measuring instruments and their application to electrical engineering testing. Text, Roller's *Electric and Magnetic Measurements,* supplemented by lectures.

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.

ELECTRICAL ENGINEERING M-I. Senior year, fall term. Lectures or recitations, four hours; laboratory, two hours. Five credits. Prerequisites: Engineering Physics II, and Calculus III. Mr. McNair.

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. Text, 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 characteristics and efficiency tests are given. A written report on each test is required.

ELECTRICAL ENGINEERING M-II. Senior year, winter term. Lectures and recitations, four hours; laboratory, two hours. Five credits. Prerequisites: Engineering Physics II; Calculus III. Mr. McNair.

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. Text, Sheldon's *Alternating-Current Machines.*

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.

DIRECT-CURRENT MACHINE DESIGN. Senior year, winter term. Lectures and computation, four hours. Two credits. Prerequisite: Direct-current machines II. Mr. McNair.

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.

ALTERNATING-CURRENT MACHINE DESIGN. Senior year, spring term. Laboratory, four hours. Two credits. Prerequisite: Alternating-current Machines II. Mr. McNair.

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.

ELECTRICAL ENGINEERING C. Senior year, spring term. Recitations or lectures, three hours; laboratory practice, two hours. Four credits. Prerequisites: Engineering Physics III; Calculus III. Mr. McNair.

This work is designed to cover briefly the fundamental principles of direct-current and alternating-current electricity. Emphasis is laid upon the proper installation and operation of the different classes of machine, and the use of electricity for lighting and power.

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.

SEMINAR. Junior and senior years, required throughout each year. Professer Reid and Mr. McNair.

The work of these courses is intended to give students of electrical engineering the opportunity to keep informed regarding the latest inven-

tions and research work along the special line which they have chosen. Reviews of current electrical literature are required, and class discussions of articles reviewed are made the basis of the class work.

ELECTRICAL ENGINEERING THESIS. Required in the course in electrical engineering. Professor Reid and Mr. McNair.

The subject for thesis work is selected in consultation with the head of the department, 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.

ELECTRICITY. Elective, winter term. Class work, three hours; laboratory, two hours. Four credits. Mr. McNair.

This course includes a study of wiring methods and materials; open and concealed wiring; the convenient and economical installation and operation of farm building lighting systems and plants; the use and installation and care of storage batteries; and other accessories to a modern electric lighting system for the farm residence and other farm buildings.

FOR GRADUATES AND UNDERGRADUATES

TELEPHONE ENGINEERING. Senior year, fall term. Class work, three hours; laboratory, two hours. Four credits. Professor Reid and Mr. McNair.

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 both of the design and maintenance of telephone lines and central-office apparatus, and of central-office methods, the selection of apparatus, and methods of handling telephone traffic. Text, Abbott's *Telephony.*

ALTERNATING-CURRENT MACHINES I. Senior year, fall term. Recitations or lectures, four hours; laboratory, four hours. Six credits. Prerequisites: Calculus III, and Direct-current Machines II. Professor Reid.

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. Text, Franklin and Estey's *Elements of Electrical Engineering,* Vol. I; Swenson and Frankenfield's *Testing of Electro-Magnetic Machinery.*

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.

ALTERNATING-CURRENT MACHINES II. Senior year, winter term. Recitations or lectures, four hours; laboratory, four hours. Six credits. Prerequisite: Alternating-current Machines I. Professor Reid.

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. Text, Franklin and Estey's *Elements of Electrical Engineering,* Vol. II; Swenson and Frankenfield's *Testing of Electro-Magnetic Machinery.*

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.

GENERATION AND DISTRIBUTION OF ELECTRICAL ENERGY. Senior year, spring term. Recitations or lectures, four hours. Four credits. Mr. McNair.

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. Text, Ferguson's *Elements of Electrical Transmission.*

ILLUMINATING ENGINEERING. Senior year, spring term. Lectures and recitations, four hours. Four credits. Professor Reid and Mr. McNair.

This 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.

Farm Machinery

Instructor WIRT, in Charge
Assistant WISEMAN

The courses in farm machinery are designed to meet the needs of students studying agriculture and agricultural engineering. Construction, adjustment, operation, selection and care of machinery are taught in the classroom by lectures and recitations. Construction, adjustment and operation are emphasized in the laboratory and in numerous field tests. The Department has about $10,000 worth of the latest machinery, which has been loaned by the manufacturing companies. Before a machine becomes out of date it is exchanged for a new one.

The Department is well supplied with dynamometers and other equipment for making exhaustive tests on machines in the field and laboratory. With these facilities, research work of considerable importance can be carried on by both undergraduate and graduate students.

COURSES IN FARM MACHINERY

FOR UNDERGRADUATES

FARM MACHINERY I. Sophomore or junior year, spring term. Class work, two hours; laboratory, four hours. Four credits. Required in the course in agriculture; optional in the course in agricultural engineering; elective in other courses. Mr. Wirt and Mr. Wiseman.

This is a beginning course in farm machinery, and takes up certain important definitions and mechanical principles, including the lever, evener, tackles, etc. Power transmission, belting, and belt lacings; the development, construction and operation of tillage, cultivation, seeding, harvesting, and haying machinery; manure spreaders, wagons, pumping machinery; and the selection and care of machinery are subjects of study in this course.

FARM MACHINERY II. Junior or senior year, winter term. Class work, two hours; laboratory, two hours. Three credits. Optional in the courses in agricultural engineering; elective elsewhere. Prerequisite: Farm Machinery I. Mr. Wirt and Mr. Wiseman.

This is a course in power farming machinery, taking up such machinery as engines, plows, ensilage cutters, threshing machines, corn shellers, hay balers, feed mills, and grain elevators.

FARM MACHINERY III. Elective, fall term. Laboratory, four hours. Two credits. Prerequisite: Farm Machinery II. Mr. Wirt and Mr. Wiseman.

This course involves the calibration of seed machinery. Tests are made on farm machinery both in the laboratory and in the field.

FARM MACHINERY IV. Elective, fall term. Laboratory, two hours. One credit. No prerequisites. Mr. Wiseman.

In this course practical instruction is given in rope work, belt splicing, soldering, pipe work, babbitting, and fencing.

FARM MACHINERY V. Elective, any term. Four to ten hours laboratory or reading. Two to five credits. Assignment by permission. Prerequisites: Farm Machinery II. Farm Buildings and Equipment.

Research problems, depending upon the prerequisites studied, are assigned in farm machinery.

Shop Practice

Associate Professor CARLSON
Instructor HOUSE
Instructor LYNCH
Instructor HAYES
Instructor GRANT
Assistant YOST
Assistant PARKER
Assistant BROWN
Assistant HENRY
Assistant BALL
Assistant SWENSON
Assistant ———

The work in the shops is planned to meet the needs of three classes of students: (1) those in the course in agriculture who expect to use the skill gained in the shops in their afterwork 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 machine 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.

The equipment of the Department of Shop Practice is set forth to a certain extent below.

WOOD SHOP. This room is 40 by 90 feet; it contains 252 separate sets of tools, and benches for 48 students in each class.

PATTERN SHOP. This room is 45 by 81 feet, and contains sixteen 10-inch by 4½-foot wood-turning lathes and one 18-inch by 12-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 complete sets of tools.

WOODWORKING MACHINERY ROOM. This room is 35 by 42 feet, and contains one Dietzwell wood planer, one Cordsman Myers friezer, one 34-inch band saw, one Beach jig saw, one Fay & Egan 20-inch variety saw, one Fay & Egan power mortiser, one Fay & Egan sandpapering machine, one

Fay & Egan 8-inch jointer, one Seneca Falls foot mortiser, besides the necessary grindstones and work benches.

MACHINE SHOP. This room is 40 by 170 feet, and contains thirteen engine lathes, as follows: One 14-inch Hendey-Norton lathe, two 14-inch Flather lathes, one 13-inch Lodge & Davis lathe, one 16-inch Lodge & Shipley combination engine and turret lathe, two 14-inch Reed lathes, five 14-inch K. S. A. C. lathes, and one 28-inch by 20-foot American lathe equipped with block to raise it to 60-inch swing, one K. S. A. C. speed lathe, one Brown & Sharpe No. 2 Universal milling machine, one No. 2 Brown & Sharpe universal grinder, one K. S. A. C. (Hendey-Norton pattern) shaper, one K. S. A. C. (Pratt & Whitney pattern) shaper, one Gray 26-inch by 6-foot planer, one Niles 41-inch vertical turning and boring mill, one Baker Bros. key seater, one Barnes 34-inch self-feed drill press, one Rogers 12-inch sensitive drill press, two K. S. A. C. 12-inch sensitive drill presses, one K. S. A. C. (Bemis-Miles pattern) 20-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 power hack saw, one Emerson direct-connected motor polishing machine, one bolt and pipe machine taking pipe up to two inches, one Bignall & Keeler pipe machine taking pipe up to eight inches, a complete set of sheet-metal worker's tools, benches and tools for fifty students, and a tool room completely stocked with the necessary tools. A time clock (Calculagraph) is installed near the machine-shop office for recording the attendance of the students and workmen.

Adjacent to the machine shop is a room 18 by 20 feet which is used as a stock and storage room for the rough and finished parts of the 1½ h. p. gas engines and 12-in. by 32-in. wood-turning lathe which are constantly in the process of construction as problem work for the students.

BLACKSMITH SHOP. This room is 50 by 100 feet and is equipped with thirty-three Sturtevant down-draft forges for students' use, and two large special Sturtevant forges for general use. Each forge has an anvil and a 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, 12-inch K. S. A. C. sensitive drill press, punch and shear, K. S. A. C. (Erie pattern) 400-pound steam hammer, emery grinder, tire bender, tire shrinker, and a number of pieces of special apparatus built by the department.

IRON FOUNDRY. This room is 27 by 100 feet. It is equipped with a 1½-ton Colliau cupola, 1½-ton K. S. A. C. steel crane, core oven 5 by 6 by 7 feet (arranged so it can be heated with either coke or gas), one car, track and turntable, one 2 ft. by 3 ft. K. S. A. C. rumbler, one K. S. A. C. emery grinder, one K. S. A. C. molding machine, one Arcade squeezer type molding machine, one hammer core machine, an exceptionally large number of flasks, both wood and iron, ladles, and necessary small tools.

BRASS FOUNDRY. This room is 24 by 34 feet. It is equipped with one 21-in. by 36-in. brass furnace, crucibles, flasks, molding tubs, benches, cases, racks and all necessary tools for bench and floor molding.

AMPHITHEATER. This room is 54 by 54 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 by 40 feet. It is conveniently located, and is equipped with 244 special metal lockers for the use of students taking work in the machine shop, blacksmith shop, foundry and engineering laboratory. A portion of this is made a separate locker-room and bath-room for the use of the shop foreman, and contains seven metal lockers.

COURSES IN SHOP PRACTICE

FOR UNDERGRADUATES

FORGING I. Freshman year, fall and spring terms. Lectures, one hour; laboratory, four hours. Three credits. Professor Carlson, Mr. Lynch, and Mr. Brown.

This is a course in the forging of iron, and is designed to teach the principles and operations of drawing, bending, upsetting, welding, twisting, splitting, and punching. A study is made of the manufacture of iron and steel, and of the proper methods of making forgings and tools. Tools required: a two-foot rule and a pair of five-inch outside calipers.

FORGING II. Sophomore year, fall and spring terms. Lecture, one hour; laboratory, four hours. Three credits. Prerequisite: Forging I. Professor Carlson, Mr. Lynch, and Mr. Brown.

Advanced work in the forging of iron and in the manufacture of steel tools. Instruction is given in hardening, tempering, casehardening and annealing, heat treating and testing of tool steels. Tools required: same as Forging I.

The lectures consist of discussions and reports from periodicals and reference books on the theories of hardening, manufacture and use of alloy steels, methods of heat treatment of steels, and oxyacetylene and thermit welding.

WOODWORK. Fall and spring terms. Laboratory, four hours. Two credits. Mr. Parker and Mr. Ball.

This is a course for engineering students, the first part of which consists of exercises to give familiarity with the hand tools. The latter part of the course is devoted to such work as brings into use all of the woodworking machinery. Written reports will be required on current articles and assignments which have to do with woods, varnishes, stains, paints, and their use.

WOODWORK I. Elective, fall, winter, and spring terms. Laboratory, four hours. Two credits. Mr. Parker and Mr. Ball.

This course consists of a graded set of exercises in joinery and elementary cabinet construction to familiarize the student with the principles of wood construction and finishing. Instruction is given in the proper use and care of tools.

WOODWORK II. Elective, fall, winter and spring terms. Laboratory, four hours. Two credits. Prerequisite: Woodwork I. Mr. Parker and Mr. Ball.

A continuation of Woodwork I, with instruction in the use of the rabbet, router, and matching planes, and with the plow, dado, and fillister, on such articles as will give the necessary practice. Emphasis is laid upon the proper care and use of tools, and of wood finishing.

WOODWORK III. Elective, fall, winter and spring terms. Laboratory, four hours. Two credits. Prerequisite: Woodwork II. Mr. House and Mr. Ball.

A course in mill work where the work given is of such nature as to require the use of all the woodworking machines. Lectures are given on the proper selection, use and care of the machinery.

WOODWORK IV. Junior year, fall term. Lecture, one hour; laboratory, four hours. Three credits. Professor Carlson, Mr. House, and Mr. Ball.

This is a combined course in bench and machine work in making some of the most common building details, such as porch newels and rails, plain and fancy molding, cornices, etc. The lecture work consists of a detailed study of the wood finishes, tools and machines used in building construction.

WOODWORK V. Elective, fall, winter and spring terms. Laboratory, four hours. Two credits. Mr. Parker and Mr. Ball.

This is a course suitable for teachers of woodworking for the grammar grades. Suitable exercises for pupils of the grammar grades will be made, together with the construction of models, showing progressive steps for class work. Library assignments and reports will be required, as well as a careful study of the tools and processes used for woodworking for these grades.

WOODWORK VI. Elective, fall, winter and spring terms. Laboratory, four hours. Two credits. Prerequisite: Woodwork V. Mr. Parker and Mr. Ball.

A course suitable for the teacher of woodworking for high schools, in which a number of the most important exercises in joinery are carried out with a study of their application, after which a series of articles in practical elementary cabinet construction is made, together with a study of the proper method of finishing same. A collection and study is made of the common varieties of wood. Library assignments and reports will be required on assigned subjects, bearing upon the work. A careful study will also be made of the methods of staining, filling, waxing, varnishing and rubbing the articles constructed. Considerable emphasis will be laid upon the proper use and care of tools and machines.

WOODWORK VII. Elective, fall, winter and spring terms. Laboratory, six hours. Three credits. Prerequisite: Woodwork VI. Professor Carlson and Mr. House.

In this course, a continuation of Woodwork VI, an opportunity is furnished for taking more advanced cabinet construction. The course includes the framing of a model of a cottage, the construction of windows and door frames or of inside finishing. Some practice also is given on the turning lathes. The students are required to draw up the floor plans for a shop, select the full equipment and arrange same to the best advantage, select and obtain prices on equipments and supplies, and outline the course for a year's work in a high school.

WOODWORK VIII. Elective, fall, winter, and spring terms. Laboratory, four hours. Two credits. Prerequisite: Woodwork VII. Professor Carlson and Mr. House.

This work is such as will give the student a thorough training in handling the lathe and turning tools. Those taking this work are expected to arrange their work so that a portion of the time can be devoted to assisting with the teaching of the more elementary classes in the wood shop. This experience will be found very valuable to those who have had no teaching experience. Assignments and reports are required.

PATTERN MAKING I. Sophomore year, fall and spring terms. Lectures, one hour; laboratory, four hours. Three credits. Prerequisite: Foundry Practice I. Professor Carlson, Mr. House, and Mr. Ball.

This course 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.

PATTERN MAKING II. Elective, fall, winter, and spring terms. Laboratory, four hours. Two credits. Prerequisite: Pattern Making I. Mr. House and Mr. Ball.

A continuation of Pattern Making I, where more advanced work is given, and includes match board work, pattern for molding machines, and general pattern work.

FOUNDRY PRACTICE I. Freshman year, fall, winter and spring terms. Lectures, one hour; laboratory, four hours. Three credits. Mr. Grant.

Practice is given in floor, bench and machine molding, in core making, and in casting in iron, copper, brass, and special alloys. A study is also made of modern foundry construction, equipment, materials and methods.

FOUNDRY PRACTICE II. Elective, fall, winter and spring terms. Laboratory, four hours. Two credits. Prerequisite: Foundry Practice I. Mr. Grant.

A continuation of Foundry Practice I, and includes green and dry sand and loam molding. A study will also be made of the different mixtures of iron, and in handling the cupola and brass furnace, and in difficult molding and core work.

MACHINE TOOL WORK I. Junior year, fall and spring terms. Laboratory, four hours. Two credits. Prerequisite: Forging II. Mr. Hayes and Mr. Yost.

Practice is given in chipping, filing, shaper and planer work, scraping, drilling, and turning on the lathe. Assignments and reports on subjects bearing upon the work. Tools required: A four-inch scale or (B. & S.) slide caliper, one pair five-inch outside calipers, one pair five-inch inside calipers, one center drill, one center gage (B. & S.).

MACHINE TOOL WORK II. Junior year, fall and spring terms. Laboratory, six hours. Three credits. Prerequisites: Machine Tool Work I. Mr. Hayes and Mr. Yost.

This course consists of progressive problems in turning and calipering, in boring, in reaming and taper turning and in threading on the lathe, exercises in chucking, the use of forming tools, and gear cutting. A study is made of cutting edges, and tool adjustments best suited to the different metals, and of cutting-speeds and feeds.

MACHINE TOOL WORK III. Junior year. Fall and spring terms. Lecture, one hour. Laboratory, four hours. Three credits. Prerequisite: Machine Tool Work II. Professor Carlson, Mr. Hayes, and Mr. Yost.

This course takes up work on the turret lathe, boring mill and grinder. Practical work is also given with the jigs and templets, and a study is made of the rapid production of duplicate parts, belts, lacings and methods of belt connections, compound and differential indexing.

FOR GRADUATES AND UNDERGRADUATES

FORGING III. Elective, fall and spring terms. Laboratory, four hours. Two credits. Prerequisite: Forging II. Mr. Lynch and Mr. Brown.

This is a very practical course in making forgings of various kinds, where emphasis is laid upon the quantity as well as the quality of the work done. Practice will be given in casehardening and in the heat treatment of metals.

FORGING IV. Elective, fall, winter and spring terms. Laboratory, four hours. Two credits. Prerequisite: Forging III. Professor Carlson, Mr. Lynch and Mr. Brown.

This is an advanced course in the brazing and welding of the various metals in the forge and by means of the oxyacetylene welding processes. Lectures are given along with the work, so that various operations and precautions which have to be taken in making melt welds are more readily understood. Library assignments and reports will be required upon subjects bearing upon the work.

FORGING V. Elective, fall, winter and spring terms. Laboratory, four hours. Two credits. Prerequisite: Forging IV. Mr. Lynch and Mr. Brown.

This course is a continuation of Forging IV with a study of the cost of operation, strength of welds, and practice in making different welds in cast iron, aluminum, steel and other metals. Some practice will also be given in the use of the Thermit process of welding.

FOUNDRY PRACTICE III. Elective, fall, winter and spring terms. Laboratory, four hours. Two credits. Prerequisite: Foundry Practice II. Professor Carlson and Mr. Grant.

A portion of this course will be a time study to determine the relative cost of molding by hand and on molding machines. Each student will be required to act as subforeman of the foundry and to successfully plan and carry through a run in iron, and to keep a complete record of same on blanks provided for this purpose. A study will be made of foundry costs and job systems and management, and written reports on assigned subjects will be required.

MACHINE TOOL WORK IV. Senior year, winter term. Laboratory, four hours. Two credits. Prerequisite: Machine Tool Work III. Professor Carlson, Mr. Hayes, and Mr. Yost.

The time of this course is devoted to the shop phases of efficiency engineering, including time studies and routing of materials. Complete machines and machine parts are constructed from drawings and blue prints. A study is made of the different machine tools from assigned catalogue work, with regard to the economical and efficient production of different classes of products.

MACHINE TOOL WORK V. Senior year, spring term. Laboratory, four hours. Two credits. Prerequisite: Machine Tool Work IV. Professor Carlson, Mr. Hayes, and Mr. Yost.

This course is devoted entirely to a systematic study of certain kinds of work in order to determine the various time elements that are required in the efficient production of standard machine parts which are being made in the shops. The stop watch and the cut meter are freely used. Reports are required on assigned subjects bearing upon the work.

MACHINE TOOL WORK VI. Elective, fall, winter and spring terms. Laboratory, supplemented by lectures, four hours. Two credits. Prerequisite: Machine Tool Work V. Mr. Hayes and Mr. Yost.

This is a continuation of Machine Tool Work V, with practice in the grinding of reamers, and milling cutters, and general tool work.

MACHINE TOOL WORK VII. Elective, fall, winter and spring terms. Laboratory work, four hours. Two credits. Prerequisite: Machine Tool Work VI. Professor Carlson, Mr. Hayes, and Mr. Yost.

A continuation of the previous term's work, with advanced work in tool making, in making punches and dies for presses, drop forging dies and general tool-making work. Reference work and written reports required.

MACHINE TOOL WORK VIII. Elective, fall, winter and spring terms. Laboratory, four hours. Two credits. Prerequisite: Machine Tool Work VII. Professor Carlson.

Special work for those who wish to secure a broader training in shop management. The student will be assigned to act in the capacity of subforeman, or of productive engineer, and will be required to plan certain work and see that it is properly and promptly carried out. Written reports on assigned subjects bearing on the work will be required.

MACHINE TOOL WORK IX. Elective, fall, winter and spring terms. Laboratory, four hours. Two credits. Prerequisite: Machine Tool Work VIII. Professor Carlson.

A continuation of the previous term's work, and in addition will be given certain executive and clerical duties under the direction of the shop superintendent. Written reports on assigned subjects.

MACHINE TOOL WORK X. Elective, fall, winter and spring terms. Laboratory, four hours. Two credits. Prerequisite: Machine Tool Work IX. Professor Carlson.

Special training in the duties of timekeeper, routing clerk, job clerk, and shop inspector. Assignments and reports.

The following work is offered for those students in the various College courses who wish to gain a knowledge of woodworking and of woodworking tools and machinery to develop the constructive side of their nature, or for those who are fitting themselves for teachers. Courses V, VI, VII and VIII are designed especially for teaching purposes.

FACTORY ENGINEERING. Senior year, winter term. Lectures and recitations, two hours. Two credits. Prerequisites: Applied Mechanics III; Business Organization. Professor Carlson.

This course considers the selection of a locality and sites 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.

FACTORY DESIGN. Senior year, spring term. Drafting-room work, four hours. Two credits. Prerequisite: Factory Engineering. Professor Carlson.

The knowledge gained in the shops and laboratories is applied to the design of a factory, shop or mill.

Steam and Gas Engineering

Professor POTTER
Assistant Professor SIMMERING
Instructor SANDERS
Assistant SHUTT
Assistant COLLINS
Assistant ———
Fellow BUCK

The object of the instruction in this department is to give to the student the fundamental principles underlying the design, construction, selection, operation and testing of steam boilers, steam engines, and steam turbines; gas producers; gas and petroleum engines; compressed-air and refrigerating machinery; condensers and evaporators. These subjects are developed by thorough courses in engineering thermodynamics and in steam and gas engineering, and are followed in the fourth year by courses in power-plant engineering, in refrigeration, and in heating and ventilation. The classroom instruction of every course consists of lectures and recitations, which are paralleled by work in the drafting room and laboratory, and supplemented by numerous practical problems, trade catalogues, notes, and inspection trips requiring written reports.

STEAM ENGINEERING LABORATORY

In addition to the equipment installed especially for experimental purposes, all the heating, 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 fire-tube boilers equipped with under-feed, chain-grate, and side-feed stokers; two high-pressure water-tube 250-horsepower boilers, one being equipped with a Roney stoker and the other for hand firing. Be-

sides the five-pressure boilers, there are eight low-pressure boilers equipped with under-feed stokers. All of these boilers have full equipment of auxiliaries and are provided with pyrometers, draft gauges, flue-gas samplers, and other instruments for research and laboratory work.

The steam engineering laboratory contains ten steam engines with different types of valve gears, including plain slide valves, balanced valves, double valves, piston valves, Corliss valves. These engines range in power from 6 to 250-horsepower. There are also three steam turbines equipped with surface condensers, dry vacuum pumps, wet vacuum pumps, and circulating pumps. A small compound reciprocating steam engine is also equipped so that it can be operated condensing or noncondensing. The engines in this laboratory are equipped with electric generators or with absorption brakes.

Two ammonia refrigerating machines are available only for laboratory work and a third refrigerating machine, which serves the College, is also used for tests and research in refrigeration. One of the laboratory refrigerating machines serves a thermal testing room, equipped for low temperature experiments.

The laboratory is also provided with various types of steam pumps, steam traps, steam and ammonia indicators, gauges, injectors, planimeters, pyrometers, and apparatus for testing gauges, indicators, and lubricants.

GAS ENGINEERING LABORATORY

The apparatus for gas engineering instruction and research includes a Smith suction gas producer which supplies gas to a 25-horsepower Foos gas engine. This gas engine is equipped with the necessary cylinder heads and other auxiliaries, so that it can be operated with producer gas, natural gas, water gas and with light and heavy liquid fuels. Besides the Foos experimental engine, the gas engine laboratory includes about thirty different sizes and makes of gas and oil engines, ten of which belong to the College and the others are loaned by manufacturers for teaching and for research work.

A complete compressed-air plant driven by an electric motor, and several fans, are available for experiments with air.

The gas engineering laboratory also includes several types of coal calorimeters, a Jenkins and a Sargent gas calorimeter, apparatus for approximate analysis of fuels, oil testing equipment, a bearing tester, several different types of pyrometers, a variety of gas engine indicators, Venturi and Pitot tubes.

The automobile equipment includes a gasoline auto-truck, a steam automobile, several types of automobile cylinders, differentials, transmissions, clutches, carburetors, magnetos, starting devices, and miscellaneous automobile parts.

TRACTION ENGINE LABORATORY

This laboratory is housed in a separate building and has at all times several different types of oil and steam traction engines, two belonging to the College and the others loaned by manufacturers. During the Col-

lege year 1915-1916 this laboratory had eighteen different types of traction engines for classroom use. The equipment of this laboratory includes recording and registering dynamometers, traction-engine test block and small instruments for traction-engine testing.

COURSES IN STEAM AND GAS ENGINEERING

FOR UNDERGRADUATES

STEAM AND GAS ENGINEERING I. Junior year, fall term. Lectures and recitations, four hours; laboratory two hours. Five credits. Prerequisite: Kinematics I. Assistant Professor Simmering.

A descriptive study of the various types of fire-tube and water-tube boilers, reciprocating steam engines and turbines, valve gears, governors, and the details of construction and operation. Texts, Peabody and Miller's *Steam Boilers;* Furman's *Valve Gears,* vol. I.

Laboratory.—This course includes the study and testing of gauges, indicators, simple steam engines, and steam-engine auxiliaries; valve setting and manipulation of steam engines; and oil analysis. Text: Carpenter and Diederichs' *Experimental Engineering* is used in this and subsequent laboratory courses. Assistant Professor Simmering and assistant.

STEAM AND GAS ENGINEERING II. Junior year, winter term. Lectures and recitations, three hours; laboratory, two hours. Four credits. Prerequisite: Steam and Gas Engineering I. Professor Potter, Assistant Professor Simmering.

This is a continuation of the work given under Steam and Gas Engineering I, also a study of the thermodynamics of gases and vapors. Texts, Furman's *Valve Gears,* vol. II; Ennis' *Applied Thermodynamics for Engineers.*

Laboratory.—Calibration and use of steam calorimeters, flue-gas analysis, tests of steam engines and steam turbines, manipulation and testing of gas and oil engines. Assistant Professor Simmering.

FARM MOTORS I. Junior year, winter term. Lectures and recitations, two hours; laboratory, four hours. Four credits. Mr. Shutt and Mr. Collins.

A descriptive study of steam engines, boilers, gas and oil engines, with special reference to their utilization on the farm. Text, Potter's *Farm Motors.*

Laboratory.—A study is made of the construction, manipulation and testing of various types of farm motors, including steam engines and boilers, gas and oil engines, water motors, and windmills. Mr. Shutt and Mr. Collins.

FARM MOTORS II. Junior year, spring term. Lectures and recitations, two hours; laboratory, two hours. Three credits. Prerequisite: Farm Motors I.

A continuation of the study of farm motors, including water motors, windmills, electric motors, and traction engines. Text, Potter's *Farm Motors.* Mr. Shutt and Mr. Collins.

Laboratory.—This is a continuation of the work given in Farm Motors I laboratory, including the operation of electric motors and traction engines. Mr. Shutt and Mr. Collins.

FARM MOTORS III. Senior year, fall term. Laboratory, six hours. Three credits. Prerequisite: Farm Motors II.

A study is made of the details of construction, operation and testing of the various types of steam and oil traction engines. The course also

comprises the operation and testing of steam and oil traction engines for belt work, road work, and field work. Mr. Sanders.

STEAM AND GAS ENGINEERING E-I. Senior year, fall term. Lectures and recitations, four hours; laboratory, two hours. Five credits. Prerequisites: Kinematics; Calculus III.

This is a descriptive study of steam engines, boilers and steam power-plant auxiliaries. The course includes a study of elementary thermodynamic principles of gases and vapors. Text, Allen and Bursley's *Heat Engines,* Marks and Davis's *Steam Tables.* Professor Potter and Assistant Professor Simmering.

Laboratory.—This course includes the testing of indicators, gauges, steam engines; the use of steam calorimeters and steam meters; valve setting and manipulation of steam engines. Assistant Professor Simmering and Mr. ———.

STEAM AND GAS ENGINEERING E-II. Senior year, winter term. Lectures and recitations, four hours; laboratory, two hours. Five credits. Prerequisite: Steam and Gas Engineering E-I.

Elementary thermodynamic principles applied to the study of the internal-combustion engine, and a descriptive study of gas engines, oil engines, and gas producers. Selections of prime movers for electric power plants, and the economics of the electric power-plant prime mover. Text, Levin's *Gas Engine.* Professor Potter and Professor Simmering.

Laboratory.—The course comprises manipulation and testing of gas and oil engines; engine-room and boiler-room practice; evaporation tests of steam boilers, steam-turbine tests. Assistant Professor Simmering and Mr. ———.

STEAM AND GAS ENGINEERING C. Senior year, fall term. Lectures and recitations, three hours; laboratory, two hours. Four credits. Prerequisite: Calculus III.

A descriptive study of steam boilers, steam engines, steam turbines, and gas and oil engines, including the various auxiliaries. Text, Allen and Bursley's *Heat Engines.* Professor Potter and Assistant Professor Simmering.

Laboratory.—This course includes the handling of steam and gas engines; boiler and engine-room practice; the use of steam calorimeters and indicators; simple tests on steam and gas engines. Assistant Professor Simmering.

DAIRY REFRIGERATION. Elective, spring term. Lectures and recitations, one hour; laboratory, four hours. Three credits. Assistant Professor Simmering.

This course deals with the various systems of refrigeration, ice-making, and cold storage, with special reference to dairy products.

FARM MOTORS A-I. Elective, fall or spring term. Lectures, one hour; laboratory, four hours. Three credits. Mr. Shutt and Mr. Collins.

This course is designed to teach the operation, care and repair of stationary steam, gas, and oil engines.

FARM MOTORS A-II. Elective, fall or spring term. Lectures, one hour; laboratory, four hours. Three credits. Prerequisite: Farm Motors IV. Mr. Sanders and Mr. Collins.

Details of steam engines, steam boilers, pumps and injectors. Operation and testing of stationary steam engines. This course includes a consideration of the selection, operation, repair and testing of steam and oil traction engines.

FARM MOTORS A-III. Elective, fall or spring term. Laboratory, six hours. Three credits. Prerequisite: Farm Motors A-II. Mr. Sanders.

This is a continuation of the work in Farm Motors A-II, including plowing, grading, and belt work with traction engines.

FOR GRADUATES AND UNDERGRADUATES

STEAM AND GAS ENGINEERING III. Junior year, spring term. Lectures and recitations, four hours; laboratory, two hours. Five credits. Prerequisite: Steam and Gas Engineering II; Calculus III.

This is a continuation of the study of engineering thermodynamics, including the application of the laws of gases and vapors to various thermodynamic cycles. Text, Ennis' *Applied Thermodynamics for Engineers.* Professor Potter and Assistant Professor Simmering.

Laboratory.—This course includes the thermal analysis of solid, liquid, and gaseous fuels; engine- and boiler-room practice; evaporative tests of steam boilers; complete tests of steam engines and steam turbines; A. S. M. E. codes. Assistant Professor Simmering and assistant.

STEAM AND GAS ENGINEERING IV. Senior year, fall term. Lectures and recitations, two hours; laboratory, four hours. Four credits. Prerequisite: Steam and Gas Engineering III.

This course includes a study of the steam engine and steam turbine, and also the various auxiliaries used in power plants. Also a study of the economics and finance of Steam Power Plant Engineering. Text, Gebhardt's Steam Power Plant Engineering. Professor Potter and Assistant Professor Simmering.

Laboratory.—This course includes the testing of compressed air machinery, fans and blowers; tests of refrigerating machinery; thermal tests of gas and oil engines, also tests of a suction gas producer. Professor Simmering and assistant.

POWER-PLANT ENGINEERING. Senior year, winter term. Lectures and recitations, two hours; laboratory and drafting-room work, four hours. Four credits. Prerequisites: Steam and Gas Engineering IV; Hydraulic Machinery. Professor Potter and Assistant Professor Simmering.

A study of complete power plants, including steam-electric, gas-electric, and hydro-electric power plants. The knowledge obtained through the study of the various prime movers and auxiliaries is applied to the complete power plant. Text, Gebhardt's *Steam Power Plant Engineering and Notes.*

Laboratory.—The laboratory work consists of tests of power plants and the drafting-room work will include the design of a complete power plant or some specific part of a power plant. In connection with the design work, the student makes a careful study of load conditions, location of plant, and other details.

HEATING AND VENTILATING. Senior year, spring term. Lectures and recitations, two hours; laboratory and drafting-room work, two hours. Three credits. Prerequisite: Steam and Gas Engineering IV. Assistant Professor Simmering.

This course is planned to acquaint the students with the fundamental principles of heating and ventilation, including direct and indirect systems, hot-water, hot-air and steam systems of heating; advantages of various heating systems. In the designing room, heat systems for dwellings, shops, power plants and schools are considered. Text, Hoffman's *Heating and Ventilation.*

REFRIGERATION. Senior year, spring term. Lectures and recitations, two hours; laboratory, two hours. Three credits. Prerequisite: Steam and Gas Engineering IV. Assistant Professor Simmering.

This is a study of the practical details of compression and absorption refrigerating systems, including auxiliaries, refrigerating mediums, insulation, and application of refrigeration to ice making, cold storage, and the cooling of air, liquids, and solids. Text, Macintire's *Refrigeration.*

FOR GRADUATES

ADVANCED ENGINEERING THERMODYNAMICS. Elective. Lectures and recitation, four hours. Four credits. Prerequisite: Steam and Gas Engineering IV. Professor Potter and Assistant Professor Simmering.

A study is made of the advanced phases of engineering thermodynamics, including research work along fundamental properties of gases and vapors. Reports are made of recent investigations upon thermodynamic lines.

Short Courses in Mechanic Arts

The following short courses are intended for men who wish to gain a practical knowledge of the work indicated. Each of the courses is ten weeks long, and is offered in the winter term.

SHORT COURSE IN STEAM AND GAS TRACTION ENGINES

This course is intended for those who have not the time or the means to take any of the regular technical engineering courses in the College, but who wish to obtain a practical working knowledge of stationary and traction steam and gas engines. The work of the course is shown in the following tabulation:

FIRST YEAR	SECOND YEAR
Steam Traction Engines 3 (1-4)	Gas Engines and Automobiles 4 (0-8)
Gas Engines and Gas Traction Engines 6 (2-8)	Gas Traction Engines II 4 (0-8)
Blacksmithing I 4 (0-8)	Machine Shop II 2 (0-4)
Machine Shop E-I 2 (0-4)	Blacksmithing II 2 (0-4)
Mechanical Drawing I 2 (0-4)	Mechanical Drawing II 2 (0-4)
Special Lectures 1 (1-0)	Electives 8 (-)
Electives 6 (-)	

SHORT COURSE IN SHOP WORK

This is a course designed for men who wish to gain a working knowledge of machines, tools, and methods which are used in the general repair shops. The subjects taught are shown below.

FIRST YEAR	SECOND YEAR
Blacksmithing I 4 (0-8)	Blacksmithing II 2 (0-4)
Foundry I 2 (0-4)	Foundry II 2 (0-4)
Machine Shop S-I 6 (0-12)	Machine Shop II 2 (0-4)
Carpentry and Turning 2 (0-4)	Pattern Work 2 (0-4)
Gas and Oil Engines 3 (1-4)	Gas Engines and Automobiles 4 (0-8)
Mechanical Drawing I 2 (0-4)	Mechanical Drawing II 2 (0-4)
Special Lectures 1 (1-0)	Electives 8 (-)
Electives 4 (-)	

SHORT COURSE IN CONCRETE CONSTRUCTION

This course is designed for builders and others wishing to gain a general practical knowledge of concrete construction. The subjects considered are as tabulated here.

Concrete Construction
6 (2-8)
Concrete Materials and Tests
2 (1-2)
Concrete Drawing and Design
2 (0-4)
Framing
3 (0-6)
Gas and Oil Engines
3 (1-4)
Mechanical Drawing I
2 (0-4)
Special Lectures
1 (1-0)
Electives
4 (-)

SHORT COURSE IN ROAD BUILDING, IRRIGATION AND DRAINAGE

This course, a tabulation of which is shown below, is designed for county engineers and surveyors.

Surveying
3 (1-4)
Highway Engineering
3 (3-0)
Irrigation and Drainage Engineering
3 (3-0)
Road Machinery and Materials
2 (0-4)
Bridge and Culvert Construction
6 (3-6)
Concrete Construction R
3 (1-4)
Specifications and Contracts
Road Laws and Administration
1 (1-0)
Mechanical Drawing I
2 (0-4)
Special Lectures
1 (1-0)

SUBJECTS TAUGHT IN THE MECHANIC ARTS SHORT COURSES

CONCRETE

CONCRETE CONSTRUCTION. Class work, two hours; laboratory, eight hours. Mr. Taylor.

Instruction in the selection of materials and proper proportions for different kinds of concrete construction, and in the essential principles of forming for and of mixing and placing concrete.

Laboratory work consists of practice in the making of a variety of concrete objects, as fence posts, building blocks, and other molded specimens, of concrete sidewalks, floors, water tanks, machine foundations, of stucco and plastered work, etc.

CONCRETE MATERIALS AND TESTS. Class work, one hour; laboratory, two hours. Mr. Taylor.

A study of properties and tests of cement, sands, gravels and broken

stone. Standard tests are made to determine the fineness, soundness and strength of cement, the percentage of voids and foreign matters in sand and stone, and the effect of variation in these properties upon the strength of concrete.

CONCRETE DRAWING AND DESIGN. Drafting-room practice, four hours. Mr. Bowerman and Mr. Taylor.

Exercises in drawing designed to teach the student to read simple working drawings and to enable him to make such drawings of simple proposed constructions, especially of concrete. Practice in the use of rules and tables to determine the size of beams, slabs and columns, and the amount of reinforcing required in the reinforced concrete.

SPECIAL LECTURES

SPECIAL LECTURES. One hour a week. These are given by the various heads of departments, and others, to acquaint students with the general trend of engineering and agriculture.

MECHANICAL DRAWING

MECHANICAL DRAWING I. Drafting-room practice, four hours. Mr. Bowerman and Mr. Taylor.

An elementary course in mechanical drawing, designed to teach students to read and interpret simple working drawings, and to make working drawings of simple objects or designs. Some attention is devoted to the use of the triangle, T-square, and drawing instruments, and to the principles of orthographic projection.

MECHANICAL DRAWING II. Drafting-room practice, four hours. Mr. Bowerman and Mr. Taylor.

A continuation of work of the preceding term with practice in the making of working sketches and drawings of simple machine parts from the objects.

ROAD BUILDING, IRRIGATION AND DRAINAGE

SURVEYING. Class work, one hour; field work, four hours. Mr. Frazier.

This is a brief course in the care and use of engineers' surveying instruments. The greater part of the time is devoted to exercises and practical problems involving the use of the transit and level.

HIGHWAY ENGINEERING. Class work, three hours. Professor Gearhart.

The work in the classroom is devoted to a study of the theory and practice of economic highway and pavement construction and maintenance, including a study of the needs of traffic, of its effect on the road surface, and of the materials of construction.

IRRIGATION AND DRAINAGE. Class work, three hours. Associate Professor Walker.

In this course 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.

BRIDGE AND CULVERT CONSTRUCTION. Class work, three hours; drafting room, six hours. Professor Conrad.

This is an elementary course in the design and construction of highway bridges and culverts.

SPECIFICATIONS AND CONTRACTS; ROAD LAWS AND ADMINISTRATION. Class work, one hour. Professor Gearhart.

A brief treatment of the road laws and administration in the various parts of the United States and Europe, dealing with specifications for

various types of highway construction and the fundamental considerations to be dealt with in the formation of contracts.

ROAD MACHINERY AND MATERIALS. Laboratory practice, four hours. Professor Conrad and Mr. Freeman.

A study of the use of various road-building machines and the testing of various road materials.

BLACKSMITHING I. Laboratory, eight hours. Mr. Lynch and Mr. Henry and assistants.

This is a course in iron and steel work designed to give the student a knowledge of the manufacture of iron and steel and the proper methods of handling it in the forge shop. Exercises are given in drawing, upsetting, bending, twisting, punching, welding in iron and machine steel, and also exercises in forging, hardening and tempering tool steel.

MACHINE SHOP I-S. Shop work supplemented by lectures, twelve hours a week. Mr. Hayes, Mr. Yost, Mr. Brown, and assistants.

A course in machine work to give a good working knowledge of a variety of machine operations such as chipping, filing, scraping, drilling, shaper and planer work, lathe work in cutting various threads, keyseating, soldering, brazing, babbitting, lacing belts, aligning shaftings and pulleys, cutting and threading pipe, and in making general repairs on a variety of machinery.

MACHINE SHOP I-E. Laboratory, four hours. Mr. Hayes, Mr. Yost, Mr. Brown, and assistants.

This course in machine work is to give the student practice in chipping, filing, drilling, babbitting, and adjusting bearings, and in making general repairs to machinery. Practice will also be given in cutting and fitting pipes, and in soldering and brazing, and in belt lacing.

FOUNDRY I. Laboratory, four hours. Mr. Grant, Mr. Swenson, and assistants.

This course consists of bench and floor molding, with a great variety of patterns, along with which the student gets experience with different kinds of sand and facings; also, open sand work, sweep molds, machine molding, core making, setting of cores, gates and risers, and different methods of venting, etc. The lectures consist of practical talks on the materials used in the foundry, the selection of sand, methods of venting, drying and handling of molds and cores, for the various classes of work; and discussion on the handling of the cupola, and the grading and the mixing of the irons suitable for different classes of work. Special emphasis in all cases is laid upon the practical side of the work.

CARPENTRY AND TURNING. Laboratory, four hours. Mr. House and Mr. Ball.

A course in elementary carpentry work to develop skill in the handling of tools, and to acquaint the student with the various woods and methods of finishing with shellac, varnishes, paints, oil and stains.

FRAMING. Laboratory, six hours. Mr. House and Mr. Ball.

A study of the fundamental factors to be taken into consideration in the construction of buildings, as the building site, laying out and squaring the foundation, excavating types of foundations, form building for concrete, anchoring, placing of sills, joists, bridging, studding, bracing, rafter cutting and fitting.

BLACKSMITHING II. Laboratory, four hours. Mr. Lynch and Mr. Henry.

A course for those who have had Blacksmithing I. The work consists of advanced forging in iron and steel, case-hardening, and of forging, hardening and tempering tools.

MACHINE SHOP II. Mr. Hayes and Mr. Yost.
In this course a variety of machine work is given to impart the principles of machine shop and repair work, and to develop accuracy in the handling of tools.

FOUNDRY II. Laboratory, four hours. Mr. Grand and Mr. Swenson.
This course consists of advanced work in setting up molds and in pouring iron, brass, copper, aluminum and bronze castings.

PATTERN WORK. Laboratory, four hours. Mr. House and Mr. Ball.
Practice is given in making patterns for various parts of machines to acquaint the student with the methods of pattern and core-box construction, and the allowances that have to be made for shrinkage, draft, warping and machining.

STATIONARY AND TRACTION STEAM AND GAS ENGINES

STEAM TRACTION ENGINES. Class work, one hour; laboratory, four hours. Mr. Shutt, Mr. Collins, and assistants.
A study of steam boilers and auxiliaries; types of boilers, grates for boilers, piping, pipe fittings, valves, putting in flues, steam gauges, pumps, injectors, firing, management of boilers; steam engines; valves and valve setting; engine auxiliaries; repairs, and care of steam engines; care and management of steam traction engines.

GAS ENGINES AND GAS TRACTION ENGINES. Class work, two hours; laboratory, eight hours. Mr. Sanders, Mr. Shutt, Mr. Collins, Mr. Buck, and assistants.
A study of gas and oil engines; four-stroke and two-stroke cycle engines, gas-engine fuels, carburetors, ignition systems; selection, erection, and care of gas engines; gas-engine repairs; gas traction engines.

GAS AND OIL ENGINES. Class work, one hour; laboratory, four hours. Mr. Shutt, Mr. Collins, and assistants.
A study of two-stroke and four-stroke cycle gas and oil engines; fuels; mechanical details. Selection and handling of gas and oil engines.

GAS ENGINES AND AUTOMOBILES. Laboratory, eight hours, four credits. Mr. Shutt, Mr. Collins, and assistants.
A detailed study of gas-engine operation and care, with special attention to ignition, carburetion, adjustment and repair. Automobile parts, including engines, differentials, transmissions, lubricating systems, clutches, systems of ignition, starters and carburetors.

TRACTION ENGINES II. Laboratory, eight hours, four credits. Mr. Sanders, Mr. Buck, and assistants.
Operation, care and testing of various types of steam and oil-traction engines, including details of construction, belt tests and road tests.

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 free-hand and object drawing especially designed to assist teachers in the use of the state text in drawing. Mechanical drawing and manual-training drawing are also taught.

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.

Division of Home Economics

MARY PIERCE VAN ZILE, *Dean*

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 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 skillful labor gives dignity to life, grace, refinement, and self-poise are the highest requisites for 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.

The work in home economics includes:

A four-year course, leading to degree of bachelor of science.

A three-year course in the School of Agriculture.

A six-months housekeepers' course, for which a certificate of proficiency is granted.

A one-year course in lunchroom management, for which a certificate 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, 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 junior and senior years opportunity is given for choice of electives, which makes it possible for students 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 credits, while the numerals in parentheses indicate the number of hours a week of recitation and of laboratory, respectively.

FRESHMAN

FALL	WINTER	SPRING
English I 4 (4-0)	English II 4 (4-0)	College Rhetoric I 4 (4-0)
Chemistry H I 5 (3-4)	Chemistry H II 5 (3-4)	Chemistry H III 4 (2-4)
Household Physics 4 (4-0)	Home Problems 4 (3-2) *or* Food Preparation 4 (2-4)	Costume Design 4 (1-6)
Domestic Art I 2 (0-4)	Domestic Art II 2 (0-4)	Library Methods 2 (2-0)
Object Drawing 2 (0-4)	Color and Design 3 (0-6)	Current History 1 (1-0)
Survey of Home Economics 1 (1-0)		Ornamental Gardening I 1 (0-2)
Physical Training (0-3)	Physical Training (0-3)	Physical Training (0-3)

SOPHOMORE

Organic Chemistry H 6 (4-4)	Household Microbiology I 4 (2-4)	Household Microbiology II 4 (2-4)
Elementary German I 4 (4-0)	Elementary German II 4 (4-0)	German Readings 4 (4-0)
General Zoölogy I 4 (2-4)	General Zoölogy II 4 (2-4)	Embryology 4 (2-4)
Kitchen Gardening 2 (2-0)	Foods I 4 (2-4)	Foods II 4 (2-4)
Drafting and Pattern Making 2 (0-4)	Dressmaking 2 (0-4)	Ornamental Gardening II 2 (2-0)
Physical Training* (0-3) *or*	Physical Training* (0-3) *or*	Physical Training* (0-3) *or*
Music	Music	Music.

JUNIOR

College Rhetoric II 4 (4-0)	English Literature I 4 (4-0)	English Literature II 4 (4-0)
Human Physiology 4 (4-0)	Household Chemistry 4 (1-6)	Textiles 2 (2-0)
		Chemistry of Textiles 2 (0-4)
Foods III 4 (3-2)	Human Nutrition 4 (4-0)	Dietetics I 4 (2-4)
Advanced Dressmaking 2 (0-4)	Millinery 2 (0-4)	History of Costume 2 (2-0)
Psychology *or* Elective 4 (4-0)	Elective 4 (-)	Elective *or* Psychology 4 (4-0)

SENIOR

American Government 4 (4-0)	American History I 4 (4-0)	Home Nursing 4 (4-0)
Dietetics II 2 (1-2)	Home Architecture 4 (0-8)	Home Decoration 4 (0-8)
Marketing and Serving 2 (0-4)	Household Entomology 2 (2-0)	Household Administration 2 (2-0)
Economics 4 (4-0)		
Sanitation and Public Health 2 (2-0)		
Elective 4 (-)	Elective 8 (-)	Elective 8 (-)

* Physical Training is required during the sophomore year for the young women who, in the judgment of the College physician and the Dean of Women, are in such condition of health as to require a second year's work in the physical-training department.

Electives—Course in Home Economics

FALL	WINTER	SPRING
Institutional Cookery 4 (1-9)	Institutional Management 4 (4-0)	Cafeteria Service 2 (0-6)
Fancy Cookery 2 (0-4)	Dietetics Seminar 2 (2-0)	Modern Problems of the Household 2 (2-0)
	Problems in Child Welfare 4 (4-0)	Experimental Baking H 4 (1-6)
Tailoring 4 (0-8)	Fine Needlework 4 (0-8)	Art Needlework 4 (0-8)
	Art Appreciation 4 (4-0)	Technique of Domestic Art 2 (2-0)
Inorganic Chemistry I 3 (3-0)	Inorganic Chemistry II 3 (3-0)	Inorganic Chemistry III 3 (3-0)
Organic Chemistry I 5 (3-4)	Organic Chemistry II 5 (3-4)	Organic Chemistry III 5 (3-4)
Physiological Chemistry I 4 (2-4)	Physiological Chemistry II 4 (2-4)	Physiological Chemistry III 4 (2-4)
German Comedies 4 (4-0)	German Prose I 4 (4-0)	German Prose II *or* Teachers' German 4 (4-0)
German Short Stories 4 (4-0)	German Historical Prose 4 (4-0)	German Classics 4 (4-0)
Advanced Zoölogy I 4 (2-4)	Advanced Zoölogy II 4 (2-4)	Advanced Zoölogy III 4 (2-4)
Parasitology 3 (2-2)	Evolution of Domestic Animals 1 (1-0)	Economic Zoölogy 4 (2-4)
	Home Dairying 2 (2-4) ½ term	
	Home Poultrying 2 (4-0) ½ term	
Studies in Oratory 4 (4-0)	The English Drama 4 (4-0) *or*	American Literature 4 (4-0) *or*
	The English Novel 4 (4-0)	Nineteenth Cent. Literature 4 (4-0)
Bible English 4 (4-0)	Farm and Home English 4 (4-0)	Business English 4 (4-0)
Farm Advertising 4 (4-0)	Farm Stories 4 (4-0)	Farm Bulletins 4 (4-0)
		Applications 1 (1-0)
Oral English I 4 (4-0)	Oral English II 4 (4-0)	The Short Story 4 (4-0)
English Survey I 4 (4-0)	English Survey II 4 (4-0)	English Survey III 4 (4-0)
French History 4 (4-0)	Ancient History 4 (4-0)	English History 4 (4-0)
Teachers' Course in History 4 (4-0)	Modern Europe 4 (4-0)	American History II 4 (4-0)
Principles of Sociology 4 (4-0)	Business Organization 2 (2-0)	Money and Banking 2 (2-0)
	Labor Problems 2 (2-0)	Public Finance 2 (2-0)
Extempore Speech I 2 (2-0)	Extempore Speech II 2 (2-0)	
Public School Music 2 (-)	Public School Music 2 (-)	Public School Music 2 (-)
Voice 2 (2-0)	Voice 2 (2-0)	Voice 2 (2-0)
Piano 2 (2-0)	Piano 2 (2-0)	Piano 2 (2-0)
Violin 2 (2-0)	Violin 2 (2-0)	Violin 2 (2-0)
History of Music 1 (1-0)	History of Music 1 (1-0)	History of Music 1 (1-0)
Harmony 2 (2-0)	Harmony 2 (2-0)	Harmony 2 (2-0)
School Administration 4 (4-0)	History of Education 4 (4-0)	Principles of Education 4 (4-0)
Home Economics Education 4 (4-0)	Rural Education 4 (4-0)	Educational Psychology 4 (4-0)
Practice Teaching HE 3 (1-4)	Educational Surveys (-)	Educational Seminar (-)

NOTE.—Students intending to teach should elect the educational subjects listed above.

Domestic Art

Professor BIRDSALL
Assistant Professor COWLES
Instructor FECHT
Instructor JONES
Instructor FEWELL
Instructor BUXTON
Assistant FRENCH
Assistant HARRISON
Assistant HUNT
Assistant PALMER
Assistant JONES
Assistant QUINE*

The object of the instruction in domestic art is to give young women a practical knowledge of the selection of materials; the growing of textile fibers, and the processes used in their manufacture into fabrics. The course also offers instruction in hand and machine sewing; principles of drafting and designing patterns; dressmaking, tailoring, millinery, costume design, art needlework, history of costume and textiles, together with courses in education which teach how these subjects should be presented to the various grades of schools in relation to other work. The student furnishes all her materials.

COURSES IN DOMESTIC ART

FOR UNDERGRADUATES

DOMESTIC ART I. Freshman year, fall term. Laboratory, four hours. Two credits. Required in course in home economics; elective in course in general science. Miss Palmer, Miss Harrison, and Miss Jones.

This course includes practice in hand sewing, the fundamental stitches being applied to simple articles; patching and darning; use of the sewing machine; the making of kimona, gown and corset cover. Notebook work is an important part of the course.

DOMESTIC ART I*a*. Freshman year, fall term. Laboratory, four hours. Two credits. Required in the course in home economics as a substitution for Domestic Art I for students who have had sewing in high school. Elective in the courses in general science and industrial journalism. Miss Jones and Miss Palmer.

This course consists of a brief review of foundation work both in hand and machine sewing. The principles are then applied to various useful articles and garments bringing in more advanced work than Domestic Art I.

DOMESTIC ART II. Freshman year, winter term. Laboratory, four hours. Two credits. Required in the course in home economics; elective in the course in general science. Prerequisite: Domestic Art I or Domestic Art I*a*. Assistant Professor Cowles, Miss Fecht, and Miss French.

In this course machine sewing is continued, making undergarments and a shirt waist, the patterns for which are drafted by the straight-line system. The appropriate materials and trimming for these garments are discussed.

COSTUME DESIGN. Freshman year, spring term. Class work, one hour; laboratory, six hours. Four credits. Required in the course in home economics; elective in the course in general science. Prerequisite: Color and Design. Miss Hunt.

* Resigned.

This course includes a study of the principles of design, color harmony, and the application of art in dress; original problems and their direct application to designs for textiles, embroideries and costumes; costumes in pencil, pen, ink and water color; costumes for reproduction in materials in direct relation to dressmaking.

DRAFTING AND PATTERN MAKING. Sophomore year, fall term. Laboratory, four hours. Two credits. Required in the course in home economics. Elective in the course in general science. Prerequisites: Domestic Art I and Domestic Art II. Assistant Professor Cowles, Miss Fecht, and Miss Fewell.

This course begins with modeling in crinoline, establishing the principal lines for measurements and developing an appreciation of the relation of the lines of patterns to different forms. This is followed by practice in taking measures, drafting foundation patterns by the straight-line system and making variations of all kinds from these. Emphasis is laid upon the development of one pattern from another and of the complex design from the simple. Designs are worked out upon the paper patterns and upon forms without the use of patterns, using cheesecloth or other soft materials for draping. Notebook work is required.

DRESSMAKING. Sophomore year, winter term. Laboratory, four hours. Two credits. Prerequisites: Costume Design, Drafting and Pattern Making. Miss French, Miss Harrison, and Miss Palmer.

This course includes practice in adapting patterns in making a cloth dress and a fancy waist.

ADVANCED DRESSMAKING. Junior year, fall term. Laboratory, four hours. Two credits. Required in the course in home economics. Prerequisite: Dressmaking. Miss Fewell and Miss Harrison.

This course emphasizes the artistic in line and decoration; presents the use of commercial patterns; includes practice in cutting, fitting, finishing and draping of such materials as silks, satins, chiffons and laces.

MILLINERY. Junior year, winter term. Laboratory, four hours. Two credits. Required in the course in home economics; elective in the course in general science. Prerequisites: Domestic Art I (or I*a*) and II. Professor Birdsall and Miss Palmer.

This course includes practical and artistic principles of millinery; preparing various materials for trimmings; practice in making bows, rosettes, and other forms of hat decoration; making wire and buckram frames; use of velvet, silk and straw; renovating, and use of old materials.

TEXTILES. Junior year, spring term. Class work, two hours. Two credits. Required in the course in home economics. Prerequisite: Organic Chemistry. Miss Fecht.

This course considers the textile industry, from primitive ages to modern times. The original purpose of the industry, that of furnishing covering for the body, and the later variations from this exclusive purpose are treated, together with their effect on the composition and design of fabrics. The combination of art, science and mechanics that makes possible the elaborateness of modern textiles is given careful attention. Miss Fecht.

Laboratory. See Textile Chemistry, Department of Chemistry.

HISTORY OF COSTUME. Junor year, spring term. Class work, two hours. Two credits. Required in the course in home economics. Miss Fewell.

This course includes a survey of ancient Egyptian, Grecian, Roman, early and modern French costumes. Its aim is to give the student in-

formation regarding these different periods; comparisons are held regarding the adaptation to present fashions.

FOR GRADUATES AND UNDERGRADUATES

TAILORING. Elective, fall term. Laboratory, eight hours. Four credits. Elective in the course in home economics. Prerequisite: Advanced Dressmaking. Professor Birdsall.

This course includes discussions of materials suitable for tailored suits; sponging, cutting, fitting and finishing a coat and skirt.

FINE NEEDLEWORK. Elective, winter term. Laboratory, eight hours. Four credits. Elective in the course in home economics. Miss Jones.

This course is designed to give instruction in needlework applied to hand-made garments, which include a lingerie waist, children's and infants' clothing.

ART NEEDLEWORK. Elective, spring term. Laboratory, eight hours. Four credits. Elective in the course in home economics. Professor Birdsall.

This course includes the following: stitches in crochet, knitting, cross-stitch, French embroidery, Roman cut work; their application to undergarments, waists, collars, and household linens.

TECHNIQUE OF DOMESTIC ART. Elective, spring term. Class work, two hours. Two credits. Elective in the course in home economics. Professor Birdsall.

This course is especially recommended to graduate students or those who are preparing to teach domestic art. The course deals with organization, equipment, maintenance, and demonstration, and a general review of the fundamental principles of Domestic Art.

Domestic Science

Professor HAGGART
Assistant Professor TREAT
Instructor RIGNEY
Instructor COX
Instructor DAVIS
Instructor SKINNER
Instructor SHEETS
Instructor KENNEDY
Assistant MCCLURG
Assistant BARTHOLOMEW
Assistant CAPE

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

FOR UNDERGRADUATES

FOOD PREPARATION. Freshman year, winter term. Class work, two hours; laboratory, four hours. Four credits. Required in the course in home economics for students who have not had a course in foods in high school. Elective for young women in the courses in general science and industrial journalism. Misses Cox, McClurg, Bartholomew, and Cape.

This course is intended as a survey to cover the work given in high schools. It includes the study of food principles in relation to their composition, sources, and value in the body. Attention is also given to the problem of marketing. It is planned to give the technique of the use of the laboratory and the handling of materials so as to give the student preparation for the more scientific study of foods.

Laboratory. Principles underlying the cookery of food are illustrated in the preparation of representative foods.

ADVANCED COOKERY. Laboratory, four hours. No credit. Elective in course in home economics, but required of all students whose work in food laboratory is unsatisfactory. Prerequisite: Food Preparation, or food work in high school. Miss ———.

Laboratory.—This course is planned to meet the needs of young women lacking technical skill in the preparation of food. The course will be an intensive application of the principles illustrated in the cookery of a great variety of foods.

HOME PROBLEMS. Freshman year, winter term. Class work, three hours; laboratory, two hours. Four credits. Required in the course in home economics, as a substitute for food preparation, for students who have studied foods in high school. Elective for students in the courses in general science and industrial journalism. Miss Cox and Miss Bartholomew.

This course provides instruction and practice in the processes essential to the care of the house. Among the subjects studied are cleaning processes, the laundry, marketing, choice and care of utensils, the organization for work, and the social life of the home.

Laboratory. Principles underlying methods of doing the work of the household are illustrated by demonstration and experimental work with cleaning agents, etc.

FOODS I. Sophomore year, winter term. Class work, two hours; laboratory, four hours. Four credits. Required in the course in home economics; elective for young women in the courses in general science and industrial journalism. Prerequisite: Organic Chemistry. Microbiology I to accompany this subject. Misses Davis, Cox, McClurg, and Cape.

This course includes a study of food in regard to classification, composition, occurrence, general properties, adulterations, and the effect of application of heat to the various food principles. Food values in relation to cost are emphasized. This term's work includes a study of typical carbohydrate foods and fats. Lectures are given and reference work is required.

Laboratory. Experimental cookery. This is an experimental study of carbohydrates and fats, the knowledge that is gained being applied to the preparation of foods.

FOODS II. Sophomore year, spring term. Class work, two hours; laboratory, four hours. Four credits. Required in the course in home economics; elective for young women in the courses in general science and industrial journalism. Prerequisite: Foods I. Misses Davis, Cox, McClurg, and Cape.

This study is a continuation of Foods I and includes a study of typical proteins, processes of milling, and the use of leavening agents.

Laboratory. Experimental cookery continued, studying the typical proteins and leavening agents.

FOODS III. Junior year, fall term. Class work, three hours; laboratory, two hours. Four credits. Required in the course in home economics; elective for young women in the courses in general science and industrial journalism. Misses Davis, Cox, McClurg, and Cape.

This course is a continuation of Foods I and II. Doughs and batter mixtures together with the preservation of food are the subjects studied.

Laboratory. Experimental cookery continued, studying the use of flours in bread making, and the preservation of fruits and vegetables.

MARKETING AND SERVING. Senior year, fall term. Laboratory, four hours. Two credits. Required in the course in home economics. Elective for young women in the courses in general science and industrial journalism. Prerequisite: Dietetics I. Miss Cox.

This course gives an opportunity for practice in home cookery. It includes the planning, preparation and serving of meals based upon dietetic and economic standards.

INSTITUTIONAL COOKERY. Elective, fall term. Class work, one hour; laboratory, six hours. Four credits. Prerequisite: Foods III. Elective in course in home economics. Assistant Professor Treat.

This course is a study of preparation of foods in large quantities, together with the cost of materials and the cost of service.

Laboratory. Preparation of food in quantities for institutional use, and practical experience in the cafeteria of the department.

CAFETERIA PRACTICE. Laboratory, six hours. Two credits. Elective in course in home economics. Prerequisite: Institutional Cookery. Hours to be arranged with cafeteria director. Assistant Professor Treat.

Experience is given in the service of food, in checking, and in general management.

FANCY COOKERY. Senior year, fall term. Laboratory, four hours. Two credits. Elective in the course in home economics. Prerequisite: Foods III. Miss Rigney and Miss Cox.

This course applies the principles taught in Foods I, II, and III to fancy dishes and gives practice to further develop skill in manipulation.

FOR GRADUATES AND UNDERGRADUATES

DIETETICS I. Junior year, spring term. Class work, two hours; laboratory, four hours. Four credits. Required in the course in home economics. Prerequisites: Foods I, II, and III, and Human Nutrition. Miss Sheets and Miss Cape.

This course is an application of the principles of human nutrition as applied to the feeding of individuals under physiological and economic conditions. Lectures are given and reference work is required.

Laboratory. Planning and serving of dietaries under the various physiological and economic conditions furnish the work in the laboratory.

DIETETICS II. Senior year, fall term. Class work, one hour; laboratory, two hours. Two credits. Required in the course in home economics. Prerequisite: Dietetics I. Miss Sheets and Miss Cape.

This course comprises a study of food for the infant and growing child, applying the principles of nutrition.

Laboratory. Practice in the computing, preparation, and serving of dietaries suitable for infants and young children.

SANITATION AND PUBLIC HEALTH. Senior year, fall term. Class work, two hours. Two credits. Required in the course in home economics. Miss Kennedy.

This course includes a study of conditions which determine the healthfulness of the house and the application of principles of sanitation to its care. Public health movements in relation to the home are investigated and relation of home sanitation to the community emphasized. Lectures are given and reference work is required. Prerequisites: Household Microbiology I and II.

HOUSEHOLD ADMINISTRATION. Senior year, spring year. Class work, two hours. Two credits. Required in the course in home economics. Miss Bartholomew.

This course has been arranged for the purpose of providing instruction in the problems and technical procedures of the modern household. Such topics as the following are discussed, both from the ideal and practical standpoint: the organization of the household; the choice of a home and its furnishings; income as determining the type of a household; the budget and its apportionment; household accounts; household service; apportionment of time; motion studies as applied to household activities; home life and its standards. There are lectures and class discussions, and reference work is required.

PROBLEMS IN CHILD WELFARE. Elective, winter term. Class work, four hours. Four credits. Elective in the course in home economics. Prerequisites: Physiology, and Psychology. Dean Van Zile.

A study of the rational care of the child, and of the principles of child welfare. It includes the factors that influence physical fitness, the daily routine of the infant, and the constructive and preventive measures in physical and mental development of the child.

HOME NURSING. Senior year, spring term. Class work, four hours. Four credits. Required in the course in home economics. Miss Rigney and Miss Kennedy.

This course includes the home care of the sick, first-aid treatment, and the prevention of disease.

DIETETICS SEMINAR. Elective, winter term. Class work, two hours. Two credits. Prerequisite: Dietetics I and II. Elective in course in home economics. Professor Haggart.

The purpose of this course is to familiarize the student with current literature of nutrition and recent discoveries in that field.

INSTITUTIONAL MANAGEMENT. Elective, spring term. Class work, four hours. Four credits. Elective in the courses in home economics, general science, and industrial journalism. Prerequisite: Institutional Cookery. Assistant Professor Treat and Miss Kennedy.

This course includes the study of the various types of institutions, their aim, support, control, needs, equipment and methods of purchasing supplies, together with the study of the essential characteristics, preparation and duties of the manager. Lectures are given, followed by discussions. Reference and observation work is required.

MODERN PROBLEMS OF THE HOUSEHOLD. Elective, spring term. Class work, two hours. Two credits. Prerequisites: Economics, and Household Administration. Elective in course in home economics. Professor Haggart.

Research work in modern problems of industrial and sociological conditions which affect the household.

NOTE.—During laboratory periods all students will be required to wear a uniform apron, which may be obtained upon enrollment. Students are asked to come prepared to wear wash waists or wash dresses in the laboratory. Students are requested not to wear jewelry except a simple pin and watch during laboratory hours.

Home Art

Instructor HOLMAN, in Charge
Assistant AVERILL

Taste is cultivated through the impressions received in everyday surroundings and not through the occasional visits to art galleries. We are not so sensitive to discords in color and line as we are discords in sound because we have not trained our eyes as we have our ear. "The study of design furnishes a means of exercising and thus developing good taste in connection with the things which make up the environment of everyday life and of awakening appreciation in nature and in art." Home decoration is a study of the factors which produce beautiful surroundings that make for enjoyment and peace.

FOR UNDERGRADUATES

COLOR AND DESIGN. Freshman year, winter term. Studio work, six hours. Three credits. Required in the course in home economics. Prerequisite: Object Drawing.

A study of the principles which control the use of color and the selection and arrangement of elements in the production of objects. Many exercises are given in which objects of clothing and home furnishings are scored as to design. A natural motif is adapted to shape, material and function.

COLOR AND DESIGN *a*. Freshman year, winter term. Studio work, six hours. Three credits. Required in the course in home economics, as a substitute for Color and Design, for students who have had color and design work in high school. Prerequisite: Object Drawing.

A further study is made of harmonies, adaptation of natural motifs, and designs as applied to fabrics. Art objects and articles of common use are studied according to principles of composition.

FOR GRADUATES AND UNDERGRADUATES

HOME DECORATION. Senior year, spring term. Studio work, eight hours. Four credits. Required in the course in home economics. Prerequisite: Color and Design.

This is a study of color, form, and arrangement of home furnishings. Wall coverings, carpets, pictures, furniture, etc., are discussed and studied so that the student may recognize and appreciate what is appropriate and beautiful.

HOME DECORATION *a*. Senior year, spring term. Studio work, eight hours. Four credits. Required in the course in home economics, as a substitute for Home Decoration, for students who have had home decoration in high school. Prerequisite: Color and Design.

This course embraces advance work in color, form, and arrangement of house furnishing materials. A study is made of fine arts, of handicrafts, and of the history of furnishings. Problems in spacing and coloring of side walls are discussed and developed in water color and decorating materials.

ART APPRECIATION. Elective, winter or spring term. Class work, four hours. Four credits. Elective in home economics and general science. Prerequisite: Home Decoration.

The study of art as controlled by different types of activity, religious, social and political. A comparison made of art as expressed by different people in modeling, weaving, carving, painting and building. Some masterpieces in both fine and applied art studied in detail.

Home Economics

Dean VAN ZILE
Professor HAGGART
Assistant Professor HALM

THE SURVEY OF HOME ECONOMICS. Freshman year, fall term. Class work, one hour. One credit. Required in the course in home economics. Dean Van Zile.

This course deals with the problem on the development of education for women, the place of home economics training, different phases of the work, the practical and educational purposes in its teaching, and the study of the different vocations in the field of home economics.

HOME ECONOMICS EDUCATION. Junior and senior years; fall, winter, and spring terms.

This includes two courses: Methods of Teaching Home Economics, and Practice Teaching. (See Department of Education.)

EXTENSION COURSES IN HOME ECONOMICS. Senior year, spring term. Class work, one hour; laboratory, six hours. Four credits. Elective in the course in home economics. Professor Haggart and Miss Jones.

This course is designed to give the necessary preparation to students who desire to do home economics extension work. The lecture period will be devoted to a discussion of the field of work, comprising the extension worker, the various phases of extension work, and the methods and means employed in it.

Laboratory.—The laboratory period will be used by the students in giving practical demonstrations of the principles evolved from the lecture work and will consist of lectures and demonstrations before varied audiences.

Housekeepers' Course in Home Economics

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 young women 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

Young women 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 credits, while the numerals in parentheses indicate the number of hours a week of recitation and of laboratory, respectively.

FALL	WINTER
Cookery I 4 (0-8)	Cookery II 6 (0-12)
Sewing 4 (0-8)	Home Nursing 2 (2-0)
Color and Design 3 (0-6)	Dressmaking 4 (0-8)
Hygiene and Social Problems 1 (1-0)	Floriculture 2 (2-0)

NOTE.—Young women registered in the Housekeepers' Course are required, during the fall and winter terms, to elect one additional subject selected from the College courses or from the courses in the School of Agriculture. It is hoped that many of these young women will remain in College during the spring term and take a full assignment of subjects. Before being assigned to any subject other than those listed in the Housekeepers' Course the student must present satisfactory evidence that she is qualified to carry such work successfully.

REQUIRED SUBJECTS IN HOUSEKEEPERS' COURSE

COOKERY I. Fall term. Laboratory, eight hours.

A laboratory course. Stoves, stove construction, stove management, and fuels are the first topics considered, and this discussion is followed by experiments illustrating the effect of heat upon starch and proteins. The necessary elementary principles involved are then applied to the cooking of cereals, vegetables, beverages, breads, meats, soups, simple cake mixtures and puddings, and to the canning and preserving of fruits and vegetables.

SEWING. Fall term. Laboratory, eight hours.

This is a course in hand and machine sewing. The fundamental stitches are applied to simple articles and to patching and darning. Practice is given in the use of the sewing machine and in the drafting of patterns by the straight-line system. Suitable materials and trimmings are discussed and a set of undergarments and a shirt waist are made. A note-book is required.

COLOR AND DESIGN. Fall term. Laboratory, six hours.

This is a course in simple designing and in studying color relations, with special reference to problems in the home.

COOKING II. Winter term. Laboratory, twelve hours.

The work of this course is divided into three parts. Four weeks are given to home cookery, four weeks to general care of the home, and the remaining four to the planning and the serving of meals.

HOME NURSING. Winter term. Class work, 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.

DRESSMAKING. Winter term. Laboratory, eight hours.

This course includes practice in the following: Adaptation of patterns, cutting, fitting, and making a cloth dress and fancy waist. The student furnishes all her material.

FLORICULTURE. Winter term. Class work, two hours.

Lectures in the classroom 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.

HYGIENE AND SOCIAL PROBLEMS. Fall term. Class work, one hour.

This is a lecture course covering the subjects that have a direct bearing upon the health of a young woman student. It also includes a discussion of the social hygiene problems of young women.

One-year Course in Lunch-room Management

It is the purpose of this course to offer training to mature women, who are fitted by education and ability to carry on some form of lunch-room management. The positions open to such women will be *commercial* ones only, as the department reserves the right to recommend only the members of the College institutional classes for positions in educational institutions and hospitals.

The positions open to women who complete this one-year course will be in cafeterias, tea rooms, and other commercial establishments which serve food.

This course covers one year, and certificates will be granted on the successful completion of the work.

REQUIREMENTS FOR ADMISSION

The course is open to women twenty-five years of age or older. Applications for entrance must be made in writing and applicants will be chosen by the faculty of the department according to training and ability. The number in the class is limited to twenty, in order to give each member the personal training necessary. At the close of the fall term, those who possess qualifications peculiarly adapted for the work of lunch-room management, will be selected to continue the course.

HOW TO APPLY FOR ENTRANCE

A student desiring admission to this course, is asked to write a letter, giving her general qualifications and training. The Department of Domestic Science will then send a blank form to be filled out and returned. After consideration by the faculty of the department, the candidates for this course will be chosen and notified before July 15, 1916.

Each student enrolling in this course is required to furnish herself with three gingham dresses and six white aprons. (Samples of goods and patterns may be obtained from the department.) Students are required to wear this uniform, as personal neatness counts for much in this work.

LUNCH-ROOM MANAGERS' COURSE

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

FALL	WINTER	SPRING
Principles of Cookery 4 (0-12)	Institutional Cookery 5 (0-15)	Tea Room Cookery 3 (0-9)
Food Production and Marketing 4 (4-0)	Accounting 2 (2-0)	Lunch Room Management 2 (2-0)
Business English LR 4 (4-0)	Lunch Room Decoration 2 (0-4)	
Cafeteria Practice LR-I 2 (0-6)	Cafeteria Practice LR-II 5 (0-15)	Tea Room Service *or* Cafeteria Practice LR-III 6 (0-18)
Sanitation and Hygiene 2 (2-0)		Meal Planning 2 (2-0)
		Lunch Room Promotion 2 (2-0)

REQUIRED SUBJECTS IN LUNCH-ROOM MANAGEMENT COURSE

PRINCIPLES OF COOKERY. Fall term. Laboratory, twelve hours.

The purpose of this course is to teach the principles of cookery by means of the preparation of different foods. In the laboratory a standard system of measurement is taught, and special attention is given to training in accuracy, neatness, and economy in handling utensils and materials. Standard servings and the cost of prepared foods are carefully estimated.

FOOD PRODUCTION AND MARKETING. Fall term. Class work, four hours.

This course covers the main points in source, production, and manufacture of foods. Special stress is laid on marketing and buying for the lunch room. Food values are emphasized.

SANITATION AND HYGIENE. Fall term. Class work, two hours.

This course covers the sanitary control of eating houses and food supply, together with the personal hygiene of the worker.

CAFETERIA PRACTICE LR-I, LR-II, AND LR-III. Fall, winter, and spring terms, respectively. Laboratory: six, fifteen, and eight hours, respectively.

This course is planned that the student may become thoroughly familiar with the cafeteria. Experience is obtained in the care, use, and management of equipment and later general experience is had in serving, checking, and other details.

BUSINESS ENGLISH LR. Fall term. Class work and practice, four hours. Four credits. Required in the special lunch-room management course in the Division of Home Economics. Assistant Professor Boot.

This course is designed to meet the needs of those who are especially preparing themselves to manage lunch rooms. Essential forms of business correspondence, contract forms, the best forms of making and displaying notices and posters, the best current literature in home economics, and well-directed cultural reading are given their proper emphasis in the course.

INSTITUTIONAL COOKERY. Winter term. Laboratory, fifteen hours.

This course applies the principles of cookery to the preparation of large quantities of food for use in the cafeteria. The course is given in the kitchen laboratory of the cafeteria.

LUNCH-ROOM DECORATION. Winter term. Laboratory, four hours.

Color, form, and arrangement as applied to wall and floor coverings, furniture, linen, china, and silver, are taken up.

ACCOUNTING. Winter term. Class work, two hours. This is a course in the elements of bookkeeping and of business practice as applied to the accounts of lunch rooms, tea rooms, and cafeterias.

TEA-ROOM COOKERY. Spring term. Laboratory, nine hours.

This course applies the principles of cookery to the preparation of foods adapted for the tea room. Fancy cookery is emphasized.

TEA-ROOM SERVICE. Spring term. Laboratory, eighteen hours.

During the spring term the students carry on a tea room in the dining room of the department. So far as it is practicable, students are given an opportunity to do catering. Careful attention is given to service and cost of maintenance.

LUNCH-ROOM MANAGEMENT. Spring term. Class work, two hours.

The course covers the field of organization, equipment, service, and general management of lunch rooms.

MEAL PLANNING. Spring term. Class work, two hours.

The planning of meals according to dietary standards is taught in this course. Practice is given in planning menus for cafeterias and tea rooms.

LUNCH-ROOM PROMOTION. Spring term. Class work, two hours. Two credits. Required in the course in lunch-room management. Professor Crawford.

The purpose of the course is to show the practical application of the principles of advertising and publicity to the enterprises treated in the course in lunch-room management. The several kinds of advertising are taken up in their relation to the line of business which the students plan to enter. The principles of typographical design as adapted to menu cards and other necessary printed material receive careful attention.

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 present 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 are 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

JULIUS TERRASS WILLARD, *Dean*

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 basic, 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 includes fundamental training in English, mathematics, science, history, economics, military science, and physical training 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 needs 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 satisfac-

tion 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, agriculture, 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 basic 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, approved by the Faculty or by the dean of the Division of General Science. Not fewer than ninety credit units are to be chosen 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 several groups of three or more full studies or their equivalent. It is possible to include some single subjects that may be advantageously taken without others. Special combinations in sewing, cooking, and shop work have been planned to meet the needs of prospective teachers of manual training. Students changing from other courses to the course in general science receive credit for work done in the other courses in so far as it may be fitted into the general plan of this one.

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 course in industrial journalism endeavors to give young men and women training which will enable them to write both truthfully and effectively, particularly upon industrial subjects. To such subjects the modern newspaper and the general magazine are giving constantly more attention, while there are also 1200 agricultural publications and a slightly greater number of class and trade publications which are largely or exclusively concerned with matter relating to industrial life. The training given by the College has enabled a goodly number of alumni to do successful work upon these publications.

The aim of the course is to present such subjects as will enable the writer to see his work in proper perspective, to obtain authoritative knowledge of some field of industrial activity, and to write acceptably. The course consequently offers in the first place fundamental studies of literary, social, and scientific character. Because of the materials with which journalism deals, it is highly desirable that the student obtain a clear knowledge of the social sciences and be able to read at least one current foreign language. Every student in the course is strongly urged to elect two years of German and also work selected from the fields of history, economics, sociology, and education. In the second place, the student is expected to elect subjects in agriculture, mechanic arts, general science, or home economics, depending on what portion of the field of industrial journalism he desires to enter, it being expected that every student graduated from the course shall have special knowledge of some prominent line of industry. In the third place, the theory and practice of journalism is presented in a series of courses extending throughout the junior and senior years, and opportunity is offered for taking additional electives in journalism simultaneously with the required courses.

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, are yet to come, and one who can write truthfully and attractively 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 credits, while the numerals in parentheses indicate the number of hours a week of recitation and of laboratory, respectively.

FRESHMAN

FALL	WINTER	SPRING
English I 4 (4-0)	English II 4 (4-0)	College Rhetoric I 4 (4-0)
Chemistry I 4 (3-2)	Chemistry II 4 (2-4)	Chemistry III 4 (3-2)
Plane Trigonometry 4 (4-0)	College Algebra 4 (4-0)	Public Speaking 2 (2-0)
General Botany 5 (3-4)	Plant Anatomy 5 (3-4)	Plant Physiology I 4 (2-4)
		Ink Rendering I 2 (0-4)
	Current History 1 (1-0)	Library Methods 2 (2-0)
Military Science* *or* Physical Training† (0-3)	Military Science* *or* Physical Training† (0-3)	Military Science* *or* Physical Training† (0-3)

SOPHOMORE

College Rhetoric II 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)	General Physics III 4 (3-2)
Qualitative Analysis 4 (2-4)	Organic Chemistry 4 (4-0)	English History 4 (4-0)
General Zoölogy I 4 (2-4)	General Zoölogy II 4 (2-4)	Embryology 4 (2-4)
Ink Rendering II 2 (0-4)	Elective 2 (-)	Extempore Speech I 2 (2-0)
Military Science* *or* Physical Training† *or* Music† (0-3)	Military Science* *or* Physical Training† *or* Music† (0-3)	Military Science* *or* Physical Training† *or* Music† (0-3)

JUNIOR

Psychology 4 (4-0)	Economics 4 (4-0)	American Government 4 (4-0)
Electives§ 14 (-)	Electives§ 14 (-)	Electives§ 14 (-)

SENIOR

American History I 4 (4-0)	Electives§ 18 (-)	Electives§ 18 (-)
Electives§ 14 (-)		

* For young men.

† For young women.

§ Electives are to be chosen by groups, and in combinations approved by the Faculty or the dean of the Division of General Science.

Elective Groups—Course in General Science

FALL	WINTER	SPRING
	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)
German Short Stories 4 (4-0)	German Historical Prose 4 (4-0)	German Classics 4 (4-0)
	Scientific German I 4 (4-0)	Scientific German II 4 (4-0)
	3	
Calculus I 4 (4-0)	Calculus II 4 (4-0)	Calculus III 4 (4-0)
	4	
Radiant Energy 4 (3-2)	Physical Measurements 4 (2-4)	Physical Manipulations 4 (2-4)
	5	
Inorganic Chemistry I 3 (3-0)	Inorganic Chemistry II 3 (3-0)	Inorganic Chemistry III 3 (3-0)
	6	
Organic Chemistry I 5 (3-4)	Organic Chemistry II 5 (3-4)	Organic Chemistry III 5 (3-4)
	7	
Physiological Chemistry I 4 (2-4)	Physiological Chemistry II 4 (2-4)	Physiological Chemistry III 4 (2-4)
	8	
Advanced Zoölogy I 4 (2-4)	Advanced Zoölogy II 4 (2-4)	Advanced Zoölogy III 4 (2-4)
	9	
Plant Pathology I 4 (2-4)	Plant Pathology II 4 (2-4)	Plant Pathology III 3 (0-6)
		Taxonomic Botany 4 (1-6)
	10	
Economic Botany 4 (2-4)	Plant Genetics I 4 (2-4)	Plant Physiology II 4 (2-4)
Plant Genetics II 4 (3-2)	Plant Genetics III 4 (3-2)	Plant Genetics IV 4 (3-2)
	Evolution of Plants 4 (4-0)	Mathematics of Biology 4 (4-0)
	11	
General Entomology 4 (3-2)	Taxonomy of Insects I 4 (1-6)	Gen. Economic Entomology 4 (3-2)
	12	
Plant Pathology I 4 (2-4)	Parasitology 3 (2-2)	Economic Zoölogy 4 (2-4)
	13	
Plant Pathology I 4 (2-4)	Dairy Bacteriology 4 (2-4)	Hygienic Bacteriology 4 (2-4)
		Poultry Bacteriology 4 (2-4)
	14	
Soil Microbiology 4 (2-4)	Serum Therapy 4 (3-2)	Water Purification and Sewage Disposal 4 (1-6)
	15	
Human Physiology 4 (4-0)	Household Microbiology I 4 (2-4)	Household Microbiology II 4 (2-4)

ELECTIVE GROUPS—COURSE IN GENERAL SCIENCE—*continued*

FALL	WINTER	SPRING
	16	
	Food Preparation 4 (2-4)	
	Foods I 4 (2-4)	Foods II 4 (2-4)
Foods III 4 (3-2)	Human Nutrition 4 (4-0)	Dietetics I 4 (2-4)
Dietetics II 2 (1-2)		
	17	
Domestic Art I 2 (0-4)	Domestic Art II 2 (0-4)	Costume Design 4 (1-6)
Drafting and Pattern Making 2 (0-4)	Color and Design 3 (0-6)	Textiles 2 (2-0)
Advanced Dressmaking 2 (0-4)	Dressmaking 2 (0-4)	Chemistry of Textiles 2 (0-4)
	18	
History of Education 4 (4-0)	Rural Education 4 (4-0)	School Administration 4 (4-0)
Principles of Education 4 (4-0)	Agricultural Education *or* Home Economics, Education *or* Industrial Education 4 (4-0)	Educational Psychology 4 (4-0)
		Educational Surveys (-)
	19	
Market Types and Classes of Stock 4 (1-6)	Breeding Types and Classes of Stock 4 (1-6)	Elements of Dairying 4 (2-4)
Cereal Crop Production 5 (3-4)	Forage Crops 4 (3-2)	Farm Machinery I 4 (2-4)
	20	
Farm Poultry Production 3 (2-2)	Farm Forestry 4 (3-2)	Plant Propagation 4 (3-2)
General Geology 4 (4-0)	Plant Genetics I 4 (2-4)	Forage Crop Improvement 4 (2-4)
Agricultural Chemistry 2 (2-0)	Soils 5 (3-4)	Landscape Gardening 4 (2-4)
	21	
Woodwork V 2 (0-4)	Woodwork VI 2 (0-4)	Woodwork VII 3 (0-6)
Woodwork VIII 2 (0-4)	Pattern Making 3 (1-4)	Foundry Practice I 3 (1-4)
Forging 3 (1-4)		
	22	
Engineering Physics I 5 (3-4)	Engineering Physics II 5 (3-4)	Engineering Physics III 5 (3-4)
Forging II 3 (1-4)	Forging III 2 (0-4)	Forging IV 2 (0-4)
Machine Tool Work I 2 (0-4)	Machine Tool Work II 2 (0-4)	Machine Tool Work III 3 (1-4)
	23	
Rhetoric of Oratory 4 (4-0)	American Literature *or* Nineteenth Century Literature 4 (4-0)	The English Drama *or* The English Novel 4 (4-0)
		Literature and Labor 4 (4-0)
	24	
Sociology 4 (4-0)	Business Organization 2 (2-0)	Money and Banking 2 (2-0)
	Labor Problems 2 (2-0)	Public Finance 2 (2-0)
	Coöperative Marketing 4 (4-0)	

ELECTIVE GROUPS—COURSE IN GENERAL SCIENCE—*continued*

25

Two private lessons per week in Voice or some approved instrument. Two credit units per term.

Harmony I, II and III. Two credit units each.

26

Two private lessons per week in Voice or some approved instrument. Two credit units per term.

Harmony IV, V and VI. Two credit units each.

Additional work in music may also be elected.

FALL	WINTER	SPRING
	27	
French History 4 (4-0)	Modern Europe 4 (4-0)	American History II 4 (4-0)
Teachers' Course in History 4 (4-0)	International Law 2 (2-0)	European Industrial History 4 (4-0)
	Business Law 2 (2-0)	Ancient History 4 (4-0)
	Farm Law 2 (2-0)	Kansas History 2 (2-0)
	28	
Principles of Sociology 4 (4-0)	Business Law 2 (2-0)	American Literature 4 (4-0)
	International Law 2 (2-0)	
	29	
General Entomology 4 (3-2)	General Bacteriology 4 (2-4)	Human Physiology 4 (4-0)
	30	
Elementary Journalism 2 (2-0)	Industrial Writing 2 (2-0)	Copy Reading 2 (2-0)
Journalism Practice I 2 (0-4)	Journalism Practice II 2 (0-4)	Journalism Practice III 2 (0-4)
	31	
Editorial Practice 2 (2-0)	The Economics of Journalism 2 (2-0)	The Ethics of Journalism 2 (2-0)
Journalism Practice IV 2 (0-4)	Journalism Practice V 2 (0-4)	Journalism Practice VI 2 (0-4)
	32	
Ink Rendering 2 (0-4)	Color Rendering 2 (0-4)	Linear Perspective 2 (0-4)
	33	
General Bacteriology 4 (4-0)	Histology I 4 (2-4)	Histology II 4 (2-4)
Histology III 4 (2-4)	Comp. Physiology I 7 (5-4)	Comp. Physiology II 7 (5-4)
Pathology I 7 (5-4)	Pathology II 7 (4-6)	Pathology III 7 (4-6)
Anatomy I 6½ (2-9)		
	34	
Principles of Sociology 4 (4-0)	Rural Sociology 4 (4-0)	Educational Surveys 2 (2-0)
	35	
Argumentation and Debate 4 (4-0)	English Practice 4 (4-0)	Applied English 4 (4-0)
	36	
Bible English 4 (4-0)	Farm and Home English 4 (4-0)	Business English 4 (4-0)
	37	
Farm Advertising 4 (4-0)	Farm Stories 4 (4-0)	Farm Bulletins 4 (4-0)

ELECTIVE GROUPS—COURSE IN GENERAL SCIENCE—*continued*

FALL	WINTER	SPRING
	38	
Industrial Chemistry I 6 (3-6)	Industrial Chemistry II 6 (3-6)	Industrial Chemistry III 6 (3-6)
	39	
Plane Analytical Geometry 4 (4-0)	Calculus 4 (4-0)	Teachers' Course in Mathematics 4 (4-0)
	40	
Oral English I 4 (4-0)	Oral English II 4 (4-0)	The Short Story 4 (4-0)
	41	
English Survey I 4 (4-0)	English Survey II 4 (4-0)	English Survey III 4 (4-0)
	42	
Magazine Features 2 (2-0)	The Materials of Journalism 2 (2-0)	Journalism Surveys 2 (0-4)
	The History of Journalism 2 (2-0)	
	43	
Military Engineering I 3 (1-4)	Military Engineering II 3 (1-4)	Military Engineering III 3 (1-4)
Small-arms Firing Regulations, and Infantry Drill Regulations 1 (0-2)	Field Service Regulations and Guard Manual 1 (0-2)	First Aid, Personal Hygiene and Camp Sanitation 1 (0-2)
	44	
Commercial Grain and Grain Inspection 4 (3-2)	Grain Products 4 (3-2)	Experimental Milling 2 (0-4)
Advanced Experimental Milling 4 (0-8)	Wheat and Flour Testing 4 (1-6)	Experimental Baking A 4 (0-8)
		Milling Practice 4 (0-8)

The following subjects and others may be elected independently of other members of groups if prerequisites have been taken:

General Entomology 4 (3-2)	General Bacteriology 4 (2-4)	Human Physiology 4 (4-0)
General Bacteriology 4 (2-4)	Rural Sociology 4 (4-0)	General Geology 4 (4-0)
Principles of Sociology 4 (4-0)	Rural Education 4 (4-0)	American Literature 4 (4-0)
Modern Europe 4 (4-0)		American History II 4 (4-0)
Photography 3 (2-2)		German Classics 4 (4-0)
		Applications 1 (1-0)

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 Analytical Geometry.
Chemistry and Mathematics—1, 2, 3, 5, 6, 7, and Analytical Geometry.
Chemistry and Domestic Science—1, 2, 5, 6, 7, 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—Analytical Geometry, 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, 23, 25, 26, and two groups Mathematics or Science.

Students expecting to teach should take group 18.

Course in Industrial Journalism

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

FRESHMAN

FALL	WINTER	SPRING
English I 4 (4-0)	English II 4 (4-0)	College Rhetoric I 4 (4-0)
Chemistry I 4 (3-2)	Chemistry II 4 (2-4)	Chemistry III 4 (3-2)
Library Methods 2 (2-0)	Public Speaking 2 (2-0)	English History 4 (4-0)
Composition J-I 2 (0-4)	Composition J-II 2 (0-4)	Extempore Speech 2 (2-0)
Object Drawing 2 (0-4)	Geometrical Drawing 2 (0-4)	
Electives§ 4 (-)	Electives§ 4 (-)	Electives§ 4 (-)
Military Science* *or* Physical Training† (0-3)	Military Science* *or* Physical Training† (0-3)	Military Science* *or* Physical Training† (0-3)

SOPHOMORE

College Rhetoric II 4 (4-0)	English Literature I 4 (4-0)	English Literature II 4 (4-0)
General Zoölogy I 4 (2-4)	General Zoölogy II 4 (2-4)	General Bacteriology 4 (2-4)
	Modern Europe 4 (4-0)	Economics 4 (4-0)
Electives§ 8 (-)	Electives§ 6 (-)	Electives§ 6 (-)
Military Science* *or* Physical Training† *or* Music† (0-3)	Military Science* *or* Physical Training† *or* Music† (0-3)	Military Science* *or* Physical Training† *or* Music† (0-3)

JUNIOR

Elementary Journalism 2 (2-0)	Industrial Writing 2 (2-0)	Copy Reading 2 (2-0)
Journalism Practice I 2 (0-4)	Journalism Practice II 2 (0-4)	Journalism Practice III 2 (0-4)
American Government 4 (4-0)	American History I 4 (4-0)	American History II 4 (4-0)
Electives§ 10 (-)	Electives§ 10 (-)	Electives§ 10 (-)

SENIOR

Editorial Practice 2 (2-0)	The Economics of Journalism 2 (2-0)	The Ethics of Journalism 2 (2-0)
Journalism Practice IV 2 (0-4)	Journalism Practice V 2 (0-4)	Journalism Practice VI 2 (0-4)
Principles of Sociology 4 (4-0)	Business Organization 2 (2-0)	
Electives§ 10 (-)	Electives§ 12 (-)	Electives§ 14 (-)

* For young men.

† For young women.

§ The electives of this course are to be chosen in groups adapted to imparting added proficiency in selected lines of journalistic activity, especially those of agriculture, home economics, mechanic arts and applied science. Some of the possibilities are included in the list of elective groups available for students in the course in general science; others may be arranged by conference with the dean of the division. The electives for the freshman and sophomore years must usually be chosen from freshman and sophomore subjects offered in other courses.

Bacteriology

Professor BUSHNELL
Assistant Professor HUNTER
Instructor JACKLEY
Instructor GAINEY
Assistant GLASGOW
Assistant PEISER
Fellow FREY

The Department of Bacteriology occupies a part of the first and second floors of Veterinary Hall. 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 synopsis 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 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 graduate work, the department offers excellent facilities.

Bacteriology is presented to the students 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 better understanding of cells in the aggregate. The second point of view from which this subject is approached is that of its practical application in agriculture, medicine, domestic science, and sanitary engineering.

COURSES IN BACTERIOLOGY

FOR UNDERGRADUATES

GENERAL BACTERIOLOGY. Sophomore or junior year, fall, winter, and spring terms. Lectures, two hours; laboratory, four hours. Four credits. Required in the courses in agriculture and industrial journalism; elective in the course in general science. Prerequisite: Elementary Organic Chemistry. Professor Bushnell and Mr. Peiser.

This general introductory course consists of lectures, recitations, and demonstrations, covering the morphological and biological characters, the classification and the distribution of bacteria; factors necessary for the development of bacteria, culture media, cultural features, staining values, and fundamental principles of applied bacteriology.

Laboratory.—The student prepares culture media and becomes familiar with principles of sterilization and incubation, and with general laboratory technique. During the last half of the term, organisms representing the different families and genera of Migula's classification are studied microscopical and culturally. Also preliminary quantitative and qualitative examinations are made of milk, water, soil, etc.

PATHOGENIC BACTERIOLOGY I. Sophomore year, winter term. Lectures, two hours; laboratory, four hours. Four credits. Required in the course

in veterinary medicine. Prerequisite: Elementary Organic Chemistry. Doctor Jackley.

This is primarily a general introductory course, consisting of lectures, demonstrations and recitations covering the distribution, the morphological and biochemical features of microörganisms; factors necessary for the development and cultivation of bacteria and the fundamental principles of the science as applied to veterinary medicine.

Laboratory.—The student first becomes acquainted with the general laboratory technique, comprising the preparation of media, methods of sterilization, incubation, inoculation, plating, isolating, and staining of bacteria. Different cultures of microörganisms are studied morphologically, culturally and biochemically. A quantitative and qualitative examination of different food substances is made at the latter part of the term.

SANITARY BIOLOGY. Sophomore year, spring term. Lectures, two hours; laboratory, four hours. Four credits. Required in the course in civil engineering; optional in the courses in agricultural engineering and architecture. Prerequisite: Chemistry III. Assistant Professor Hunter.

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; to the interpretation of the results of quantitative and qualitative bacteriological examinations of water; to the significance of the presence of various bacterial species in drinking water; to water-borne diseases and microörganisms involved; to typhoid-fever epidemics; to the bacteriology of sewage effluents and to methods of water purification and sewage disposal.

Laboratory.—During the first few weeks of the term the student acquires a working knowledge of bacteriological technique. The latter part of the 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.

HOUSEHOLD MICROBIOLOGY I. Sophomore year, winter term. Lectures, two hours; laboratory, four hours. Four credits. Required in the course in home economics; elective in the course in general science. Prerequisite: Elementary Organic Chemistry. Professor Bushnell and Miss Glasgow.

This course consists of lectures, recitations and demonstrations relating to the classification, distribution, and the relative importance of bacteria. The morphological and biochemical characters of microörganisms are considered, together with a study of those factors necessary for the proper development of bacteria, and the fundamental principles of the science as applied to household economics.

Laboratory.—General laboratory technique is first taken up, consisting of preparation of media, methods and principles of sterilization, incubation, introduction, plating, isolation and staining of microörganisms. Studies consisting of the morphological, cultural and biochemical characteristics of different organisms are made, which upon completion is followed by a quantitative and qualitative examination of water and milk.

FOR GRADUATES AND UNDERGRADUATES

PATHOGENIC BACTERIOLOGY II. Junior year, winter term. Lectures, two hours; laboratory, four hours. Four credits. Required in the course in veterinary medicine. Prerequisite: Pathogenic Bacteriology I. Doctor Jackley.

A study is made 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 nature of infectious diseases; antitoxins,

vaccines, and specific treatments; epizoötic and epidemic diseases of unknown etiology are further treated.

Laboratory.—A study is made of the microscopical and cultural character of pathogenic microörganisms; of laboratory animal inoculations, autopsy, and diagnosis; of 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.

HOUSEHOLD MICROBIOLOGY II. Sophomore year, spring term. Lectures, two hours; laboratory, four hours. Four credits. Required in the course in home economics; elective in the course in general science. Prerequisite: Household Microbiology I. Professor Bushnell and Miss Glasgow.

This course is designed to give the student a more thorough knowledge of those microörganisms of importance in the household. The significance of microbial findings in the analysis of water, milk, and foods, also consideration of the conditions which tend to increase or decrease the bacterial content of food substances are studied in detail. Some time is given to the principles of sanitation as applied to public health problems. The class work is a more theoretical consideration of the problems undertaken in the laboratory.

Laboratory.—A study of microörganisms and their activities, both beneficial and harmful, in their relation to household economy, bacteriological study of water, milk, and foods; the determination of the potability of water; milk contamination, the effect of cooling upon the bacterial content of milk, pasteurization of milk, etc.; microscopical study of yeasts and molds; the spoilage of canned vegetables and fruits; methods of food preservation; the manufacture of vinegar; study of activities of various species of microörganisms, thermal death point, the germicidal action of various disinfectants, etc., are taken up in the laboratory work. Printed laboratory directions are furnished.

SERUM THERAPY. Junior year, spring term. Lectures, three hours; laboratory, two hours. Four credits. Required in the course in veterinary science; elective in the course in general science. Prerequisite: Pathogenic Bacteriology II or Hygienic Bacteriology. Doctor Jackley.

A detailed study is made 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; of susceptibility, immunity, and infection; of theories of immunity; of anaphylaxis, opsonins, precipitins, bacteriolysins, and agglutinins.

Laboratory.—Experimental production of opsonins, antitoxins, agglutinins, precipitins, and cytolysins; experiments showing the constitutions 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; the identification of animal and vegetable proteins; complement fixation tests for glanders, opsonic technique, etc., comprises the laboratory work.

SOIL MICROBIOLOGY. Elective, fall term. Lectures, two hours; laboratory, four hours. Four credits. Prerequisite: General Bacteriology. Mr. Gainey.

This is an introductory course covering the principles of soil microbiology as defined at the present time, and fitting the student for independent research on microbial investigations of soil, including the influence of microbial flora, of depth and character of soil, temperature, moisture, chemical reaction, aëration, and other factors; activities of soil microörganisms, ammonification, nitrification, denitrification, sym-

biotic and nonsymbiotic nitrogen fixation. Various texts are recommended as reference books.

Laboratory.—The laboratory work comprises the preparation of various special culture media and reagents necessary to conduct bacteriological analyses of the soil; qualitative analysis and the laboratory study of ammonification, nitrification, denitrification, symbiotic and nonsymbiotic nitrogen fixation; plot 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.

HYGIENIC BACTERIOLOGY. Elective, spring term. Lectures, two hours; laboratory, four hours. Four credits. Prerequisite: General Bacteriology or Household Microbiology I. Professor Bushnell and Miss Glasgow.

Pathogenic bacteria, especially those related to diseases of man; channels of infestion, 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, are studied. Various books are recommended as textbooks.

Laboratory. The laboratory work comprises microscopical and cultural study of pathogenic bacteria; technique involved in the diagnosis of bacterium tuberculosis in sputum; the culture of pathogenic anaërobic bacteria; the isolation and identification of pathogenic bacteria from animal tissues, from pus and exudates; bacteriological examination of air, water, milk, sewage; interpretation of results, etc.

DAIRY BACTERIOLOGY. Elective, winter term. Lectures, two hours; laboratory, four hours. Four credits. Prerequisite: General Bacteriology. Assistant Professor Hunter and Mr. Peiser.

Consideration is given to the bacterial flora of milk, butter, and cheese; to infectious diseases conveyed through dairy products; to bacterial contamination of milk by air, water, utensils, etc.; to normal and abnormal fermentations in milk, their significance and control.

Laboratory. The preparation of culture media necessary for dairy bacteriological work; milk contamination; 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 are taken up in the laboratory work. Various texts are recommended as reference books.

POULTRY BACTERIOLOGY. Elective, spring term. Lectures, two hours; laboratory, four hours. Four credits. Prerequisite: General Bacteriology. Doctor Jackley.

Consideration is given to the various microbial diseases of poultry; etiology, sources and modes of infection; prevention and cure; to the microbial content of freshly laid eggs, cold-storage eggs, and egg products, with conditions tending toward increase or decrease of this microbial content.

Laboratory. Microörganisms pathogenic for poultry; artificial production, diagnosis and control of poultry diseases; microbial content of eggs and egg preparation produced and handled under various conditions, form the subject matter of the laboratory work. Laboratory directions are furnished.

WATER PURIFICATION AND SEWAGE DISPOSAL. Elective, spring term. Lectures, one hour; laboratory, six hours. Four credits. Prerequisite: General Bacteriology. Assistant Professor Hunter.

The course comprises a study of the bacterial content of natural waters; of factors influencing the bacterial flora of the water; of bacterial indicators of pollution; of the collection and transportation of water samples; of methods of water purification and sewage disposal; of the application of water sanitation to rural homes and municipalities.

Laboratory. The laboratory work consists of 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.

FOR GRADUATES

RESEARCH BACTERIOLOGY. Elective, fall, winter, and spring terms. Credit to be arranged. Prerequisite: The student must have credit in at least two of the outlined courses offered by the department.

Advanced students showing sufficient training, ability and interest in original research may be admitted to this course, upon approval of the head of the department. The student will be under the direct supervision of a Faculty member of the department and in consultation with him the subject for investigation shall be chosen and outlined.

Botany

Professor ROBERTS
Assistant Professor DAVIS
Assistant Professor MILLER
Instructor MELCHERS
Instructor HOAR
Assistant POOLE
Assistant SCHMIDT

The instruction given in the Department of Botany has a threefold purpose:

First, general training in botany as an observational science, familiarizing the students 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. Four distinct general lines of work in botany are being conducted in the Experiment Station: Experimental plant breeding; the investigation, prevention and control of plant diseases; physiological investigations in drouth resistance; 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 forty 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, Bausch & Lomb and Spencer camera lucidas, a Zeiss drawing table, two Zeiss binocular microscopes, 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, Spencer 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.

A special laboratory is equipped for advanced work in plant genetics, and is provided with 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, a Lovibond improved colorimeter, an Egli calculating machine, a comptograph adding machine, a Corelli polar planimeter, specific-gravity apparatus, numerous balances, the usual glassware, etc.

A seed laboratory and herbarium is equipped with a Zeiss binocular and other microscopes, and accessory apparatus, as well as with the standard Kny-Scherer apparatus for testing the purity and vitality of seeds.

For investigations in plant physiology and plant pathology in the Experiment Station, a large laboratory is equipped with apparatus for studying normal and abnormal conditions in plants. The apparatus used for making determinations of fungous and bacterial diseases of plants, and for the study of the life histories of pathogenic organisms, consists in part as follows: two compound microscopes, a Bausch & Lomb binocular monobjective compound miscroscope, analytical balances, drying ovens, hot-air sterilizers, steam autoclav, steam still, transfer chambers for isolating organisms, pathological tables, research desks, a large supply of glassware for culturing fungi, a soil and air thermograph, a herbarium containing the various genera and species of fungi, and a large and representative collection of specimens illustrating the economic plant diseases.

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

FOR UNDERGRADUATES

GENERAL BOTANY. Freshman year, fall term. Class work, three hours; laboratory, four hours. Five credits. Required in the courses in agriculture and general science. Text to be selected. Professor Roberts, Assistant Professor Davis, Mr. Hoar, and Mr. Poole.

This is a general introduction to botany. A careful study is made of the morphology of the chief great groups of plants, of their elementary physiology and ecology, of the classification and geographic distribution of the plant kingdom, and its economic relation to man. Text, *Nature and Development of Plants*, by C. C. Curtis.

Laboratory.—The aim of the laboratory work in this course is to give as thorough a study as may be of the morphology of the chief important groups in the plant kingdom, taken in the order of their relative complexity, and of their probable relations to one another as parts of an evolutionary series. An excellent and very complete series of prepared slides is of assistance in this work. Laboratory outlines are furnished by the department.

PLANT ANATOMY. Freshman year, winter term. Class work, three hours; laboratory, four hours. Five credits. Required in the courses in agriculture and general science. Prerequisite: General Botany. Professor Roberts, Assistant Professor Davis, Mr. Hoar, and Mr. Poole.

This course comprises a detailed study of the anatomical structure of the organs and tissues of the higher plants, with especial reference to their origin and mode of development.

Laboratory.—The laboratory work consists of a microscopic study of the development of the growing plant, of the origin and differentiation of leaf, stem and root organs, and the development of the flower and the seed. A study is also made of the development of internal tissue systems, such as the vascular bundles, latex vessels, resin ducts, etc.; of the protective system of bark and cortex, and of auxiliary tissues, such as sclerenchyma or hard bast fibers, as in flax, hemp, etc. The purpose of the course is to familiarize the student thoroughly with the anatomical and structural characters of the seed plants from the developmental standpoint. Laboratory outlines are furnished by the department. Prerequisite: Laboratory work in General Botany.

PLANT PHYSIOLOGY I. Freshman year, spring term. Class work, two hours; laboratory, four hours. Four credits. Required in the courses in agriculture and general science. Prerequisite: Plant Anatomy. Assistant Professor Davis, Doctor Miller, Mr. Hoar, and Mr. Poole.

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. Text, *Plant Physiology*, by C. R. Barnes.

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 Anatomy.

PLANT PATHOLOGY I. Elective, fall term. Class work, two hours; laboratory, four hours. Four credits. Elective in the courses in agriculture and general science. Prerequisite: Plant Physiology I. Mr. Melchers.

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 the 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 some 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. Text *Fungous Diseases of Plants,* by Duggar.

Laboratory.—Practical work in the recognition of all the more common diseases of the farm, orchard and garden is accompanied by detailed microscopic studies of diseased tissues and identification of the fungus parasites which cause them. Laboratory outlines are furnished by the department. Prerequisite: Laboratory work in Plant Physiology I.

PLANT GENETICS I. Junior year, winter term. Class work, two hours; laboratory, four hours. Four credits. Required in the course in agriculture; elective in the course in general science. Prerequisite: Plant Physiology I. Professor Roberts.

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. Text, *Genetics,* by H. E. Walker, supplemented by lectures and reference reading.

Laboratory. The course begins with a thorough study of the cell, followed by a study of the homotypic and heterotypic mitoses, chiefly in *Lilium, Erythronium,* and *Ascaris.* This is succeeded by an examination of floral mechanisms, with reference to close- and cross-pollination, followed by biometric work in variation and correlation, and practical work in the calculation of the chief constants of the frequency polygon. The course closes with a laboratory study of Mendelian phenomena. Prerequisite: Laboratory work in Plant Physiology I.

MEDICAL BOTANY. Sophomore year, fall term. Class work, one hour; laboratory, four hours. Three credits. Required in the course in veterinary medicine. Prerequisite: High-school Botany or its equivalent. Mr. Hoar.

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.

Laboratory. This comprises the 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 High-school Botany or its equivalent.

SEED TESTING. Elective, spring term. Laboratory, two hours. One credit. Elective in the course in agriculture. Prerequisite: General Botany. Mr. Schmidt.

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. Laboratory outlines furnished by the department.

PLANT PHYSIOLOGY II. Elective, spring term. Lectures, two hours; laboratory work, four hours. Four credits. Elective in the course in agriculture and general science. Prerequisite: Plant Physiology I and Laboratory. Doctor Miller.

This course offers opportunity for advanced work upon special problems in plant physiology, to be selected by the department for investigation.

PLANT PATHOLOGY II. Elective, winter term. Class work, two hours; laboratory, four hours. Four credits. Elective in the courses in agriculture and general science. Prerequisite: Plant Pathology I. Mr. Melchers.

This is a continuation of Plant Pathology I. The class work consists primarily of a series of lectures pertaining to mycology, considering the subject from the evolutionary standpoint. The classification of fungi causing plant diseases receives considerable attention, and the relationship of the fungi to one another is emphasized. This course is designed to train those who wish to become more familiar with the classification of the fungi, and with their morphology, and is essential for those who wish to follow plant pathological work professionally. Text, *Fungi which Cause Plant Diseases*, by Stevens.

Laboratory. The laboratory work consists of a detailed study of the genera of pathogenic fungi. A large supply of plant disease material furnishes a basis for these studies. Prerequisite: Laboratory work in Plant Pathology I.

PLANT PATHOLOGY III. Elective, spring term. Laboratory work, six hours. Three credits. Elective in the courses in agriculture and general science. Prerequisite: Plant Pathology II and Laboratory. Mr. Melchers.

This course is a continuation of Plant Pathology II. Its purpose is to give the advanced student an opportunity for making a closer and more extended study of the pathogenic organisms which cause plant disease. The course will include a somewhat detailed study of the cryptogamic herbarium. Considerable attention will be devoted to the growing of pure cultures of parasitic fungi, the making of inoculations, isolation of fungi, etc. The preparation of media of various kinds, for the growing of fungi, will receive considerable attention. The course is especially designed for those who intend to pursue plant pathology as investigators in experiment stations.

FOR GRADUATES AND UNDERGRADUATES

PLANT GENETICS II. Elective, fall term. Class work, three hours; laboratory, two hours. Four credits. Elective in the courses in agriculture and general science. Prerequisite: Plant Genetics I. Professor Roberts.

The work of Plant Genetics I is continued, with special reference to the practical details, technique, and history of the breeding of the principal economic plants. Extensive reference reading in the literature is required, and a thesis involving a review of the work accomplished in some phase of genetics.

Laboratory. Experimental work in hybridization, using a considerable variety of forms, in order to acquire familiarity with the technique of crossing, and with the range of phænotypic characters in the species available for investigation. Crosses are made of antithetic characters, using plant material of known behavior. Prerequisite: Laboratory work in Plant Genetics I.

PLANT GENETICS III. Elective, winter term. Class work, three hours; laboratory, two hours. Four credits. Elective in the courses in agriculture and general science. Prerequisite: Plant Genetics II. Professor Roberts.

A more advanced study of fundamental problems in genetics. Such topics as the cytological basis of heredity, mutation, and the questions of sex-inheritance and the inheritance of acquired characters, receive extended treatment. Baur's *"Experimentelle Vererbungslehre,"* 2d edition, is read in class, and extensive topical reference reading is required in other German handbooks, and in the original literature. A reading knowledge of German is required.

Laboratory. Continuation of experimental work in hybridization, carried on in the greenhouse. Prerequisite: Laboratory work in Plant Genetics II.

PLANT GENETICS IV. Elective, spring term. Class work, three hours; laboratory, two hours. Four credits. Elective in the courses in agriculture and general science. Prerequisite: Plant Genetics III. Professor Roberts.

Continuation in general character of the work of the preceding course, except that individual problems begin to be developed, preparatory to graduate work. A reading knowledge of German is required.

Laboratory. Experimental investigation of hybrids. Individual research in problems in plant genetics. Prerequisite: Laboratory work in Plant Genetics III.

ECONOMIC BOTANY. Elective, fall term. Class work, two hours; laboratory, four hours. Four credits. Graduate, and elective in the courses in agriculture and general science. Prerequisite: Plant Anatomy. Professor Roberts.

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 receive considerable attention. Forestry products are not considered. Text, *The Origin of Cultivated Plants*, by De Candolle. Lectures and reference reading.

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 Anatomy.

EVOLUTION OF PLANTS. Elective, winter term. Class work, four hours. Four credits. Graduate, and elective in the courses in general science and agriculture. Prerequisite: Economic Botany, class and laboratory work. Professor Roberts.

Careful consideration is given to the lines along which evolution has proceeded in the plant kingdom, to the relationship of the more important phyla and to the probable derivation of the chief groups of plants. Text, *Evolution of Plants*, by Campbell. Lectures and reference reading.

TAXONOMIC BOTANY. Elective, spring term. Class work, one hour; laboratory, six hours. Four credits. Graduate, and elective in the courses in agriculture and general science. Prerequisite: Plant Anatomy. Mr. Hoar.

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.

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 Anatomy.

BOTANICAL MICROTECHNIQUE. Elective. Laboratory, eight hours. Four credits. Professor Roberts.

This course is planned to provide a thorough training in the principles and practice of microtechnical methods in botany, including the killing, fixing, and embedding of plant material, microtome work, and the staining and mounting, by various methods, of a tolerably complete and characteristic series of permanent slides, representing the vegetative and reproductive tissues of typical plants, taken from all the principal groups. Text: Chamberlain's *"Plant Histology."*

Chemistry

Professor WILLARD
Associate Professor KING
Associate Professor SWANSON
Assistant Professor NEWMAN
Assistant Professor HUGHES
Assistant Professor BRUBAKER
Instructor GUTSCHE
Instructor BURCHARD
Instructor MILLER*
Assistant MURPHY*
Assistant MCCLUNG
Assistant ZOLLER

All of the industries are becoming more and more dependent for their highest success upon intelligent application of the sciences, and the social 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

* Resigned.

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

CHEMISTRY I. Freshman year, fall and winter terms. Lectures and recitations, three hours; laboratory, two hours. Four credits. Prerequisite: Elementary Physics. See Chemistry H-I, H-II and H-III. Associate Professor King, Assistant Professors Brubaker and Hughes, Mr. Burchard, Mr. Murphy, Mr. McClung, and Mr. Zoller.

This term's work begins the study of inorganic chemistry, and 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. McPherson and Henderson's "*A Course in General Chemistry*" is used as a textbook, this term's work covering the first 190 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.

CHEMISTRY II. Freshman year, winter and spring terms. Lectures and recitations, two hours; laboratory, four hours. Four credits. See Chemistry H-I to H-III. Teachers same as for Chemistry I.

The work under this head is a continuation of the study of inorganic chemistry begun the preceding term, and includes subjects covered in pages 191 to 377 of the textbook.

Laboratory.—The laboratory work of this term is a continuation of that begun in the preceding term.

CHEMISTRY III. Freshman year, fall and spring terms. Lectures and recitations, three hours; laboratory, two hours. Four credits. See Chemistry H-I to H-III. Teachers same as for Chemistry I.

This work completes the study of inorganic chemistry begun the preceding terms.

Laboratory.—The laboratory work in this course is a continuation of that of the preceding terms.

CHEMISTRY H-I, H-II, AND H-III. Freshman year. In each of the first two courses: Lectures and recitations, three hours; laboratory, four hours. Five credits. In the third course: Lectures and recitations, two hours; laboratory, four hours. Four credits. Required in the course in home economics. Teachers the same as for Chemistry I.

These courses cover in general the same field as that treated in Chemistry I, II, and III, and include the laboratory work of Qualitative Analysis. The subject matter of the lectures and recitations and the experimental work in the laboratory are selected with special reference to the needs of young women.

QUALITATIVE ANALYSIS. Sophomore year, fall and winter terms. Lecture, two hours; laboratory, four hours. Four credits. Required in the courses in agriculture, agricultural engineering, veterinary medicine, home economics, and general science. Prerequisite: Chemistry III. Assistant Professor Newman, and Messrs. Gutsche, Burchard, McClung, and Zoller.

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 observation 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.

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.

ORGANIC CHEMISTRY. Sophomore year, fall and winter terms. Lectures and recitations, four hours. Four credits. Required in the courses in agriculture and general science. Prerequisite: Chemistry III. Assistant Professors Hughes and Brubaker.

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 everyday affairs of life are treated in greater detail. Opportunity is thus afforded to consider the hydrocarbons, alcohols, organic acids, fats, soaps, 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. Text, Norris's *Organic Chemistry,* in part, accompanied by lectures amplifying certain parts of the subject.

ORGANIC CHEMISTRY H. Sophomore year, fall term. Lectures and recitations, four hours; laboratory, four hours. Six credits. Required in the course in home economics. Prerequisite: Chemistry H-III, or Chemistry III. Assistant Professor Hughes.

The lectures and recitations in this course are the same as in Organic Chemistry. Textbook, Norris's *Organic Chemistry.*

Laboratory.—The laboratory work includes experiments and preparations touching organic substances largely employed in the household, especially fats, carbohydrates and proteins.

AGRICULTURAL CHEMISTRY. Sophomore year, spring term, and junior year, fall term. Class work, two hours. Two credits. Required in the course in agriculture. Prerequisite: Qualitative Analysis. Associate Professor Swanson.

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.

QUANTITATIVE ANALYSIS I. Sophomore year, spring term, or junior year, fall term. Laboratory, four hours. Two credits. Required in the course in agriculture; elective in others. Prerequisite: Qualitative Analysis. Assistant Professor Newman.

This consists of simple quantitative exercises, which are planned to give the student a knowledge of the simpler operations in quantitative analysis, as well as to lay the foundation for studies in which such knowledge is required. Quantitative analysis is at the basis of many investigations connected with agriculture, and the course is designed not only to increase the student's knowledge of chemistry, but to give him an appreciation of the value of exact quantitative work. Textbook, *Quantitative Chemical Analysis,* by Frank and Clemans.

CHEMISTRY C. Sophomore year, winter term. Lectures, one hour; laboratory, eight hours. Five credits. Required in the course in civil engineering. Prerequisite: Chemistry III. Assistant Professor Newman.

This course is 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. Texts, W. A. Noyes's *Qualitative Analysis,* and Lincoln and Walton's *Quantitative Analysis,* supplemented by pamphlets and mimeographed matter.

HOUSEHOLD CHEMISTRY. Senior year, fall term. Class work, one hour; laboratory, six hours. Four credits. Required in the course in home economics. Prerequisites: Qualitative Analysis and Organic Chemistry. Assistant Professor Brubaker, Mr. Gutsche, and Mr. Zoller.

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, fuel, fabrics, disinfectants, metals, and other materials used in and about the home are the subjects of numerous experiments touching their properties, usefulness and defects.

HUMAN NUTRITION. Junior year, winter or spring term. Class work, four hours. Four credits. Required in the course in home economics; elective in the course in general science. Prerequisite: Organic Chemistry, and Physiology. Professor Willard, and Assistant Professor Hughes.

This is a course in the chemistry of foods and nutrition, and includes, among others, the following topics: the composition of the 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 textbook, but is supplemented by lectures.

CHEMISTRY OF TEXTILES. Junior year, spring term. Laboratory, four hours. Two credits. Required in course in home economics; elective in course in general science. Prerequisite: Organic Chemistry. Assistant Professor Brubaker.

A study of the behavior of textile fibers and fabrics toward various chemical reagents. Chemical and microscopic tests for identification of fibers. Bleaching, dyeing and finishing. Laundry processes as they affect color, shrinkage, strength, etc. Quantitative analysis of mixed goods.

FOR GRADUATES AND UNDERGRADUATES

QUANTITATIVE ANALYSIS II. Junior or senior year, fall, winter or spring terms. Laboratory, amount subject to arrangement. One credit for each three hours a week for a term. Graduate or elective. Prerequisite: Quantitative Analysis I. Associate Professor Swanson and Assistant Professor Newman.

This course is offered to meet the needs of students who require additional preparation in quantitative analysis before entering upon certain elective courses, but who are unable to take the more extended courses, III, IV, and V. Laboratory guide, Foulk's *Notes on Quantitative Analysis*, or its equivalent.

QUANTITATIVE ANALYSIS III, IV, AND V. Junior or senior year. Class work, one hour; laboratory, six hours. Four credits each term. Graduate or elective. Prerequisite: Qualitative Analysis. Assistant Professor Newman.

This course covers three terms, and consists of a discussion of chemical theory as applied to quantitative reactions, accompanied by experiments in the laboratory. Reports are made of assigned reference work for the study of methods of analysis not taken up in the laboratory.

Laboratory.—The laboratory work the first term consists of a selected series of gravimetric determinations designed to give accuracy in a variety of fundamental operations. In the second term solutions of acids, bases, and oxidizing agents are standardized and used in analysis. During the third term substances are analyzed which require more complicated methods and involve both gravimetric and volumetric processes. Special attention is given to industrial products and raw materials. Textbook, *Quantitative Analysis*, by Edgar G. Mahin.

QUANTITATIVE ANALYSIS, SPECIAL. Junior or senior year. Laboratory work as arranged for. One credit for each two hours a week for a term. Graduate or elective. Prerequisites: Quantitative Analysis I and II, or III, IV, and V.

Under this head provision is made for the election, to such an extent as may be arranged for, of any kind of quantitative chemical work not otherwise designated. The various research and state laboratories of the department afford a large opportunity for advanced work.

AGRICULTURAL ANALYSIS. Junior or senior year, fall and winter terms. One credit for each three hours a week for one term. Prerequisite: Quantitative Analysis I, or I and II, depending upon the work to be undertaken. Associate Professor Swanson.

In this course the student may specialize in the analysis of feeding stuffs, soils, fertilizers, or dairy products. As far as his preparation will allow, he may take up the chemical study of a special problem. This applies particularly to graduate students.

CHEMISTRY D-I. Junior year, fall term. Laboratory, four hours. Two credits. For students specializing in dairy husbandry. Prerequisite: Quantitative Analysis I. Associate Professor Swanson.

This course includes calibration of volumetric apparatus, preparation of standard acid and alkali solutions of definite normality, and analysis

of milk and butter. Laboratory guide, Lincoln and Walton's *Elementary Quantitative Analysis,* supplemented by special directions.

CHEMISTRY D-II. Junior year, winter term. Laboratory, four hours. Two credits. For students specializing in dairy husbandry. Prerequisite: Chemistry D-I. Associate Professor Swanson.

The course comprises determination of volatile fatty acids, of soluble and insoluble acids, saponification and iodine number of butter fat. These constants are determined on other fats also, as far as time permits.

PRINCIPLES OF ANIMAL NUTRITION. Spring term. Class work, four hours. Four credits. Graduate or elective. Prerequisite: Organic Chemistry.

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. Text, *Principles of Nutrition,* by H. P. Armsby.

INORGANIC CHEMISTRY I, II, AND III. Junior or senior year; fall, winter and spring terms. Given in 1914-'15 and alternate years thereafter. Class work, three hours. Three credits each term. Prerequisite: Qualitative Analysis. Associate Professor King.

This course consists of a thorough study of the facts of chemistry and their theoretical interpretation according to the views of the present day. Text, *Modern Inorganic Chemistry,* by J. W. Mellor.

INDUSTRIAL CHEMISTRY I, II, AND III. Graduate or elective; junior or senior year; fall, winter, and spring terms. Given in 1915-'16 and alternate years thereafter. Class work, three hours; laboratory, six hours. Six credits each term. Prerequisite: Organic Chemistry. Associate Professor King and Assistant Professor Newman.

This course consists of three hours a week of lectures and recitations in each term upon the more important technical chemical processes. Considerable attention is given to general operations, and the machinery employed. The more important commercial manufacturing industries are then taken up, including, with others, the production of alkalies, acids, glass, clay products, cement, paint, pigments, oils, varnish, soap, gas, paper, leather, petroleum, sugars, starch, and the products of fermentation and the destructive distillation of wood and coal. Textbook, *Industrial Chemistry for the Student and Manufacturer,* by Rogers and Aubert.

ORGANIC CHEMISTRY I, II, AND III. Graduate or elective; junior or senior year; fall, winter, and spring terms. Given in 1914-'15 and alternate years thereafter. Class work, three hours; laboratory, four hours. Five credits each term. Assistant Professor Hughes.

This course includes a careful, systematic study of the aliphatic and aromatic compounds to such an extent as the time permits. Text, Perkin and Kipping's *Organic Chemistry.*

Laboratory.—A considerable number of organic preparations are made, Jones' *A Laboratory Outline of Organic Chemistry* being used as the guide.

PHYSIOLOGICAL CHEMISTRY I, II, AND III. Graduate or elective; junior or senior year. Given in 1915'-16 and alternate years thereafter. Class work, two hours; laboratory, four hours. Four credits each term. Prerequisite: Organic Chemistry. Assistant Professor Hughes.

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 metabo-

lism and the interrelations of organs are among the important topics studied. Textbook, *Mathews' Physiological Chemistry.*

JOURNAL MEETING. Once a week, throughout the year, the officers of the department, with the more advanced students and such others as wish to, meet for papers and discussions upon topics representing the progress of chemical science, chiefly as found in the current journals. The preparation of subjects for presentation at these meetings may be made a part of the credit work of advanced students.

Economics and Sociology

Professor KAMMEYER
Instructor MACKLIN

Vocational training alone does not fully prepare a student for his life 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 economic and social conditions under which he will live and work, in order that he may become a useful member of society. The State needs men and women trained for citizenship. It is the purpose of this department to plan and direct its work with this need in view.

A department library of well-selected books and pamphlets bearing on economics, sociology, and statistics is at the disposal of the students, and is used for collateral readings, book reviews, and reports.

COURSES IN ECONOMICS

FOR UNDERGRADUATES

ECONOMICS. Sophomore, junior, and senior years; fall, winter, and spring terms. Class work, four hours. Four credits. Required in all courses except veterinary medicine. Professor Kammeyer.

A study of economic principles underlying the phenomena of production, consumption, exchange, and distribution of wealth, including a general survey of the State in its relation to industry, transportation, public utilities, insurance, socialism, etc. Instruction by recitations and lectures. Text, Ely's *Outlines of Economics.*

AGRICULTURAL ECONOMICS. Senior year; fall, winter, and spring terms. Class work, four hours. Four credits. Required in the course in agriculture. Instructor Macklin.

Clear thought and sound judgment, upon the problems that confront the individual, are essential to success in any phase of agricultural production. The course in agricultural economics undertakes to familiarize the student with the economic principles and forces with which every farmer must deal. The relative profitability of farm enterprises, the proportion in which the factors of production should be combined for optimum results, and other phases of production are followed by the laws of values and the important questions connected with the exchange of farm products and the ultimate distribution of farm wealth. The course is conducted by lectures, texts and supplementary reading. Texts: Taylor's *Agricultural Economics;* and Ely and Wicker's *Elementary Principles of Economics.*

FOR GRADUATES AND UNDERGRADUATES

BUSINESS ORGANIZATION. Junior or senior year, winter term. Class work, two hours. Two credits. Required in courses in the Division of Mechanic Arts; elective in the course in general science and home economics. Prerequisite: Economics. Professor Kammeyer.

A study of individual proprietorship, partnership and corporation as forms of business organization and management; the advantages and disadvantages of each, and legislative restrictions. The selling plans, advertising methods and systems of credits and collections used by typical manufacturing and distributive industries are made the basis of study and reports. Attention is given also to the origin and operation of markets and exchanges, cost accounting, and special systems of wage payment. Instruction is by recitations, lectures, and reports. Text: Briscoe's Economics of Business.

LABOR PROBLEMS. Elective, winter term. Class work, two hours. Two credits. Elective in the course in general science. Must be preceded by a course in general economics. Professor Kammeyer.

The history, organization, functions and legal status of labor unions in the United States and the principal countries in Europe. Statistics and judicial decisions relating to strikes, boycotts, picketing, arbitration, etc., are subjects of study and investigation. This course also includes a study of the various plans that have been proposed and tried for the more equitable distribution of wealth, such as coöperation, profit-sharing, industrial partnership, etc. Instruction by lectures, assigned readings, and reports. Text: Carlton's *History and Problems of Organized Labor.*

MONEY AND BANKING. Elective, spring term. Class work, two hours. Two credits. Elective in the course in general science. Must be preceded by a course in general economics. Professor Kammeyer.

A study of money, its history and characteristics as a medium of exchange and a 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 exchange, etc. Special attention is given to the new Federal Reserve Act, its purpose, provisions, and operation. Text: Holdsworth's *Money and Banking.*

PUBLIC FINANCE. Elective, spring term. Class work, two hours. Two credits. Elective in the courses in general science and home economics. Must be preceded by a course in general economics. Professor Kammeyer.

This course embraces a study of public revenues and public expenditures; the development of tax systems, reforms needed, public indebtedness, budgets, and other phenomena of financial administration. Plehn's *Introduction to Public Finance* is used as a basis for recitations. This is supplemented by library work and reports.

COÖPERATIVE MARKETING. Senior year, winter term. Class work, four hours. Four credits. Optional in the course in agriculture. Prerequisite: Agricultural Economics. Instructor Macklin.

American farmers' organizations have attempted much in the way of reorganizing the process by which agricultural products are transferred from the farm to the consumer as well as in the bettering of farmers as a class. Knowledge of their experience in coöperative undertakings, whether in the line of marketing or production, is essential to a thorough understanding of the situation regarding farmers coöperative organizations and the problems of greater economy in marketing. Following the sketch of the important farmer movements, speculation, market organization, coöperative production, exchange and credit are studied in detail. The course consists of lectures, special topics, assigned readings and discussions. Text: Weld's *The Marketing of Farm Products.*

RESEARCH IN AGRICULTURAL ECONOMICS. Electives throughout the year. Open to a limited number of advanced students only. Hours of work to be arranged by appointment. Credit to be based on the quality of the work accomplished. Instructor Macklin.

This opportunity is given to a small number of students especially interested in the economic problems of immediate interest to the farmers of Kansas. The facts and the processes of present marketing systems must be known before intelligent changes in them can be suggested. The forces causing undesirable tenancy must be determined before the evils can be eradicated. These subjects and many others are topics for careful research in this course.

COURSES IN SOCIOLOGY

FOR UNDERGRADUATES

PRINCIPLES OF SOCIOLOGY. Senior year, fall and spring terms. Class work, four hours. Four credits. Required in the courses in agriculture and industrial journalism. Professor Kammeyer.

This course is designed to give the students a knowledge of social forces, institutions and ideals, and the fundamental principles of social development. The work is based largely upon discussion, lectures and reports. Text: Blackmar and Gillins' *Sociology*.

RURAL SOCIOLOGY. Senior year, spring term. Class work, four hours. Four credits. Optional in the course in agriculture, elective in other courses. Instructor Macklin.

A brief outline of the course consists of a study of such social farm problems as follows: Movements of the farm population; social psychology of rural life; social aspect of current agricultural questions such as tenancy, farm labor, etc.; social significance of means of communication in rural districts; farm organizations; social aspects of rural institutions, such as the school, church and home. Instruction is given by recitations and lectures.

Education

Professor HOLTON
Associate Professor KENT
Associate Professor REISNER
Assistant Professor HALM

The courses in this department have for their controlling purpose the professional training of teachers. Two types of courses are offered: (1) courses that give the broad, fundamental principles upon which public education is based, and (2) courses that develop technique and skill in school management and the organization of the subject matter of the curriculum. All courses are based upon the proposition that education supported by public taxation should function in social and vocational efficiency.

A minimum of twenty-seven credit hours is required in this department for the state teacher's certificate.

COURSES IN EDUCATION

FOR UNDERGRADUATES

PSYCHOLOGY. Junior or senior year, fall, winter, or spring term. Class work, four hours. Four credits. Required for state teacher's certificate. Associate Professor Reisner.

General introduction to the forms and laws of conscious experience as based on a knowledge of the physiological conditions of mental life. The

work of the course will include the study of a text, outside readings, lectures and class experiments.

HISTORY OF EDUCATION. Junior or senior year, fall or winter term. Class work, four hours. Four credits. Required for state teacher's certificate. Associate Professors Reisner and Kent.

This course is intended to present the successive relationships that have existed between educational machinery and practices, and the changing political, economic, scientific, cultural and ideal environments from primitive times to the present.

PRINCIPLES OF EDUCATION. Junior or senior year, fall, winter, or spring term. Class work, four hours. Four credits. Required for state teacher's certificate. Professor Holton and Associate Professor Reisner.

Taking the purpose of education to be the preparation of the child for efficient participation in the life of society, the course aims at presenting the biological, psychological, economic, cultural and moral aspects of the educative process.

TEACHING METHOD. Junior or senior year, winter or spring term. Class work, four hours. Four credits. Required for state teacher's certificate. Associate Professor Reisner.

The aim of this course will be the development of good classroom technique through detailed study of child experiences as related to the larger demands of education. The work will include lectures, library assignments and observation of classes. A feature of the course will be individual reports and discussions. Prerequisite: Psychology.

EDUCATIONAL PSYCHOLOGY. Junior or senior year, spring term. Class work, four hours. Four credits. Optional with Principles of Education for state teacher's certificate. Associate Professor Reisner.

The course will deal with those aspects of psychology that have a direct bearing upon educational practices. Special attention will be paid to the results of experimental investigations in the field. Lectures and library work. Prerequisite: Psychology.

EDUCATIONAL ADMINISTRATION. Junior or senior year, fall, winter, or spring term. Class work, four hours. Four credits. Required for state teacher's certificate. Professor Holton.

This course is a study of the organization of state, city and county school systems, with special emphasis upon the rural and vocational schools; the interrelation of boards of education, superintendents, principals, teachers. The school law of Kansas is also studied.

TEACHING METHODS IN HOME ECONOMICS. Junior and senior years, fall, winter, and spring terms. Class work, four hours. Four credits. Required of all candidates for state teacher's certificate who are preparing to teach home economics. Prerequisite: General Psychology. Assistant Professor Halm.

This course deals with topics relating to domestic science and domestic art and with methods of presenting the same. It discusses the place of home economics in modern education and the aims and phases of work in the various types of schools. The organization, maintenance, equipment, and supervision of such departments are also treated.

AGRICULTURAL EDUCATION. Senior year, fall, winter, or spring term. Class work, four hours. Four credits. Required of all candidates for state teacher's certificate who are preparing to teach agriculture. Professor Holton and Associate Professor Kent.

This course is a study of typical secondary schools of agriculture and departments of agriculture in public schools; of land-grant colleges; of the making of a course of study in agriculture for elementary and secondary schools; of laboratory supplies and equipment; of the pedagogy of vocational subjects.

INDUSTRIAL EDUCATION. Senior year, fall, winter, or spring term. Class work, four hours. Four credits. Required of all candidates for state teacher's certificate who are preparing to teach manual training, shop work, trade courses, and other industrial subjects. Associate Professor Kent.

This course is a study of typical secondary schools of industrial education and departments of industrial education in public schools; of the industrial schools of Germany; of the making of a course of study in industrial education for elementary and secondary schools; of shop equipment and cost; of the pedagogy of vocational subjects.

HOME ECONOMICS EDUCATION. Senior year, fall, winter, or spring term. Class work, four hours. Four credits. Required of all candidates for state teacher's certificate who are preparing to teach home economics. See Division of Home Economics. Assistant Professor Halm.

This course deals with the place of home economics in secondary education, the organization of the course of study and syllabi of schools of various types, viz., academic, technical, trade, vocational, and junior or intermediate high schools. It includes the development of topics relating to nutrition, foods, sanitation, housewifery, home nursing, textiles, clothing, costume design, laundry, house furnishing and decoration, and the method of presenting the same.

RURAL EDUCATION. Junior and senior years, fall, winter, or spring term. Class work, four hours. Four credits. Elective for state teacher's certificate. Professor Holton.

This is a course on the subject matter and methods employed in rural and agricultural education. An outline syllabus of the course is as follows: The development of agricultural education; agricultural colleges; écoles pratiques d'agriculture in France; Folkehojskoler in Denmark; agricultural schools in Wisconsin, Massachusetts, and other states; school gardens; organization of the course of study for rural high schools; extension service; rural schools and community service; district, township and county as units of school organization; consolidation of rural schools.

FOR GRADUATES AND UNDERGRADUATES

METHODS OF EXTENSION TEACHING. Senior and graduate elective. Class work, two hours. Two credits. Professor Holton.

This course undertakes to do two definite lines of work: (1) To bring together in an organized form the subject matter to be used in extension teaching, and (2) to develop the most effective methods of presenting this subject matter in short courses, farmers' institutes, women's clubs, boys' and girls' clubs and all other organizations. The accumulated ability of the entire board of instruction in the College will be used in presenting this course.

PRACTICE TEACHING HE. Senior and graduate elective, each term. Class work, one hour; laboratory, four hours. Three credits. Prerequisites: Foods I, II, and III; Dressmaking; and Teaching Methods. Assistant Professor Halm.

Students whose qualifications are accepted for this course will serve as teachers of sewing and cooking in the School of Agriculture classes.

PRACTICE TEACHING AG. Senior and graduate elective, fall, winter, or spring term. Class work, one hour; laboratory, four hours. Three credits. Required of all candidates for the state teacher's certificate who are preparing to teach agriculture, shop work, or the sciences. Prerequisite (or corequisite): Teaching Method. Associate Professor Kent.

Students expecting to teach take this work as a part of the regular professional work. Approved students are put in charge of regular classes in the School of Agriculture. The work is supervised by a mem-

ber of the Department of Education and by the regular class teacher. Both teachers criticise lesson plans and presentation. Students do practice teaching in the subjects which they expect to teach as far as circumstances permit.

EDUCATIONAL SEMINAR. Senior or graduate students, fall, winter, or spring term. One double period a week. The number of credits depends upon the time given to investigation and the quality of the work. Elective. Professor Holton, Associate Professors Kent and Reisner, and Assistant Professor Halm.

This course consists of research in rural and vocational education.

EDUCATIONAL SURVEYS. Senior and graduate students, fall, winter, or spring term. One double period a week. The number of credits depends upon the time given to investigation and the quality of the work. Elective. Professor Holton.

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 social, economic and educational conditions in a given community.

The English Language

Professor SEARSON*
Professor MACARTHUR
Associate Professor DAVIS
Assistant Professor RICE
Assistant Professor BOOT
Assistant Professor CONOVER
Instructor LEONARD
Instructor SYFORD
Instructor WINSHIP
Instructor HALL†
Instructor COOKE
Instructor BURK

Ability to use language accurately, clearly, and concisely is 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 these 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 cooperation with the technical departments of the College, to increase the knowledge and usefulness of the students.

COURSES IN THE ENGLISH LANGUAGE

FOR UNDERGRADUATES

ENGLISH I. Freshman year, each term. Class work, four hours. Four credits. Required in all courses. Prerequisite: Graduation from a fully accredited high school, with three units in English, or the equivalent. Professor Macarthur, Associate Professor Davis, Assistant Professor Boot, Miss Syford, Mr. Winship, and Mr. Cooke.

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* Absent, on leave, March 25, 1916, to March 25, 1917.

† Resigned January 1, 1916.

During the first week of the course the student is given a series of classroom exercises to test his fitness to pursue the work of the course. Following these exercises, the student is given a rapid, thorough review of the essentials of English, followed by essays on simple themes designed to develop his ability to tell accurately and interestingly what he knows and to describe creditably what he sees. The chief object of the course is to enable the student to use clear-cut, correct English, to express his thoughts readily, accurately, and precisely on topics of vital human interest. Special consultations are held with all students, and special supplementary drills are given to all who need additional help.

ENGLISH II. Freshman year, each term. Class work, four hours. Four credits. Required in all courses. Prerequisite: English I. Professor Macarthur, Associate Professor Davis, Assistant Professor Boot, Miss Syford, Mr. Winship, and Mr. Cooke.

This course is a continuation of English I. In addition to continuing accurate drills, careful attention will be given to the making of plans, outlines, and abstracts, and to the proper construction of paragraphs and themes. So far as possible, the student will be shown how to get the most from the lecture or from the printed page, and will be trained to take notes properly. To give a natural incentive to proper oral and written expression, the fields of agriculture and country life, engineering, home economics, applied science, sociology, psychology, and general economics are explored freely for topics of keen interest. The course is conducted with the central idea of assisting the freshman to acquire the habit of clear, accurate thought-getting and thought-expression in all his technical work.

COLLEGE RHETORIC I. Freshman or sophomore year, each term. Class work, four hours. Four credits. Required in all except the engineering courses. Prerequisite: English II. Professor Searson, Professor Macarthur, Associate Professor Davis, Assistant Professor Boot, Assistant Professor Rice, and Mr. Burk.

This course is a continuation of the work in English II. It includes a brief review of the essentials taught in English I and English II. In addition, special work in outlining, practical work in abstracting, directed library investigations, references and bibliography work, are required in order to assist each student to write and to speak effectively along the line of his own special interests and needs. Special drills in readiness and flexibility of thought-expression will be given by requiring a great deal of extemporaneous writing in the classroom. So far as possible, the work will be so arranged as to adapt itself to the special needs of the students of the several divisions.

COLLEGE RHETORIC II. Sophomore, junior, or senior year, each term; junior or senior year, fall term. Class work, four hours. Four credits. One term's work required in all except the engineering courses. Prerequisite: College Rhetoric I. Professor Searson, Professor Macarthur, Associate Professor Davis, Assistant Professor Boot, Assistant Professor Rice, and Mr. Burk.

The course includes a brief review of the essentials of thought-expression, library investigation, bibliography work, logical 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. The work is adapted to meet the special needs of the students of the several college divisions.

ENGINEERING ENGLISH. Winter and spring terms. Class work, four hours. Four credits. Required in the courses in engineering and architecture. Prerequisite: English Literature. Professor Macarthur and Professor Searson.

This is an advanced course in technical writing for engineers. Correct forms of writing engineering reports, technical papers, and of recording the results of experimental and research work, are especially emphasized in the course. The course is designed to meet the needs of engineering students in the matter of technical writing and speaking.

SPECIAL ENGLISH. This course is offered each term as supplementary to the courses in the School of Agriculture and 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. Instructor by special assignment.

ARGUMENTATION AND DEBATE. Elective, fall term. Class work, four hours. Four credits. Elective in the courses in home economics, agriculture, and general science. Prerequisite: College Rhetoric I. Professor Macarthur, Mr. Burk.

This course includes a systematic study of the theory of debate; briefmaking; classroom practice in debating, in defending propositions, and in extemporaneous speaking; the proper method of collecting and classifying material, and effective methods of refuting arguments. 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.

BIBLE ENGLISH. Elective, fall term. Class work, four hours. Four credits. Elective in the courses in agriculture, home economics, and general science. Prerequisite: College Rhetoric I. Professor Searson.

This course comprises a study of simple, forceful English based on Bible models. Short illustrative extracts, typical short stories, descriptions, clear explanations, and effective arguments are studied carefully to discover the secrets of simplicity, clearness and power of that great classic.

FARM AND HOME ENGLISH. Elective, winter term. Class work, four hours. Four credits. Elective in the courses in agriculture, home economics, and general science. Prerequisite: College Rhetoric I. Professor Searson.

This course is designed primarily to teach the plain, practical English indispensable to farm men and women who, by reason of special preparation for their work, expect to become leaders. This is a practice course in the essentials of useful, technical English, letter writing, farm reading and writing, and farm and club writing and speaking.

BUSINESS ENGLISH. Elective, spring term. Class work, four hours. Four credits. Elective in the courses in agriculture, home economics, and general science. Prerequisite: College Rhetoric I. Professor Searson, Associate Professor Davis.

This course comprises a thorough review of business letter-writing, exercises in writing contracts, notes, mortgages, wills, orders, sale bills, specifications, model story advertisements of farm produce, and a practice study of other forms commonly used in connection with the business of farm and home.

FARM ADVERTISING. Elective, fall term. Class work and practice, four hours. Four credits. Elective in the courses in home economics, agri-

culture, and general science. Prerequisite: College Rhetoric I. Associate Professor Davis.

How to advertise all kinds of farm produce in order to secure regular customers by parcel post or by direct delivery is the object of this course. The student is shown how to write the most effective copy for "display ads.," "story ads.," and handbills, and how to feature the central point in each advertisement. The course includes the collection of the most important facts concerning farm produce and such study of markets and marketing as is necessary.

FARM STORIES. Elective, winter term. Class work, four hours. Four credits. Elective in the courses in agriculture, home economics, and general science. Prerequisite: College Rhetoric I. Associate Professor Davis.

This course is designed to teach the student how to get the facts for a good farm "story" and how to write effective human-interest "stories" of farm life. Every phase of farm life is considered with the purpose of developing in the student the power to recognize the material for a good "story" and to write the "story" with vivid, effective appeal. The student is given extensive practice in setting forth the most interesting facts and incidents connected with farm life.

FARM BULLETINS. Elective, spring term. Class work, four hours. Four credits. Elective in the courses in agriculture, home economics, and general science. Prerequisite: College Rhetoric I. Associate Professor Davis.

In this course the student is required to make an extensive study of farm bulletins and the essentials of writing good bulletins. How to write in a simple, direct style that appeals to the readers for whom the bulletin is intended is the subject of careful study. Current farm bulletins is made the basis for thorough drills in this special line. The student is permitted to take the facts he has collected in connection with the work of other classes and to use them in working out special reports required in this course. The course is designed especially for those who intend later to write clear-cut, practical, and effective farm bulletins.

APPLICATIONS. Elective, spring term. Class work, one hour. One credit. Elective in the courses in agriculture, home economics, and general science. Prerequisite: College Rhetoric I. Professor Searson, and Associate Professor Davis.

This is a practice course designed to assist the seniors in the various courses in the College to write effective letters of application. The proper forms for letters of application for positions in the fields of industry will be taught the student in special practice drills.

HOME ECONOMICS ENGLISH. Elective, fall term. Class work, four hours. Four credits. Elective in the housekeepers' course in home economics. Assistant Professor Boot.

This is a study and conference course which will be varied to suit the needs of women in the housekeepers' course.

ORAL ENGLISH I. Elective, fall term. Class work, four hours. Four credits. Prerequisite: College Rhetoric I. Professor Macarthur and Mr. Burk.

In this course a study of the principles of oral composition and practice in oral composition in the form of conversations, recitations, dictations, pleas, protests and discussions are offered. All useful forms of oral composition are emphasized in the most practical manner.

ORAL ENGLISH II. Elective, winter term. Class work, four hours. Four credits. Prerequisite: College Rhetoric I. Professor Macarthur.

This is an advanced course in oral composition and offers the applications of the principles of oral composition in daily practice.

ADVERTISING ENGLISH. Elective, spring term. Class work and practice, four hours. Four credits. Elective in the courses in agriculture, home economics, and general science. Prerequisite: College Rhetoric I. Associate Professor Davis.

The fundamental principles of advertising, a study of the best in general advertising practice, special composition and display features of effective advertising, and practice in writing special advertisements, comprise the essentials of this course.

VOCATIONAL ENGLISH. Elective, fall term. Class work, four hours. Four credits. Elective in the courses in agriculture, home economics, and general science. Prerequisite: College Rhetoric I. Assistant Professor Boot.

This course comprises a careful study of the English needed in each of the fundamental vocations. Special studies and reports are made of the opportunities offered by the several leading vocations. The student is given practice in the use of oral and written English, in preparing club papers, talks, and special articles from the viewpoint of the vocations studied.

CORRECT USAGE. Elective, spring term. Class work, two hours. Two credits. Elective in the course in agriculture, home economics, and general science. Prerequisite: College Rhetoric I. Assistant Professor Conover.

In this course a study is made of what constitutes the best usage in speech and in writing. How to determine correct usage, a study of the best current standards, and practical exercises requiring the daily application of the principles studied, are leading features of the course.

FOR GRADUATES AND UNDERGRADUATES

ENGLISH PRACTICE. Elective, winter term. Class work, four hours. Four credits. Elective in the courses in home economics, agriculture, and general science. Prerequisite: College Rhetoric I. Professor Macarthur, Assistant Professor Conover.

This course offers advanced work in correct English practice. Definite work is assigned in practical, everyday 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 the most effective form. Work done in other departments may be used as a basis for a part of the laboratory practice in this course. Regular conferences and consultations offer the student an opportunity to secure systematic personal help.

APPLIED ENGLISH. Elective, spring term. Class work, four hours. Four credits. Elective in the courses in home economics, agriculture, and general science. Prerequisite: College Rhetoric I. Professor Macarthur and Assistant Professor Conover.

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. Definite 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 the reference basis of the course.

CURRENT ENGLISH. Elective, winter term. Class work, four hours. Four credits. Prerequisite: College Rhetoric I. Miss Syford.

This course offers a study of language as used in the best newspapers, magazines and current books. The works of standard present-day writers and speakers are studied carefully in a definite program of systematic readings and reports.

THE SHORT STORY. Elective, spring term. Class work, four hours. Four credits. Prerequisite: College Rhetoric I. Assistant Professor Rice.

Practice in writing short stories, based upon a thorough study of the world's best short stories, is offered in this course. The principles which underlie the material and structure of the short story—plot, setting, action and character analysis—are especially emphasized.

ENGLISH SURVEY I. Elective, fall term. Class work, four hours. Four credits. Prerequisite: College Rhetoric I. Professor Searson and Assistant Professor Boot.

This course offers an advanced study in the history of the English language. A study of the sources of the language and its early development is made especially for advanced undergraduate students or for students desiring graduate work.

ENGLISH SURVEY II. Elective, winter term. Class work, four hours. Four credits. Prerequisite: English Survey I. Professor Searson and Professor Macarthur.

This course is a continuation of English Survey I, with advanced library investigations and reports.

ENGLISH SURVEY III. Elective, spring term. Class work, four hours. Four credits. Prerequisite: English Survey II. Professor Searson and Associate Professor Davis.

This course is a continuation of English Survey II, with advanced readings and reports and a complete summary of the work of the year.

ENGLISH FORMS. Elective, fall term. Class work, two hours. Two credits. Elective in the courses in agriculture, home economics, and general science. Prerequisite: College Rhetoric I. Assistant Professor Conover.

This course includes a careful study of the forms of discourse and the practical adaptations of these forms to meet current needs. A wide range of the best illustrative matter is studied as a basis for intelligent, worthwhile practice.

COMMUNITY ENGLISH. Elective, winter term. Class work, four hours. Four credits. Elective in the courses in agriculture, home economics, and general science. Prerequisite: College Rhetoric I. Mr. Cooke.

This course comprises the study and practice of the English work most needed to carry on the activities and recreations of community life. Necessary business, social, or other conventional forms, the pageant, the scenario, the practical talk, the paper and the discussion of every phase of community life, are some of the essentials of the course.

TECHNICAL WRITING. Elective, winter term. Class work, two hours. Two credits. Elective in the course in agriculture, home economics, and general science. Prerequisite: College Rhetoric I. Assistant Professor Conover.

This course is planned to help students properly to record and to report necessary technical work. Fundamental principles of technical writing are studied in connection with such practice as will necessitate clearness, accuracy, and effectiveness.

METHODS OF TEACHING ENGLISH. Elective, spring term. Class work, four hours. Four credits. Elective in the courses in agriculture, home economics, and general science. Prerequisite: College Rhetoric I. Assistant Professor Boot.

A course planned to meet the needs of those who are called upon to teach English in connection with the applied sciences. The course of study, the applications of English instruction to life needs and definite methods of motivating English instruction, are specially considered in this course.

FOR GRADUATES

HISTORY OF LANGUAGE I. Elective, fall term. Class conference, four hours. Four credits. Prerequisite: English Literature II. Professor Searson, Professor Macarthur, Associate Professor Davis.

This course includes a study of the origin of the English language with special emphasis placed upon Old English.

HISTORY OF LANGUAGE II. Elective, winter term. Class conference, four hours. Four credits. Prerequisite: History of Language I. Professor Searson, Professor Macarthur, Assistant Professor Conover.

This course is a continuation of History of Language I with special emphasis placed upon Middle English.

HISTORY OF LANGUAGE III. Elective, spring term. Class conference, four hours. Four credits. Prerequisite: History of Language II. Professor Searson, Professor Macarthur, Assistant Professor Boot.

This course is a continuation of History of Language II.

SPECIAL STUDIES I. Elective, fall term. Personal conferences, four hours. Four credits. Prerequisite: English Literature II. Professor Searson, Professor Macarthur, Assistant Professor Rice.

Individual assignments are made in the fundamental fields of research in applied English. The student is required to carry on an original investigation and to make an acceptable report of his research work.

SPECIAL STUDIES II. Elective, winter term. Personal conferences, four hours. Four credits. Prerequisite: Special Studies I. Professor Searson, Professor Macarthur.

This course is a continuation and extension of Special Studies I.

SPECIAL STUDIES III. Elective, spring term. Personal conferences, four hours. Four credits. Prerequisite: Special Studies II. Professor Searson, Professor Macarthur.

This course is a continuation and extension of Special Studies II.

English Literature

Professor BRINK
Assistant Professor GOOD

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

FOR UNDERGRADUATES

ENGLISH LITERATURE. Freshman year, winter or spring term. Class work, four hours. Four credits. Required in the courses in the Division of Mechanic Arts. Prerequisite: College Rhetoric I. Professor Brink and Doctor Good.

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.

ENGLISH LITERATURE I. Sophomore or junior year, fall or winter term. Class work, four hours. Four credits. Required in the courses in industrial journalism, general science, and home economics; elective in other courses. Prerequisite: College Rhetoric I. Professor Brink and Doctor Good.

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.

ENGLISH LITERATURE II. Sophomore or junior year, winter or spring term. Class work, four hours. Four credits. Required in the courses in industrial journalism, general science, and home economics. Prerequisite: English Literature I. Professor Brink.

This is a continuation of English Literature I. The work includes: some plays of Shakespeare by the seminar method; reports and discussions; principles of Shakespearean 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.

FOR GRADUATES AND UNDERGRADUATES

STUDIES IN ORATORY. Elective, fall term. Class work, four hours. Four credits. Elective in courses that offer electives. Prerequisite: College Rhetoric I. Professor Brink.

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 especially emphasized. The class examines and analyzes 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. Text, Brink's *The Making of an Oration.*

THE ENGLISH DRAMA. Elective, winter term. Class work, four hours. Four credits. Elective in courses that offer electives. Prerequisite: College Rhetoric I. Professor Brink.

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 mainly is employed. The technique of the drama is studied, including character analysis, thought interpretation, and plot development.

THE ENGLISH NOVEL. Elective, fall term. Class work, four hours. Four credits. Elective in courses that offer electives. Prerequisite: College Rhetoric I. Doctor Good.

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.

NINETEENTH CENTURY LITERATURE. Elective, spring term. Class work, four hours. Four credits. Elective in courses that offer electives. Prerequisite: College Rhetoric I. Doctor Good.

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.

AMERICAN LITERATURE. Elective, winter or spring term. Class work, four hours. Four credits. Elective in courses that offer electives. Prerequisite: College Rhetoric. Professor Brink.

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.

LITERATURE AND LABOR. Elective, spring term. Class work, four hours. Four credits. Elective in all courses that offer electives. Prerequisite: College Rhetoric. Doctor Good.

This course is arranged in recognition of the fact that much of the literature of the world is intimately related, either as cause or effect, to the work and progress of the race, and therefore to the heart of laboring man. It attempts, through the study of representative productions, to unfold this relation of literature to labor.

Entomology

Professor DEAN
Assistant Professor WELCH
Assistant Professor MERRILL
Instructor MCCOLLOCH

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.

Facilities for advanced work are provided for graduate students and others who expect to pursue the subject professionally. An advanced laboratory is equipped with individual desks, binocular microscopes, compound microscopes, rotary microtome, imbedding ovens, drawing apparatus, and a supply of glassware and reagents sufficient for histological work and for research. A well-equipped insectary is available for training in insectary methods. An air conditioning machine in the insectary adds materially to the possibilities for experimental work. A field station, with all of the necessary equipment, provides means for the study of insects under normal field conditions.

COURSES IN ENTOMOLOGY

FOR UNDERGRADUATES

GENERAL ENTOMOLOGY. Junior year, fall and spring terms. Class work, three hours; laboratory, two hours. Four credits. Required in the course in agriculture. Prerequisites: General Zoölogy I and II. Professor Dean and Assistant Professor Welch.

This is a study of the elementary anatomy and physiology of insects, complete enough to give a thorough understanding of the life history and habits of the most important species and the general principles upon which the control of these economic forms is based. It is a study of the more important general facts about insects as a class; the main characters of the different orders and groups; how they have fitted themselves to survive and multiply; and how the structure and habits of one group render it susceptible to certain measures of control, while in other groups entirely different measures are necessary. The class work consists of lectures and of text and special reference study.

HOUSEHOLD ENTOMOLOGY. Senior year, winter term. Class work, two hours. Two credits. Required in the course in home economics. Prerequisites: General Zoölogy I and II. Professor Dean.

This is a study of the elementary structure and physiology of insects complete enough to give a clear understanding of the life history, habits and methods of control of the principal insects injurious to house, garden, lawn, and human health. The course consists of reference study and a series of lectures.

APICULTURE. Elective, spring term. Class work, two hours; laboratory, two hours. Three credits. Elective in the courses in general science and agriculture. Prerequisite: General Entomology. Assistant Professor Merrill.

This course comprises a general study of the structure, life history, general behavior, activities and products of the honey bee. Special attention is given to practical beekeeping, dealing with the best methods practiced among beekeepers. A study is made of bee diseases and of the standard methods to be used in the eradication and control of them. A study is also made of the relation of bees to agriculture and horticulture.

FOR GRADUATES AND UNDERGRADUATES

HORTICULTURAL ENTOMOLOGY. Senior year, winter term. Class work, two hours. Two credits. Elective in the courses in agriculture and general science. Prerequisite: General Entomology. Assistant Professor Merrill.

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.

GENERAL ECONOMIC ENTOMOLOGY. Elective, spring term. Class work, three hours; laboratory, two hours. Four credits. Elective in the courses in general science and agriculture. Professor Dean.

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. Prerequisite: General Entomology.

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.

MILLING ENTOMOLOGY. Senior year, spring term. Class work, two hours. Two credits. Optional in the course in agricultural engineering, elective in the courses in general science and agriculture. Prerequisite: General Entomology. Professor Dean.

This is a study of the insect pests of flouring mills, elevators, granaries, warehouses and bakeries, and of the standard methods to be used in dealing with them. The course consists of lectures and special reference reading. Inspection trips will be made to flour mills and warehouses.

INSECT MORPHOLOGY I. Elective, fall term. Class work, one hour; laboratory, six hours. Four credits. Elective in the courses in agriculture and general science. Prerequisite: General Entomology. Assistant Professor Welch.

This is a study of the external anatomy of insects belonging to all the larger and more important orders and of the internal anatomy of one or two types.

TAXONOMY OF INSECTS I. Elective, winter term. Laboratory, six hours; lecture, one hour. Four credits. Prerequisites: General Entomology and Insect Morphology I. Assistant Professor Welch.

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.

ADVANCED GENERAL ENTOMOLOGY. Elective, winter term. Four credits. The class work consists of lectures and assigned readings, together with demonstrations and field work. Prerequisite: General Entomology. Assistant Professor Welch.

The purpose of this course is to give the advanced student a comprehensive view of the broad biological aspect of the subject and an understanding of the relation of insects to the complex of environmental factors. The various subdivisions of entomology will be correlated and used as a basis in the presentation of general principles as well as illustrating the problems of maintenance and the various ways in which insects have solved them. The course will include a somewhat detailed consideration of the following: anatomy as the basis for physical considerations, embryology of insects, aquatic insects and their special adaptations, color and coloration, origin of adaptations, insects in relation to plants, to other animals, and to other insects, insects in relation to transmission of disease, insect behavior, geographical distribution, and geological distribution.

MEDICAL ENTOMOLOGY. Elective, winter term. Class work, four hours. Four credits. Prerequisite: General Entomology. Assistant Professor Welch.

The subject matter of this course deals with insects and other arthropods as transmitters and disseminators of disease, attention being confined to that phase of the subject which pertains to the health of man. Emphasis is placed on the various important species of insects which are related to disease, the pathogenic organisms and their relation to insects, and the preventive measures which have, up to date, proved most effective. Some attention is also given to the important theories which underlie this subject and to important investigations in progress at the present time.

ENTOMOLOGICAL AND ZOÖLOGICAL LITERATURE. Elective, fall term. Lectures, one hour. One credit. Prerequisite: General Entomology. Assistant Professor Welch.

This course deals with the literature of entomology, special consideration being given to bibliographical works and their uses. Since the literature of entomology is, to a considerable extent, inseparably associated with that of zoölogy, the course is of equal importance to the students of both subjects. The course is designed primarily to meet the needs of advanced undergraduate and graduate students who are beginning research work. General and special bibliographical sources, foreign and American scientific journals and serials, and the construction of special bibliographies according to approved methods constitute the chief subjects for consideration. All advanced students of entomology and zoölogy are expected to arrange for this course.

FOR GRADUATES

INSECT MORPHOLOGY II. Elective, fall term. Laboratory, eight hours. Four credits. Prerequisite: Insect Morphology I. Assistant Professor Welch.

This course is designed for those advanced students who desire more thorough preparation in the essentials of insect anatomy than is provided for in Insect Morphology I. More extensive studies of detailed external and internal anatomy are made and preparation is afforded for advanced work in taxonomy and research in morphology.

TAXONOMY OF INSECTS II. Elective, winter term. Laboratory, eight hours. Four credits. Prerequisite: Taxonomy I and Insect Morphology II. Assistant Professor Welch.

This course provides for a more comprehensive preparation in the field of insect taxonomy. At the discretion of the instructor, the work may be taken in such a way that either a broader acquaintance with insects and the principles of classification is afforded, or intensive work may be done on selected restricted groups.

INSECT HISTOLOGY. Elective, fall term. Class work, one hour; laboratory, six hours. Four credits. Prerequisites: General Entomology and General Cytology. Assistant Professor Welch.

This course is designed primarily for students who expect to do technical work in entomology. The work of the laboratory consists of the application of those special methods of gross and microscopical technique which are applicable to insects. Practice in the use of the various special methods of killing and fixing, clearing, sectioning, staining, and mounting the various groups of insects and insect tissues is afforded. A study of insect tissues constitutes an important part of the course. The lectures deal with the more general matters of technique and insect histology.

RESEARCH IN ENTOMOLOGY. Advanced students having sufficient fundamental training may, with the approval of the head of the department, undertake original investigation in one of the following fields of entomology: Taxonomy, morphology, economic entomology. Such work is pursued under the direct supervision of some member of the departmental faculty and the final results may, if of sufficient merit, be used to fulfill the thesis requirement for the master's degree. The special student may, if willing and capable, be drawn into the research work of the Agricultural Experiment Station during the summer vacation and receive training in the investigation of economic problems.

Prerequisites: For research in taxonomy and morphology—General Entomology, Insect Morphology I, Taxonomy of Insects I, and Cytology. For research in economic entomology—General Entomology, General Economic Entomology, Insect Morphology I, and Taxonomy of Insects I.

Geology

Professor NABOURS
Assistant Professor NEWMAN

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

GENERAL GEOLOGY. Junior year, fall term. Class work, four hours. Four credits. Required in the course in agriculture; elective in the course in general science. Professor Nabours.

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 a study of a text and references. A few short field trips are made to the surrounding country.

ENGINEERING GEOLOGY. Junior year, spring term. Class work, four hours; laboratory, four hours. Six credits. Required in the course in civil engineering. Professor Nabours and Assistant Professor Newman.

The class work in this subject consists in a study of the general principles of structural and dynamic geology, and of rocks in respect to their

mineral composition, structural properties, changes in weathering, etc. It is given by lectures, textbooks and references. Text, *Geology for Engineers*, by R. F. Sorsbie.

Laboratory.—The laboratory work comprises the observation and description of such structural and dynamic features as the locality affords, and a study of the principal rocks, and their mineral constituents.

German

Professor CORTELYOU
Instructor LIMPER
Graduate Assistant BARTELS*
Graduate Assistant PARK*

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 reading knowledge of the language. And participation in the semimonthly meetings of the Deutscher Verein Teutonia, open to students who have had a year of German or more, gives ample opportunity for developing the student's powers in speaking the language and in understanding it when he hears it.

Students who have had German in the high school will be required, as a rule, to take more advanced courses as their elective or required work in German here.

COURSES IN GERMAN

FOR UNDERGRADUATES

ELEMENTARY GERMAN I. Sophomore year, fall or winter term. Class work, four hours. Four credits. Required in the course in home economics; elective in other courses. Professor Cortelyou, Mr. Limper, and Miss Bartels.

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, declensions of nouns and pronouns, the indicative mode of weak verbs, sentence order, and the comparison of adjectives. Frequent reviews enable the student to digest the facts presented, while the abundant conversation and written work subserves the same end. Text, Vos's *Essentials of German* (first eighteen lessons).

*Winter term, 1916.

ELEMENTARY GERMAN II. Sophomore year, each term. Class work, four hours. Four credits. Required in the course in home economics; elective in other courses. Prerequisite: Elementary German I. Professor Cortelyou, Mr. Limper, and Mrs. Park.

The remaining important points of grammar are studied. Students are repeatedly drilled on the grammatical constructions already emphasized in Elementary German I. The general 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, Vos's *Essentials of German* (completed).

GERMAN READINGS. Sophomore year, each term. Class work, four hours. Four credits. Required in the course in home economics; elective in other courses. Prerequisite: Elementary German II. Professor Cortelyou, Mr. Limper, and Miss Bartels.

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.*

FOR GRADUATES AND UNDERGRADUATES

GERMAN SHORT STORIES. Elective, fall or winter term. Class work, four hours. Four credits. Elective in the courses in agriculture, general science, and home economics. Prerequisite: German Readings. Given in the year 1915-'16 and alternate years thereafter. Professor Cortelyou and Mr. Limper.

The material read in this course comprises a number of short stories of considerable interest by such modern authors as Auerbach, Niese, Goldhammer, von La Roche, von Leander, von Scheffel, and von Polenz. Text, Baker's *German Stories.*

GERMAN COMEDIES. Elective, fall or winter term. Class work, four hours. Four credits. Elective in the courses in general science, home economics, and agriculture. Prerequisite: German Readings. Given in the year 1916-'17 and alternate years thereafter. Professor Cortelyou and Mr. Limper.

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 amerikansiches Duell*, Hugo Mueller's *Im Wartesalon erster Klasse*, and Emil Pohl's *Die Schulreiterin.* Exercises in conversation and sight reading are occasionally introduced. Text, Manley and Allen's *Four German Comedies.*

GERMAN HISTORICAL PROSE. Elective, winter term. Class work, four hours. Four credits. Elective in the courses in home economics and general science. Prerequisite: German Comedies or German Short Stories. Given in the year 1915-'16 and alternate years thereafter. Professor Cortelyou and Mr. Limper.

In this course an insight is obtained of the Prussian government, administration of justice, military system, economic development, and strivings toward national unity as they existed at the time of Frederick the Great. Text, Rogge's *Der grosse Preussenkoenig*, edited by Adams.

GERMAN PROSE I. Elective, winter term. Class work, four hours. Four credits. Elective in the courses in general science and home economics. Prerequisite: German Comedies or German Short Stories. Given in the year 1916-'17 and alternate years thereafter. Professor Cortelyou and Mr. Limper.

This is a practical course designed to give the student an intimate knowledge of everyday German as used among the Germans in their varied activities. The following are studied in this course: visits; the various stores; restaurants, and drinking customs; meals, and expressions used at table; boarding houses and hotels; the family, weddings, marriages, etc.; dress; the school system; religion and church life; divisions of society, occupations; money, measures, and weights; festivities; traveling; the postal system, the telegraph, the telephone; the city in general; Berlin and cities of the provinces; the country; the German empire; the military system; conversational phrases; the best German; everyday German. There are occasional sight translations, and some conversational work is done. Text, Kron's *German Daily Life*.

GERMAN CLASSICS. Elective, spring term. Class work, four hours. Four credits. Elective in the courses in general science and home economics. Prerequisite: German Historical Prose, or German Prose I or II. Given in the year 1915-'16 and alternate years thereafter. Professor Cortelyou and Mr. Limper.

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.

GERMAN PROSE II. Elective, spring term. Class work, four hours. Four credits. Elective in the courses in general science and home economics. Prerequisite: German Comedies. Given in the year 1916-'17 and alternate years thereafter. Professor Cortelyou and Mr. Limper.

This course is designed to give the student facility in the rapid translation of fairly easy prose. A number of modern short stories are read. Besides the more formal work, there are sight translations of easy selections. Text, Allen and Batt's *Easy German Stories*, Vols. I and II.

SCIENTIFIC GERMAN I. Elective, winter term. Class work, four hours. Four credits. Elective in the courses in agriculture and general science. Prerequisite: German Readings. Professor Cortelyou.

This course is designed as an introduction to the vast field of scientific publications appearing in German. It consists chiefly in translating miscellaneous scientific articles, especially those dealing with chemistry and physics. Text, Dippold's *Scientific German Reader*.

SCIENTIFIC GERMAN II. Elective, spring term. Class work, four hours. Four credits. Elective in the courses in agriculture and general science. Prerequisite: Scientific German I. Professor Cortelyou.

This is a continuation of the preceding course. The particular line of scientific material to be taken up here will depend upon the needs of the students electing the course. Texts to be selected.

TEACHERS' GERMAN. Elective, spring term. Class work, four hours. Four credits. Elective in the courses in general science and home economics. Prerequisite: Five or more terms of College German, or its equivalent. Mr. Limper.

In this course a rapid but thorough review of the grammar is given, and composition work is carried on in connection with it. Conversation also occupies part of the class period. Several recitations are devoted to the theory of phonetics, particularly as applied to German. Text, Bierwirth's *Elements of German*, and supplementary matter furnished by the department.

History and Civics

Professor PRICE
Associate Professor ILES
Assistant Professor TAYLOR
Assistant Professor JAMES
Instructor REYNOLDS

The Department of History and Civics offers seventeen different courses in the College, as described below. 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

ENGLISH HISTORY. Fall, spring, and summer terms. Class work, four hours. Four credits. Required in the courses in industrial journalism and general science; elective in the course in home economics. Assistant Professor Taylor.

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. Much 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. As far as the limited time permits, lectures are given on contemporary continental institutions, movements, and conditions.

FRENCH HISTORY. Elective, fall term. Class work, four hours. Four credits. Elective in the courses in home economics and general science. Associate Professor Iles and Assistant Professor Taylor.

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. Then 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 regime 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's *The Growth of the French Nation,* supplemented by special library assignments, and by lectures on medieval institutions.

MODERN EUROPE. Sophomore and elective, winter and summer terms. Class work, four hours. Four credits. Required in the course in indus-

trial journalism; elective in the courses in home economics and general science. Associate Professor Iles and Assistant Professor Taylor.

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,* vol. II, and readings.

AMERICAN HISTORY I (*or* NATIONALITY AND DEMOCRACY). Junior or senior year, each term. Class work, four hours. Four credits. Required in the courses in general science, home economics, and industrial journalism; optional in the course in agriculture. Prerequisite (except by special permission): American Government. Professor Price.

This is an advanced course in the political, constitutional and industrial history of America to about 1820. The course covers the conditions that led to the discovery and colonization of America; the effects of the French and Indian War; the reasons for the War of Independence; the conditions during the confederation period; the westward expansion; and the specific political, economic and industrial lines along which the nation has developed to the nationality and democracy of the Jacksonian epoch. This is a library course with lectures and quizzes. Each student uses an American history notebook of topics and references prepared by the department.

AMERICAN HISTORY II (*or* SLAVERY AND INDUSTRIAL EXPANSION). Senior year, each term. Class work, four hours. Four credits. Required in the course in industrial journalism; elective in other courses. Professor Price.

The work of this term continues the course in American History I down to the present time. It begins with the Missouri compromise; the antislavery agitation; the Webster-Hayne debate; and South Carolina nullification. 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 American history, in an effort more clearly to understand and appreciate the present industrial age.

AMERICAN AGRICULTURAL HISTORY. Class work, four hours. Four credits. Elective in the division of Agriculture. Professor Price.

The whole period of our American history has been primarily that of a rural people. The larger part of both population and wealth have been rural. Our leading statesmen have come largely from rural communities, and our national policies and institutions have been shaped largely by the needs and the demands of the rural portions of the nation. To-day with the disappearing frontier and our changing industrial, social and political conditions it is eminently fitting that our college students who are to be the leaders in the new age should understand and appreciate especially the unique part our rural population and interests have played in the remarkable development of our nation. This course

will include our political, constitutional and industrial development, but with special consideration of the rural factor in each case. Lectures, quizzes, library readings and special reports.

AMERICAN INDUSTRIAL HISTORY. Sophomore year, fall term; or junior year, winter term. Class work, four hours. Four credits. Required in the courses in the Division of Mechanic Arts. Assistant Professor Taylor.

This course covers: (1) a study of the physical geography, geology, climate, etc., of the American continent and how these have affected American history and institutions; (2) a study of the discovery and colonization of America—the impelling motives, the life, occupations, religion, psychological temperament, political institutions, etc., of the people, of the attitude of the mother country toward colonization and the colonists, and of the later history of immigration; (3) the influence of the frontier on American history and development; (4) a study of the South before the war (under slavery), and of the new South as it has been developed since the war, including a comparison of the South with New England and the West; (5) a study, running throughout the course, of the life and the industries or occupations of the people; (6) a review of the leading facts in the political history of the nation. This course is based on *Outlines of American Industrial History*, prepared by the department; but special use is made of such texts as Bogart's *Economic History of the United States*, and Coman's *Industrial History of the United States*. Instruction is given by means of lectures, assigned readings, and reports.

EUROPEAN INDUSTRIAL HISTORY. Elective, spring term. Class work, four hours. Four credits. Assistant Professor Taylor.

This course includes especially the industrial and social history of England, the industrial life and institutions of the middle ages, and a survey of the most important phases of the industrial conditions in modern Europe, and in China, Japan, and the Philippines. It includes the essential features of the history of civilization—the chief elements in the story of human progress. Based primarily on Cheyney's *Industrial and Social History of England*. Supplemented by lectures and reference work.

CURRENT HISTORY. This course is offered each term. Class work, one hour. One credit each term. One credit required in the freshman year of the home economics and general science courses. Elective for not to exceed two credits in any one year nor a total of four credits in the student's course. Professor Price and Associate Professor Iles.

The content of this course differs each term from that of any other term. The text for the course is a good weekly magazine, such as *The Independent*, *The Literary Digest*, or *The Outlook*. The course is so conducted as to give a wide outlook on the world of to-day, and a better understanding of the conditions and institutions in the midst of which we live. It includes a study of as much of the everyday essentials of American and foreign governments, of international relations, of international law, of biography, of industrial developments, and of history—suggested each week by the events of the week—as can be crowded into the one hour of the recitation period. It directs the student to good habits of news reading of the right sort.

TEACHERS' COURSE IN HISTORY. Elective. Class work, four hours. Four credits. Professor Price or Associate Professor Iles.

This is a seminar course of discussions based on Johnson's *Teaching of History in Elementary and Secondary Schools*, together with Mace's revised work on *Method in History*, and supplemented by a study of the Report of the Committee of Seven, and of the Committee of Five on History in the Secondary Schools, and of the Committee of Eight on

History in the Elementary Schools. A critical examination is made of special books on method in history and civics, and of special articles in the *History Teacher's Magazine.* Each student prepares typical lessons in history and civics. This course is elective in securing a State teacher's certificate.

HISTORY OF THE HOME. Class work, four hours. Four credits. Elective in the course in home economics. Professor Price and Miss Reynolds.

This course includes the history of the primitive family; the Hebrew family; the family life of the Greeks and of the Romans; and the history of the home and family during the Middle Ages, including the influence of the Christian church. Next the history of the English family in the seventeenth and eighteenth centuries and of the American colonial home are studied. This is followed by a study of the industrial revolution and its effects upon family life. Finally, the history of the family during the nineteenth century, the present situation and tendencies are examined. The course is based primarily on Goodsell's *History of the Family,* supplemented by lectures and special studies.

KANSAS HISTORY. Elective, spring term. Class work, two hours. Two credits. Assistant Professor Taylor.

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 prepared by the department.

ANCIENT HISTORY. Elective. Class work, four hours. Four credits. Open to all students who can satisfactorily carry the work. Miss Reynolds.

This is intended primarily for those who expect to teach this subject in the high schools. It includes a study of the ancient world, its industries, art, literature, and government. The course will be based on one of the standard modern texts, and is intended to familiarize the student with the best modern literature on the subject.

IMMIGRATION AND INTERNATIONAL PEACE. Elective. Class work, one hour. One credit. Professor Price.

The title of the course suggests its character. One of the most important questions confronting our nation to-day is that of immigration. Possibly the most interesting question in world politics is that of international peace, as compared with the heavy burden of military and naval armaments, and the awful cost of war. Text: Fairchild's *Immigration—A World Movement and Its American Significance.*

COURSES IN CIVICS

AMERICAN GOVERNMENT. Junior or senior year, each term. Class work, four hours. Four credits. Required in the courses in agriculture, home economics, general science, industrial journalism, electrical engineering, and mechanical engineering. Associate Professor Iles.

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 Beard's *American Govern-*

ment and Politics, or Macy and Gannaway's *Comparative Free Government.*

Throughout this course special and definite attention is given to recent and current events in governmental activities.

BUSINESS LAW. Junior year, winter or spring term. Class work, two hours. Two credits. Required in the courses in civil and highway engineering, mechanical engineering, and electrical engineering; optional in the courses in architecture and agricultural engineering; elective in other courses. Assistant Professor Taylor.

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.*

FARM LAW. Elective, winter and spring terms. Class work, two hours. Two credits. Elective in the courses in general science and agriculture. Assistant Professor Taylor.

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.; factories, 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.

INTERNATIONAL LAW. Elective. Class work, two hours. Two credits. Assistant Professor Taylor.

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, Stockton's *Outlines of International Law.*

Industrial Journalism and Printing

Professor CRAWFORD
Instructor SNOW
Assistant ALLEN
Assistant KEITH

The work in industrial journalism and printing endeavors to accomplish two purposes: The preparation of students who expect to be leaders in industrial, economic, and social life, to do occasional writing for newspapers and magazines on subjects of special interest; the training of students fundamentally interested in journalism for positions on newspapers and other publications, particularly where writing on agriculture and other industrial subjects is in demand. The instruction given in the courses considers the requirements of newspapers, agricultural papers, trade publications, and general magazines. The work comprises lectures, discussions, and practice. *The Kansas Industrialist,* the official paper of the college, is under the editorial and mechanical direction of the professor of industrial journalism and superintendent of printing.

In it is published acceptable matter written by students, who are encouraged to write also for daily newspapers and other publications.

Attention is given to the mechanical side of the profession in the instruction in printing, two terms of which are required of all students taking the course in industrial journalism. Printing has been taught in the institution continuously since 1875—the longest period during which instruction in the subject has been given in any American college. Practical work is done not only on *The Kansas Industrialist*, but in a wide variety of job printing for College departments.

The equipment for instruction in journalism and printing is that of a practical publishing and printing plant. The journalism work room contains typewriters, reference books, "morgue," and files of a large number of newspapers, agricultural publications, and trade journals.

The printing plant contains one two-revolution cylinder press, one drum-cylinder press, three platen presses, two wire-stitching machines, two paper cutters, an interchangeable perforating and punching machine, a quantity of both display and body type, including some of the most modern faces, and a large amount of miscellaneous equipment. All power machines are driven by individual electric motors.

A large amount of timely agricultural and other information is furnished regularly to Kansas newspapers, farm journals, and other publications. Special assignments are covered for these periodicals, and special inquiries are answered.

COURSES IN INDUSTRIAL JOURNALISM AND PRINTING

FOR UNDERGRADUATES

COMPOSITION J-I. Freshman year, fall term. Laboratory practice, four hours. Two credits. Required in the course in industrial journalism; elective in other courses. Mr. Keith.

The course comprises a study of the case, the point system, and the measurement of type and stock. Practice is given in setting straight matter. Emphasis is laid on accuracy.

COMPOSITION J-II. Freshman year, winter term. Laboratory practice, four hours. Two credits. Required in the course in industrial journalism; elective in other courses. Prerequisite: Composition J-I. Mr. Keith.

The work of the preceding term is continued. A study is made of type faces and the typography of advertisements and head display. The principles of effective make-up are treated.

ELEMENTARY JOURNALISM. Junior year, fall or spring term. Class work, two hours. Two credits. Required in the courses in industrial journalism and agriculture; elective in other courses. Mr. Snow.

The course endeavors to give the student practical experience in the fundamentals of newspaper work. Methods of obtaining news of various types, the writing of the lead, and the general style of the news story are carefully considered. The duties of the reporter and the physical, mental, and ethical demands made upon him are briefly presented.

INDUSTRIAL WRITING. Junior year, winter term. Class work, two hours. Two credits. Required in the course in industrial journalism; elective in other courses. Prerequisite: Elementary Journalism. Mr. Snow.

This course applies the principles of journalism to the treatment of industrial subjects, such as are found in agriculture, engineering, home economics, and more general scientific research. The feature story is emphasized, and the demands of newspapers, farm publications, and magazines for this type of writing are analyzed. The use of photographs and other illustrations receives attention. The work of the College and the Experiment Station affords the basis for the study and practice.

COPY READING. Junior year, spring term. Class work, two hours. Two credits. Required in the course in industrial journalism; elective in other courses. Prerequisite: Industrial Writing. Professor Crawford and Mr. Snow.

The course deals with the errors made in the structure and detail of news and feature stories. A study is made of newspaper style and of magazine or book style, the distinction between the two being clearly pointed out. The writing of heads and titles, proof-reading, and the make-up of periodical publications receive detailed attention. In all the matters taken up the students obtain practical training as well as theoretical instruction.

JOURNALISM PRACTICE I TO III. Junior and senior years, four hours. Two credits, each term. Required in the course in industrial journalism; elective in other courses. The prerequisite for each term is the work of all preceding terms in Journalism Practice. Professor Crawford and Mr. Snow.

The work in Journalism Practice follows closely the other courses in journalism with which it is taken. Students are required to gather news, both assigned and unassigned, and to write the stories in the department work room. The College campus is divided into "runs" which the students must cover at regular intervals, and assignments are given at specific times as in a newspaper office. The work given is suited to the advancement of the student. As he progresses in his work, he is required not only to obtain news and feature stories but to edit copy, to read proof, to write heads, to prepare editorials, to select matter worthy of reprint, and to perform other duties required in newspaper and magazine offices. Emphasis is laid on popular treatment of industrial subjects. The instructor in charge gives the students training in looking up references and in handling technical subjects simply but accurately, and also makes specific criticism on the work done by the students.

FOR GRADUATES AND UNDERGRADUATES

EDITORIAL PRACTICE. Senior year, fall term. Class work, two hours. Two credits. Required in the course in industrial journalism; elective in other courses. Prerequisite: Copy Reading. Professor Crawford.

The course deals not only with the writing of editorials suitable for farm papers, trade papers, and newspapers, but with the entire conduct of the editorial offices of a periodical publication. Students obtain instruction and practice in writing the matter commonly prepared by the editorial staff of a paper, including editorials, paragraphs, exchange matter, light verse, and humor. The acceptance and rejection of contributions receive consideration, as does also the arrangement of articles in the publication. Editorial policies and their influence form the subject of careful discussion.

THE ECONOMICS OF JOURNALISM. Senior year, winter term. Class work, two hours. Two credits. Required in the course in industrial journalism; elective in other courses. Prerequisite: Copy Reading. Professor Crawford.

This course deals with the business management of periodical publications. The building up of circulation and the soliciting of advertising receive special emphasis. Premiums and other plans for increasing

circulation are discussed. The place of the advertising agency, advertising rates, and the preparation of advertising copy are treated.

THE ETHICS OF JOURNALISM. Senior year, spring term. Class work, two hours. Two credits. Required in the course in industrial journalism; elective in other courses. Prerequisite: The Economics of Journalism. Professor Crawford.

The course treats the ethics of journalism as exemplified in the use of contributed matter, in the work of the reporter, in the editorial conduct of the paper, and in the handling of subscriptions and advertising. The federal and state laws relating to periodical publications, to advertising, to libel, and to authors' rights, including the federal law of copyright, are extensively treated. The attitude of newspapers and other publications on matters of ethics and law is observed at first hand by the students.

JOURNALISM PRACTICE IV TO VI. Senior year, four hours. Two credits, each term. Required in the course in industrial journalism; elective in other courses. The prerequisite for each term is the work of all preceding terms in Journalism Practice. Professor Crawford and Mr. Snow.

The general character of the work is described in the announcement of courses 6 to 8, heretofore. The work of each term in Journalism Practice corresponds to the subject pursued in class in the same term.

THE MATERIALS OF JOURNALISM. Elective, winter term. Class work, two hours. Two credits. Elective in the courses in agriculture, home economics, general science, and industrial journalism. Mr. Snow.

This is a course intended primarily for the general student who desires to obtain a knowledge of the principal newspapers and magazines, and to be able to form judgments as to the accuracy and adequacy of news reports and other published matter. The materials handled by the publications, the methods of treatment, and the character of the editorial comment are carefully presented. Attention is given to the several types of journalism.

MAGAZINE FEATURES. Elective, fall term. Class work, two hours. Two credits. Elective, on permission of the head of the department, in the courses in agriculture, home economics, general science, and industrial journalism. Mr. Snow.

The course is intended for advanced students, who desire to prepare literary work suitable for publication in magazines. The matter of the courses is varied to suit the needs and desires of the students, emphasis being laid upon such types of magazine writing as members of the class wish to practice.

THE HISTORY OF JOURNALISM. Elective, winter term. Class work, two hours. Two credits. Elective in the courses in agriculture, home economics, general science, and industrial journalism. Professor Crawford.

The course deals with the history of journalism from its beginning, and with the history of printing so far as this is concerned with periodical publications. Most of the time of the course is given to journalism in England, Canada, and the United States, though some attention is given to publications of other countries. The differentiation of journalism in the nineteenth century and the several types which arose because of this, are the subjects of careful study. Particular attention is given to the fields of agricultural and trade journalism.

JOURNALISM SURVEYS. Elective, spring term. Laboratory work, four hours. Two credits. Elective in the courses in agriculture, home economics, general science, and industrial journalism; elective on permission of the head of the department. Professor Crawford.

This course comprises the careful investigation of the periodical reading matter of communities. The information obtained is carefully tabulated and studies are made of the relation of the reading matter to the economic, social, and moral life of the communities.

Library Economy

Librarian SMITH
Assistant Librarian DERBY
Reference Assistant DAVIS

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 may 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.

COURSES IN LIBRARY ECONOMY

FOR UNDERGRADUATES

LIBRARY METHODS. Freshman or sophomore year; fall, winter, or spring term. Class work, two hours. Two credits. Required in the courses in agriculture, home economics, general science, and industrial journalism. Assistant Librarian Derby and Reference Assistant Davis.

The course consists of lecture and laboratory work on classification and arrangement of books in the library; card catalogues; the principal works of reference, such as dictionaries, encyclopedias, atlases, and standard works in history, literature, economics, quotations, statistics, etc.; public documents and their indexes; indexes to periodicals; trade, national and subject bibliographies, etc. Instruction is given also in methods of indexing current reading for purposes of future reference.

LIBRARY METHODS E. Freshman year, fall term. Laboratory work, two hours. One credit. Required in all courses in the Division of Mechanic Arts. Assistant Librarian Derby, and Reference Assistant Davis.

This course is similar to that listed above, but consists of laboratory work only. It is not an equivalent of Library Methods, and may not be substituted for it.

Mathematics

Professor REMICK
Associate Professor ANDREWS
Associate Professor WHITE
Assistant Professor PORTER
Assistant Professor STRATTON
Instructor ZEININGER
Instructor FEHN
Instructor HOLROYD
Assistant DEAN

In an institution that stands as an exponent of the industrial type of education, mathematics should occupy an important place. Training in the exact science is valuable not only for its own sake but also on account of its manifold applications. On this basis the courses in mathematics are offered primarily with the following ends in view: (1) the

attainment of mental power and accuracy in the interest both of general culture and special application; (2) the acquirement of facts and processes that will provide the student with an indispensable tool for further scientific and technical study.

Freshman courses are offered each term, sophomore courses at least twice during the year.

COURSES IN MATHEMATICS

FOR UNDERGRADUATES

PLANE TRIGONOMETRY. Freshman year, fall term. Four hours. Four credits. Required in the courses in engineering, architecture, and general science. Prerequisites: Solid Geometry; Algebra IV (or equivalent). Professor Remick, Associate Professor White, Assistant Professors Porter and Stratton, and Mr. Fehn.

This course treats of the functions of acute angles, right triangles, goniometry, oblique triangles, practical problems. Text, Wentworth-Smith's *Plane and Spherical Trigonometry.*

COLLEGE ALGEBRA. Freshman year, winter term. Four hours. Four credits. Required in the courses in architecture, engineering, and general science. Prerequisite: Plane Trigonometry. Professor Remick, Associate Professor Andrews, Assistant Professors Porter and Stratton, and Mr. Fehn.

Elementary topics, functions and their graphs, quadratic equations are rapidly reviewed. The further treatment includes the subjects of complex numbers, theory of equations, permutations and combinations, partial fractions, logarithms, and determinants. Text, *Higher Algebra,* by Hawkes.

PLANE ANALYTICAL GEOMETRY. Freshman year, spring term. Four hours. Four credits. Required in the courses in architecture and engineering; elective in the course in general science. Prerequisites: Plane Trigonometry and College Algebra. Associate Professors Andrews and White, Assistant Professors Porter and Stratton.

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, *Analytical Geometry,* by Ashton.

CALCULUS I. Sophomore year, fall term. Four hours. Four credits. Required in the courses in engineering; elective in the course in general science. Prerequisite: Analytical Geometry. Professor Remick, Associate Professors Andrews and White, and Assistant Professor Porter.

This course includes a study of fundamental ideas, a thorough treatment of the processes of differentiating standard elementary forms with applications to geometry and mechanics. Maxima and minima, differentials, and rates are discussed in connection with practical problems. Text, *Differential and Integral Calculus,* by Granville.

CALCULUS II. Sophomore year, winter term. Four hours. Four credits. Required in the courses in engineering; elective in the course in general science. Prerequisite: Calculus I. Professor Remick, Associate Professors Andrews and White, and Assistant Professor Porter.

The chief topics considered are curvature, mean value theorem, partial differentiation, expansion of functions, integration of standard algebraic and transcendental expressions, definite integrals, rational fractions, and integration by parts. This course contains problems closely related to the work of engineering students. Text, *Differential and Integral Calculus,* by Granville.

CALCULUS III. Sophomore year, spring term. Four hours. Four credits. Required in the courses in engineering; elective in the course in general science. Prerequisite: Calculus II. Professor Remick, Associate Professors Andrews and White, and Assistant Professor Porter.

In this division of the subject the emphasis is laid on the application of calculus to practical problems. Problems involving areas, lengths, surfaces, and volumes are treated by processes of single integration. The idea of successive and partial integration is applied to areas, moments, centers of gravity, surfaces, volumes, etc. The types of differential equations which the student of engineering is most likely to meet with in his subsequent work are briefly discussed. Text, *Differential and Integral Calculus*, by Granville.

SPHERICAL TRIGONOMETRY. Junior year, fall term. Two hours. Two credits. Optional in the course in civil and highway engineering. Prerequisite: Plane Trigonometry. Associate Professor White and Assistant Professor Porter.

The usual formulas employed in the solution of right and oblique spherical triangles are here discussed. After familiarity with the formulas has been gained through the medium of abstract examples, a brief course of applications follows, including in particular problems of astronomy.

CALCULUS. Elective, winter term. Four hours. Four credits. Elective in the course in general science. Prerequisite: Analytical Geometry. Professor Remick and Associate Professor Andrews.

This course is designed especially for students intending to teach secondary mathematics. It includes a brief treatment of the fundamental principles of both branches of calculus, practice with the standard formulas of differentiation and their application to geometry and to practical problems involving maxima and minima, rates, etc. Integration of the usual elementary forms is followed by the idea of the definite integral and a few of the more important applications.

TEACHER'S COURSE IN MATHEMATICS. Elective, spring term. Four hours. Four credits. Elective in the course in general science. Associate Professor Andrews and Assistant Professor Stratton.

As its name indicates, this course is intended primarily for those who are planning to teach elementary mathematics. Emphasis is given to pedagogical questions, with some reference to the historical course of development. A discussion of the best methods of teaching arithmetic, algebra, and geometry, a study of the reports of prominent mathematical organizations, especially those of the international commission, a comparison of curricula in different schools—these are some of the matters which receive consideration. An examination is made of books and articles on the teaching of mathematics. The course proceeds by lectures, readings, and reports on assigned topics.

ANALYSIS OF STATISTICS. Elective, fall term. Four hours. Four credits. Elective in the course in agriculture. Professor Remick and Assistant Professor Porter.

The special purpose of this course is to acquaint students of agriculture, who may have occasion to make use of statistical tables of various sorts, with the modern mathematical methods of treatment. Use is made of farm bulletins, agricultural reports, etc., by means of lectures, readings, and recitations.

MATHEMATICS OF BIOLOGY. Elective, spring term. Four hours. Four credits. Elective in the course in general science. Prerequisite: Analytical Geometry. Professor Remick.

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.

ACCOUNTING PRACTICE. Elective, spring term. Four hours. Four credits. Elective in the course in mechanic arts. Prerequisite. Elementary Bookkeeping. Assistant Professor Porter.

This course includes: the analysis of the development and structure of bookkeeping methods; the accounts of single proprietors, partnerships, and corporations; the construction of manufacturing and trading profit-and-loss accounts and balance sheets; the analysis of railroad reports and of bank statements, including bankruptcy and receivership conditions. The course is designed to give the student power to analyze commercial accounts and statements.

FOR GRADUATES AND UNDERGRADUATES

DIFFERENTIAL EQUATIONS. Elective, fall term. Four hours. Four credits. Elective in the course in general science. Prerequisite: Calculus III. Professor Remick.

This course is designed for those who may wish to extend their study of mathematics beyond the usual first course in calculus, and also for those intending to take advanced work in physics, mechanics, or engineering. The various standard types of differential equations are considered together with the usual applications. Text, *Differential Equations*, by Murray.

METHOD OF LEAST SQUARES AND THEORY OF MEASUREMENT. Elective, winter term. Two hours. Two credits. Elective in the course in general science. Prerequisite: Calculus III. Associate Professor Andrews.

The course includes a study of the law of error based on the theory of probability and the probability curve. Adjustments of observations by the method of least squares. Development of precision measures. Distribution of errors, Gauss's method of substitution in the solution of normal equations. The solution of a number of problems will be required.

SOLID ANALYTICAL GEOMETRY. Elective, spring term. Four hours. Four credits. Elective in the course in general science. Prerequisite: Plane Analytical Geometry and Calculus III. Associate Professor White.

The topics treated include coördinates of points in space and their transformations, and involve the usual discussion of planes and lines. The standard types of quadric surfaces are considered together with their classification and principal properties. Text, *Analytical Geometry of Space*, by Snyder and Sisam.

FOR GRADUATES

In addition to the preceding courses, more advanced work in mathematics is offered for candidates for the master's degree. Courses are available in the following subjects: Advanced Calculus, Theory of Equations, Theory of Functions of a Complex Variable, Modern Analytical Geometry, and Theoretical Mechanics.

Military Training

First Lieutenant MATHEWS (U. S. A.), 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 under twenty-five years of age are required to take military science three full hours a week for two years, unless excused from a part of this on account of membership in College athletic teams. (See Physical Education.) A student entering as a junior or above is held for Military Science for the time necessary to complete the remainder

of his College course unless this period is reduced by credits brought from another institution.

Credit in military science to a greater or less extent may be allowed through the committee on advanced credits only on account of military work done in other institutions, or in the School of Agriculture, under the instruction of an officer detailed by the War Department of the United States.

Requests for excuse from military science, or for postponement of the work, are acted upon by the President of the College. Such requests are presented through the student's dean, and the President obtains the advice of the commandant of cadets, who thoroughly investigates each case on its merits and makes his recommendation to the President. Requests based on physical condition must be accompanied by a recommendation made by the College physician. Students excused from military science on account of physical disability or age are assigned to an equivalent amount of some other College work instead. Students permitted to postpone military science for any reason are not thereby excused but must make it up later, even though they have in the meantime reached the age of twenty-five years.

Additional work in military science may be elected by students who have completed the required work, and these are given preference for appointment as cadet officers and noncommissioned officers. A senior or junior, having enrolled optionally and accepted a commission or warrant, is required to continue the work throughout the College year subject to the same regulations as other cadets. One credit unit of elective work toward graduation is allowed for each term of military science taken beyond that required.

Students under military instruction are organized into a battalion or a regiment of infantry, a machine-gun platoon, a company of engineers, and a company of signal corps, 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 regimental 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. Commissions are given all officers, and these commissions are signed by the governor, the secretary of state, and the adjutant general of Kansas National Guard, while warrants signed by the President of the College and the commandant of cadets are issued to the noncommissioned officers. Both are held during the good conduct of the recipient.

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 of the Corps of Cadets, Kansas State Agricultural College, and is expected to conform to the rules and requirements of the same.

The uniform conforms generally to the U. S. Army service uniform. The cost of cap, blouse, breeches, leggins, and gloves amounts to approximately $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, report at once to the office of the commandant of cadets for measurement, and then make their cash deposits to cover the cost of the uniform. Students who are unable to purchase both uniform and civilian clothing are advised to wear the uniform in lieu of civilian clothing during their term of compulsory military training. Cadets belonging to the local company of the Kansas National Guard are permitted to use their issue uniforms and, in addition, receive pay and credit for drill done at the College.

The Department of Military Science, having during the past two years attained such a degree of proficiency as to be classified as a "distinguished college" by the War Department, we are privileged to recommend for appointment a second lieutenant in the United States Army from the graduating class. The appointee is the man having the highest scholarship and military attainments.

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 constabulary, 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.

Attention is invited also to the following order from the War Department:

"1. As a result of a conference between a committee of the War Department and a committee representing the Association of Military Schools and Colleges, it has been decided that the War Department will issue to the graduates of military colleges and schools, at which officers of the army are detailed as professors of military science and tactics, who have pursued the military course, a certificate to the effect that they are qualified mentally, morally, and physically for appointment as officers of volunteers or reserves and that they have demonstrated their capacity by examination. The record is filed in the War Department and the recipient of the certificate is required to keep the adjutant general of the army notified as to his whereabouts.

"2. The examination referred to in the certificate will be both written and practical and will be conducted by the professor of military science and tactics, under instructions from the War Department."

The College is equipped with a modern target range, complete in every detail, and an indoor gallery range. A College rifle club, with the initiation fee fixed at $1, has been organized by the cadets. To this club, organized for the purpose of promoting rifle practice, all cadets are eligible. Matches are held each week with the leading colleges and universities throughout the United States.

The following explanation of the courses in military science is placed here for the information of the student, and the general amplification of the six terms of compulsory work. In general, the several lectures will be delivered by the commandant, or such other persons as he may be able to obtain. The subject of a lecture will, in most cases, be a military one covering some phase of the national defenses, military history, or military policy of the United States. Cadets will not be required to take notes on the lectures unless they desire to do so. The recitation work in the fall and spring terms, when held, will be classroom explanation and recitation on different parts of the work, which will be more easily grasped by a theoretical explanation of the subject in conjunction with the practical work, while that of the winter term will be largely theoretical, requiring outside preparation. Arrangements have been made with the English Department whereby credit may be given for all satisfactory theme work. The term requirements in this regard are of such a light nature that the work will not require over ten minutes per day for the whole term.

COURSES IN MILITARY SCIENCE AND TACTICS

MILITARY SCIENCE I. Lectures, recitations, themes, and laboratory, three hours. Required in all College courses and the first year in the School of Agriculture for all male students. Prerequisites: None.

This term's work begins the study of the national defenses of the United States. The military policy of the United States, the school of the soldier, squad, and company. It is designed, with the succeeding terms, to give the student a knowledge of the military history and military policy, or rather lack of one, of the United States, and will attempt to point out a rational, sane method of preparing each and every one for the defense of his native land in case of necessity. Having shown the necessity of military training the course becomes one of practical training in the three different schools named above, always appealing first to the individual's reason in an attempt to show him the reason for everything he does. *Manual of Military Training,* by Capt. Jas. A. Moss, is the textbook used. This will be supplemented by certain reference work on *The Military Policy of the United States,* by General Emory S. Upton.

MILITARY SCIENCE II. Lectures, recitations, themes and laboratory, three hours. Required in all College courses and the first year in the School of Agriculture for all male students. Prerequisites: None.

The work under this head is a continuation of the study of the military needs of the country and the more elementary details of the duties devolving upon one in case he is called to the defense of the country, and will include the same text and reference books as that in Military Science I, with such addition as may be deemed advisable by the head of the department.

MILITARY SCIENCE III. Lectures, recitations, themes and laboratory, three hours. Required in all College courses and first year in the School of Agriculture for all male students. Prerequisites: None.

The work under this head is a continuation of the preceding terms' work, putting special stress on extended-order work, outposts, patrols, advance guards, rear guards, flank guards, small-arms firing, gallery practice, practice on outdoor range, guard mounting, performance of guard duty, castrametation, hygiene and first aid to the injured, together with sand table exercises and map problems. Textbook, Capt. Jas. A. Moss's *Manual of Military Training*. Reference book, *The Valor of Ignorance*, by Gen. Homer Lea.

MILITARY SCIENCE IV. Second or sophomore year, fall term. Lectures, recitations, themes, and laboratory, three hours. Required in all College courses. Prerequisites: Military Science I and II.

In this course it will be the object of the department to continue and perfect the work learned in the schools of the soldier, squad, company, manual of arms, care and preservation of the rifle, and all other equipment, extended order, outposts, outguards of all classes, range practice, both indoors and outdoors, ceremonies of all kinds. Textbook, Capt. Jas. A. Moss's *Manual of Military Training*. Reference book, *The Day of the Saxon*, by Gen. Homer Lea.

MILITARY SCIENCE V. Second or sophomore year, winter term. Lectures, recitations, themes, and laboratory, three hours. Required in all College courses. Prerequisites: Military Science I, II, III, or IV.

The work during this term will be largely theoretical in character, taking up the theory of combat, castrametation, marches, underlying principles of rifle fire, and the methods of instruction for field firing of large bodies of untrained men; methods of obtaining and maintaining health conditions in large bodies of men, the causes of camp diseases, and methods of preventing and eliminating same. Textbook, Capt. Jas. A. Moss's *Manual of Military Training*, with such reference work as may be deemed necessary by the head of the department. *Peace Insurance*, by Capt. Richard Stockton, is taken up as advanced work.

MILITARY SCIENCE VI. Second and sophomore year, spring term. Lectures, recitations, themes, and laboratory, three hours. Required in all College courses. Prerequisites: Military Science I, II, III, or IV, or V.

During the last term's required work in the department of military science it will be necessary for all men to become thoroughly acquainted with the organization, administration, and supply of the army, both in peace and war. Under organization the subject of present distribution of the army, reasons therefor, changes recommended by the general staff of the army, with reasons for the same. Actual peace basis compared with that recommended by the general staff, with reasons. Military map-making and map-reading. Textbook, Capt. Jas. A. Moss's *Manual of Military Training*. Reference book for use in writing the required theme of 600 or more words, *Report on the Organization of the Land Forces of the United States*.

MILITARY ENGINEERING I. Elective in all College courses upon completion of two years of military science. Fall term. Lecture or recitation, one hour; laboratory, four hours. Three credits. Prerequisites: Two years of military science.

This is a practical course in field engineering, using the materials at hand to construct simple yet at times very necessary engineering structures, with these materials, using short, rough but comparatively accurate methods in accomplishing the work in hand. Sand table exercises are given, and cords and knots used in hasty bridge construction are studied. Text, Beach's *Field Engineering*, with such reference work as may be deemed necessary.

MILITARY ENGINEERING II. Elective in all College courses, upon completion of two years of military science. Winter term. Lecture or recitation, one hour; laboratory, four hours. Three credits. Prerequisite: Military Engineering I.

This course is a continuation of Military Engineering I, taking up reconnaissance, bridge building, roads, their construction and care. Textbook, *Engineering Field Manual,* with reference work.

MILITARY ENGINEERING III. Elective in all College courses upon completion of two years in military science. Spring term. Lectures or recitation, one hour; laboratory, four hours. Three credits. Prerequisites: Military Engineering I and II.

In this course which is a continuation of Military Engineering I and II, special stress is laid upon railroad construction, field fortification, animal transportation and such other work of an engineering nature as may be considered beneficial, together with informal talks upon the work done by the army engineers in different parts of the world, the methods of accomplishing same, difficulties other than engineering, such as climate, sanitation, etc., that must be overcome. Text, *Engineering Field Manual,* together with reference work in the professional papers of the Engineering Corps.

All of the engineering work enumerated above is of the most practical nature and will be of great help to any man, whether he be in the Division of Mechanic Arts, Agriculture, or General Science, as it trains engineering students in rough-and-ready methods of accomplishing work of a temporary or of a permanent nature, agriculture students in rough bridge building, road making, etc.; while for the general science student it offers an opportunity to complete and round out his work in lines of general, and at the same time practical, every-day use.

SMALL-ARMS FIRING REGULATIONS AND INFANTRY DRILL REGULATIONS. Elective in all College courses. Fall term. Lectures and recitations, two hours. One credit. Prerequisite: None.

This is a practical course in both firing regulations and infantry drill regulations, which will give all men who are interested in rifle shooting an opportunity to learn the theory of shooting, the causes of poor shooting, methods of overcoming same and how to become a good shot, while the course in infantry drill will perfect men along the theoretical lines of this subject, show them the reason why, and the proper way to do, enabling men who are especially interested in becoming officers and noncommissioned officers to perfect themselves so as to prove their ability in these lines. Textbook, Capt. Jas. A. Moss's *Manual of Military Training,* with such reference to War Department publications as may be deemed necessary.

FIELD SERVICE REGULATIONS, AND GUARD MANUAL. Elective in all College courses. Winter term. Lectures and recitations, two hours. One credit. Prerequisite: None.

This is a course in two of the most important subjects that affect a soldier's duty and on matters that it is of primary importance he should know theoretically, and be able to put into practical application. The safety of not only himself but of the entire command will at many times depend upon the manner in which he performs the different kinds of patrolling, reconnoitering, outpost and other guard duty described in the two subjects above. Text, Capt. Jas. A. Moss's *Manual of Military Training,* and such reference work from War Department publications as may be necessary.

FIRST AID TO THE INJURED, PERSONAL HYGIENE, AND CAMP SANITATION. Elective in all College courses. Spring term. Lectures and recitations, two hours. One credit. Prerequisite: None.

In this day and age a knowledge of first aid and personal hygiene, together with its kindred subject, camp sanitation, is of primary impor-

tance to every one—more so than it has ever been heretofore; and it will undoubtedly become of even greater importance as time goes on. Surprising as it may seem, we are learning that the rural districts are in even greater need along these lines nowadays than the cities, and as the great majority of our students are from these districts this is an exceptional opportunity for them to improve themselves in the above subjects. Textbook, Capt. Jas. A. Moss's *Manual of Military Training*, together with such work in books of a similiar nature as may be beneficial.

Music

Professor WESBROOK
Assistant Professor BROWN
Instructor CARLEY
Assistant BIDDISON
Assistant EASTER
Assistant FAIRMAN
Assistant ABERNETHY
Band Leader OZMENT

The aim of the Department of Music is to become of vital value in the life of every student. The department strives to create and foster a love and appreciation for the best in music and to give to students that broader culture and more complete education which is gained through academic and professional and vocational training combined with musical and artistic study. Believing that this can be accomplished to a much greater degree by having artistic performers among us, courses are offered which will prepare those who so desire to be efficient in some chosen musical line. Students enrolled in the department participate in the musical contributions to the public programs of the College, and such participation is a part of their training and duty.

METHODS OF INSTRUCTION

Instruction in voice and instrumental music is taught in private lessons. Each teacher in the Department of Music, however, reserves a certain number of hours of his time for class work in these subjects, taking four in a class for a period of one hour a week, so that those not having time for the private work may enroll in these classes and by emulation and observation, and, with what little individual attention the student may receive in so short a time, will get a general view and insight into the work undertaken. However, no two students have the same mental, physical or artistic capacity, and their individual capabilities can be neither properly nor fully developed without painstaking personal attention. The best results are dependent on a close adaptation to the individual needs of the pupils, and this, of course, can not be gained in classes, as is the case in the individual lessons. The effectiveness of the methods used is demonstrated by the interest and progress of the pupils.

All theoretical work is taught in classes. These and other classes in the Department of Music are free to any student in the institution.

CREDITS

Students taking work in the Department of Music are allowed credits on their work in the Divisions of General Science, Home Economics, and Agriculture, while substitutions in music, with the approval of the Dean, may be made in the Division of Mechanic Arts, as follows: For Voice or

some instrument, two hours each term; for Musical History, one hour each term; for Harmony, two hours each term; for Counterpoint, Musical Form and Musical Analysis, two hours each term; for Chorus, Orchestra or Band, one hour each term; for Public School Music Methods, two hours each term. Young women electing music instead of the second year of physical training will be given a course consisting of choral work Monday evening of each week and one lesson a week in Musical Appreciation.

Students coming from other schools to take up our course in applied music may be sufficiently advanced as players or singers to enter the second or third year of the regular course but prohibited therefrom owing to their lack of theoretical knowledge. If such students enter the first year of the theoretical course, their progress as players and singers is not retarded, but it would be much to their advantage to make special theoretical preparation in the hope of qualifying for more advanced standing.

CURRICULUM IN APPLIED MUSIC

By applied music is meant the practical and scientific study of voice, piano, violin, violoncello, organ, or some band instrument, in private individual lessons, together with the study of theoretical subjects in classes. The course is designed to fit students not only to be artistic soloists, but also to be efficient teachers of their chosen instrument.

In addition to the requirements outlined below, a high-school education or its equivalent is necessary for a certificate. As to the length of time it takes to complete this course satisfactorily, much depends upon the natural ability of the pupil, the intensity of his application, and the time he spends in developing the art of his particular instrument. Each candidate for a certificate must give a public recital some time during the spring term of his third year.

During the last term in this course a teacher-training class in each department is conducted, and this practice teaching, under the supervision of the instructor, together with the training already acquired, gives to the student the fundamentals for successful teaching.

OUTLINE OF CURRICULUM IN APPLIED MUSIC

FIRST YEAR

FALL TERM:

Voice or some instrument. Two private lessons a week.
Harmony I. Two one-hour recitations a week.
Musical Appreciation I. One one-hour recitation a week.
Ensemble. Choral society, orchestra, band or glee club.
Elementary German I. Four one-hour recitations a week.

WINTER TERM:

Voice or some instrument. Two private lessons a week.
Harmony II. Two one-hour recitations a week.
Musical Appreciation II. One one-hour recitation a week.
Ensemble. Choral society, orchestra, band or glee club.
Elementary German II. Four one-hour recitations a week.

SPRING TERM:

Voice or some instrument. Two private lessons a week.
Harmony III. Two one-hour recitations a week.
Musical Appreciation III. One one-hour recitation a week.
Ensemble. Choral society, orchestra, band or glee club.
German Readings. Four one-hour recitations a week.

SECOND YEAR

FALL TERM:

Voice or some instrument. Two private lessons a week.
Harmony IV. Two one-hour recitations a week.
Ensemble. Choral Society, orchestra, band or glee club.
Musical History I. One one-hour recitation a week.
Ear Training. One one-hour recitation a week.
English I (Music). Four one-hour recitations a week.
Recital.

WINTER TERM:

Voice or some instrument. Two private lessons a week.
Harmony V. Two one-hour recitations a week.
Ensemble. Choral society, orchestra, band or glee club.
Musical History II. One one-hour recitation a week.
Ear Training. One one-hour recitation a week.
English II (Music). Four one-hour recitations a week.
Recital.

SPRING TERM:

Voice or some instrument. Two private lessons a week.
Harmony VI. Two one-hour recitations a week.
Ensemble. Choral society, orchestra, band or glee club.
Musical History III. One one-hour recitation a week.
Ear Training. One one-hour recitation a week.
English III (Music). Four one-hour recitations a week.
Recital.

THIRD YEAR

FALL TERM:

Voice or some instrument. Two private lessons a week.
Counterpoint. Two one-hour recitations a week.
Ensemble. Choral society, orchestra, band or glee club.
Psychology. Four one-hour recitations a week.
Recital.

WINTER TERM:

Voice or some instrument. Two private lessons a week.
Musical Form. Two one-hour recitations a week.
Ensemble. Choral society, orchestra, band or glee club.
History of Education. Four one-hour recitations a week.
Recital.

SPRING TERM:

Voice or some instrument. Two private lessons a week.
Musical Analysis. Two one-hour recitations a week.
Ensemble. Choral society, orchestra, band or glee club.
Educational Psychology. Four one-hour recitations a week.
Recital.
Practice Teaching.

Upon the approval of the Dean of the Division of General Science and the Director of the Department of Music, substitutes in collegiate subjects such as German, English, etc., as outlined above, may be made, these substitutes to be made in literary lines.

A certificate is awarded to students who complete the course in music as outlined in the foregoing statement.

THEORETICAL COURSES IN MUSIC

The aim of theoretical courses is primarily to give the student an intelligent conception of music as a science, and to give him such working knowledge of the material of music as will fit him for intelligent appreciation, criticism and interpretation; and secondarily, to form a broad foundation for later study in composition.

HARMONY I, II AND III. Beginning fall term and continuing throughout the year. Class work, two hours. Two credits. Required in curriculum in Applied Music. Elective in College courses. Texts, Heacox's *First Lessons in Harmony* and Chadwick's *Harmony*.

This course consists of a study of the following: Scales and intervals; primary and secondary triads and their inversions; harmonizing of given basses and melodies; chords of the dominant seventh; secondary seventh chords; modulation; original work begun; ear training; key-board harmony.

HARMONY IV, V AND VI. Beginning fall term and continuing throughout the year. Class work, two hours. Two credits. Required in curriculum in Applied Music. Elective in College courses. Prerequisite: Harmony III. Text, Chadwick's *Harmony*.

This course includes a study of the following: Modulations, continued; altered chords; suspensions; foreign tones; pedal points; figuration; accompaniments; original work; ear training; elementary harmonic analysis; elementary analysis of form.

COUNTERPOINT. Fall term. Class work, two hours. Two credits. Required in curriculum in Applied Music. Elective in College courses. Prerequisite: Harmony VI. Text, Lehmann's *Counterpoint*.

The course in counterpoint consists of the study of simple counterpoint in two parts: first, second, third, fourth and fifth species, and florid counterpoint.

MUSICAL FORM AND MUSICAL ANALYSIS. Beginning winter term and continuing through spring term. Class work, two hours. Two credits each term. Required in curriculum in Applied Music. Elective in College courses. Prerequisites: Harmony VI and Counterpoint. Text, Cutter's *Musical Analysis*.

Chord reading and the accounting theoretically for every note in a piece of music, combined with analytical study of hymn tunes, preludes, inventions, and dance forms of Bach, small instrumental forms, song forms, sonata forms, cantata and oratorio forms.

HISTORY OF MUSIC I, II AND III. Beginning fall term and continuing through the year. Students may enter at the beginning of any term, however. Class work, one hour. One credit each term. Required in curriculum in Applied Music. Elective in College courses. Text, Hamilton's *Outline of Musical History*.

A modern text forming the basis of this work is supplemented by lectures and library research. Time is given to the early and primitive development of the art, but special stress is laid upon the classical, Roman and modern periods, together with the present-day conditions and tendencies. In addition to theses upon the general historical and critical subjects, the class is also given practice in journalistic criticism of concert and recital performances.

MUSICAL APPRECIATION I, II AND III. Class work, one hour. Lectures.

Students may be enrolled at the beginning of any term. Required in the curriculum in Applied Music. Elective in College courses.

Music is a language and like language must be learned by hearing. As it is the sole design of this course to facilitate intelligent listening, the student's powers of imagination and observation are appealed to at once.

The work is presented in a nontechnical way in the form of illustration from a talking machine. The subjects treated are melody, rhythm, form, cadence, classical and romantic ideals, present-day tendencies, songs, piano, violin, orchestra, band, chorus, opera, etc., and differences in concert and recital programs.

Several different hours are devoted to this work so that many students may be accommodated at periods which will suit their convenience.

SCHOOL MUSIC METHODS I, II, AND III. Fall term and continuing throughout the year. Lectures and research, three hours. Two credits each term. Elective in College courses.

This course deals with the place of music and the teacher in the school and in the community.

SCHOOL MUSIC METHODS IV, V, AND VI. Fall term and continuing throughout the year. Lectures, research and practice teaching, three hours. Two credits each term. Elective in College courses. These courses are a continuation of Public School Music Methods I, II, and III.

PRACTICAL COURSES IN MUSIC

VOICE. Two private lessons a week. Two credits. Elective in College courses. No College credit is given for work taken in classes.

The course of instruction is based primarily upon the Italian school for training voices. Correct tone placement, so that the pupil produces tones throughout all registers with ease, and with firm, even quality, is the foundation of good singing. During the first year especial attention is given to a systematic course in breathing, tone placement and analysis of vowels and consonants relative to vocal needs. At all times attention is given to perfect enunciation, and German, French and Italian diction is taught in connection with actual song coaching. The song literature of America, England, Germany, France and Italy is studied and a satisfactory performance of songs, oratorio or operatic arias from each one of these schools is necessary. Students specializing in voice in this course are expected to be or become able to play simple accompaniments.

VIOLIN. Two private lessons a week. Two credits. Elective in College courses. No College credit is given for work taken in classes.

In this department the aim is to teach the fundamentals of violin playing in such a manner as to lay the foundation of intelligent musicianship. In this work as in the other lines of musical endeavor, mastery of the instrument is a task which imposes different difficulties upon every student. Natural ability, physical characteristics and the general make-up of the individual so influenced progress that no definite method of instruction can be outlined which can be profitably pursued by all players. However, particular attention is paid to the correct position of the student while playing and also the manner of holding the violin and bow. A graceful and natural method of playing is insisted upon and great care is exercised to develop an accurate feeling for good intonation. Elementary scale work is begun at an early period and is gradually extended. Studies and exercises from the best writers are selected and, as the student develops, the entire field of violin literature is open for study.

Violincello, viola and contrabass receive the same attention in this department as does the violin.

PIANO. Two private lessons a week. Two credits. Elective in College courses. No College credit is allowed for work taken in classes.

The methods of instruction in this department are direct and simple. Pupils are taught not only to play, but also to think logically according to the scientific principles of the art. Thus is developed definite and intelligent teaching ability as well as sound artistic performance. A technical foundation is the first requisite in modern piano playing. This is accomplished by a carefully selected and graded set of exercises and studies designed to bring about that mental control of muscles, without which artistic results can not be obtained. Clearness of conception, distinctness of phrasing, variety of tone, good rhythm and technical accuracy are insisted upon. As the student advances, difficult compositions of both the classic and modern writers are studied. Interpretation becomes a special study and all the emotional, intellectual and physical faculties are brought into that harmony and control which alone results in artistic performance. Opportunity is offered for study of accompaniments and piano ensemble.

WIND INSTRUMENTS. Two private lessons a week. Two credits. Elective in College courses. No College credit is given for class work.

In this department opportunity is offered for the study of any wind instrument. Both the Albert and Boehm systems of clarinet playing are taught, while the semi-no-pressure system of cornet playing is used. In this as in other departments, the work is taught beginning with elementary scale and technical study and extending over the more difficult literature written for wind instruments. Instruction in instrumentation, conducting and formation of bands is also given.

MUSICAL ORGANIZATIONS

Every voice and each instrument has a distinct function in the science of tonal expression and only in the combination of voices and instruments are the finest effects in the coloring of melody, harmony and rhythm produced. This combination is made possible in the Department of Music by the number of students enrolled in the College and by the variety of ensemble organizations.

THE CHORAL SOCIETY. Throughout the year. Weekly rehearsals, all special rehearsals and public performances. One credit.

This organization, which is conducted by Professor Wesbrook, numbers about three hundred and is one of the largest student singing organizations in America. The rehearsals are held Monday evening, weekly, and part songs, madrigals, glees, cantatas, and the great oratorios are studied and presented publicly with the assistance of the orchestra and visiting artist soloists.

THE ORCHESTRA. Regular rehearsals, all special rehearsals and public performances. One credit.

The orchestra is conducted by Assistant Professor Brown, teacher of stringed instruments. It is a definite organization wherein discipline prevails and permanent membership with regular attendance is insisted upon. This body maintains a correct and well-balanced instrumentation, containing all the instruments of the modern symphony orchestra. The work is highly educational and offers in the preparation for concerts and performances with the choral society the actual experience and routine necessary for efficient orchestra playing. Membership is open to all in the College who are capable of playing acceptably.

THE MILITARY BAND. Regular rehearsals, special rehearsals and public performances. One credit.

The band is a part of the cadet corps and practice in the band is accredited through the Department of Military Science in lieu of drill and theoretical instruction. Members of the band are required to conform strictly to the cadet regulations, while assignments to the band are made by Band Leader Ozment. The band furnishes music for all ceremonies of a military character and for various other College occasions.

THE APOLLO CLUB. The Apollo Club consists of about thirty of the best men's voices in the Institution. The try-out for this singing body is held in the fall term of each year and the club is chosen from a large number seeking admission. A "waiting list" is maintained, and a place made vacant in the club by a member who drops out, is immediately filled by one on this list.

The singing of the Apollo Club is characterized by striking vigor, spontaneity, clear enunciation, shading and color, all of which are vital elements in artistic singing. This organization is available for a limited number of concert engagements and recitals throughout the State.

THE ST. CECILIA CLUB. This is a singing organization of young women and is without doubt one of the finest organizations of its kind in the West. The voices are selected with the utmost care as to range,

blending qualities and special adaptability to the work, thus securing an almost perfect ensemble. The St. Cecilia and Apollo Clubs are combined for special choir singing.

RECITALS AND CONCERTS

Unusual advantages for hearing good music are afforded at this Institution. In addition to numerous choral, orchestra, band and glee-club concerts given in which the leading soloists of the country are heard assisting, a number of great artists are brought to our College by the College lyceum-course committee. Recitals by the members of the conservatory faculty and by students are numerous.

FEES

The following nominal term fees for private instruction are charged those pursuing regular college courses leading to a B. S. degree:

Voice, with the director, two private lessons a week	$12.00
Voice, with other teachers, two private lessons a week	9.00
Violin, two private lessons a week	10.00
Piano, two private lessons a week	9.00
Band instruments, two private lessons a week	5.00

The following nominal term fees for private instruction are charged special music students and all those not pursuing College courses leading to B. S. degree.

Voice, with the director, two private lessons a week	$25.00
Voice, with the director, one private lesson a week	15.00
Voice, with other teacher, two private lessons a week	20.00
Voice, with other teacher, one private lesson a week	12.00
Violin, two private lessons a week	20.00
Violin, one private lesson a week	12.00
Piano, two private lessons a week	20.00
Piano, one private lesson a week	12.00
Band instruments, two private lessons a week	12.00
Band instruments, one private lesson a week	7.00
Piano rent for all students, a term	2.00

Physical Education and Athletics

G. S. LOWMAN, Professor of Physical Education and Director of Intramural Athletics
J. R. BENDER, Head Coach and Director of Inter-collegiate Athletics
BLANCHE ENYART, Assistant Professor of Physical Education for Women
C. J. MERNER, Instructor in Physical Education and Assistant Coach
ETHEL M. LORING, Assistant in Physical Education for Women

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 each student 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.

COURSE FOR BOTH MEN AND WOMEN

PLAYGROUND METHODS. Elective, spring term. Recitation, two hours. Two credits. Professor Lowman.

The playground idea is spreading throughout the country, and it has been stated on good authority that if the present rate of increase continues within the next three or four years there will be well-organized playgrounds in every city with a population of 5000 or more. With the remarkable growth of the playground movement, and the excellent opportunity for service offered by this new phase of work, has come a demand for trained play leaders and organizers of play. The well-trained teacher will find in this field not only good remuneration for his services but a most interesting sphere of labor.

It is the object of this course to so qualify the students taking this work that they may have an intelligent knowledge of and the reasons for the organization of play activities; that they may also be equipped to intelligently promote, equip and administer playgrounds and playground activities.

The course covers, in general, the history of the playground movement in the United States; the necessity of the playground; playgrounds in large cities and in small towns; how to start and maintain playgrounds; supervisory organization, location, construction and administration of playgrounds. Suggestions are given to the playground directors in regard to (*a*) the educational value of directed play, (*b*) equipment of the grounds, (*c*) publicity work, (*d*) time and hours, (*e*) the daily playground, (*f*) special days, (*g*) clubs, (*h*) government on the playground, (*i*) activities to encourage, and (*j*) the special games for the playground, with special emphasis on the rural problem.

PHYSICAL TRAINING FOR MEN

Physical training is optional for College men, but may be elected. Three days a week for the term is considered full time, and for this one hour of credit is given. A total of six hours of credit may be elected.

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 conditions, 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, tastes, and capacities. 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 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 sports during the school year must undergo a physical examination preliminary to participation in each

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 of typical men.

Members of the 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. Credit, the equivalent of a one-hour subject, is given and counts toward the College degree. The individual's grade rests largely on the basis of attendance, punctuality, earnestness, and application; but written and practical tests are also given.

Regulation uniforms must be worn in the gymnasium. Students are advised not to procure uniforms until after their arrival at the College.

All requests for transfer from military to intramural athletic work must come directly from the Professor of Physical Education, and as soon as the transfer is definitely decided upon, the Registrar and the Dean are notified in order that a proper record of the change in assignment may be made.

Students who are due to take military drill, but who expect to be on athletic teams for one or more sports, must be measured for military uniforms and order uniforms at the beginning of the term in order that they may be ready for use at once when the students are reported back to the Department of Military Training.

HYGIENE 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.—INTRODUCTORY COURSE. Ten lectures. Hygiene and social problems are discussed in special lectures and attendance on these lectures is required of all men entering College.

2.—FRESHMAN COURSE. Six 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.

3.—SOPHOMORE COURSE. Six lectures. This course reviews and enlarges upon certain phases of the freshman 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.

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 movement, 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 basketball, 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.

h. *Swimming.* A part of the regular instruction for the spring term is in swimming. A passing grade must be made in this phase of the work.

ATHLETICS

DEPARTMENTAL ATHLETICS. In the fall and spring terms, the courses in the gymnasium are partly 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 basketball. In the spring are offered: baseball; track and field events; cross-country running; and outdoor basketball.

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.

INTRAMURAL ATHLETICS. All athletics within the institution, including the School of Agriculture teams, come directly under the supervision of the Department of Physical Education. It is the aim of the department to furnish an opportunity for all students to participate in some form of healthy athletic competition. To carry out the above aim, class football is maintained during the fall term between the different classes of the College, also between the different classes in the School of Agriculture. Basketball is also promoted during the fall and early part of the winter between the different fraternities, different classes and differ-

ent cadet companies, as well as between the different departments of the institution.

The work of the spring term is largely given over to competition in baseball, between the different classes, both in the College and School of Agriculture, the different departments of the institution and boarding-house teams. It is the aim of the department, too, to revive an interest in track athletics between the different classes of the institution. All these activities as promoted will be run, as nearly as possible, on a tournament plan, making it possible for a large majority of the students to participate in some form of activity. Suitable trophies will be presented and suitable emblems will be granted to participants on winning teams.

In addition to interclass competition there will be a small outside schedule for the School of Agriculture in the different forms of athletics promoted by the department.

By action of the Student Council, approved by the Faculty, the following rules govern class athletic contests:

1. Managers of class teams are required to play only men who hold assignments to the class with which they play.
2. The requirements for participation in class games are the same as for varsity teams.
3. The respective managers of class athletics are required to present a certified list of eligible players to the other manager at each game.
4. No man who has been a member of the varsity squad during a given season shall participate in a class game during that season.
5. No man shall participate in a class game who has won a K in that sport.

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 value 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 educational system and a healthy system of sport. Intercollegiate contests are scheduled for the different sports; namely, football, basketball, baseball, track athletics, and tennis. The College is a member of the Missouri Valley Conference and competes with the best teams in the Middle West.

A student who is a regular member of one or more of the College athletic teams, if due to take military science, may be transferred to athletics for the season of the sport in which he participates, but no man may take part in more than two sports, of one term each, in one year. At the end of the season the man is reported back to the Department of Military Training for the remainder of the term, and a grade reported to the Registrar by the Director of Intercollegiate Athletics for the student's work in that department, stating the time devoted to it; and a grade in military science is reported by the Professor of Military Training for the student's work in military drill, stating the time given to that subject.

Men due to take military science are permitted to try for the freshman athletic teams, and, if chosen for such teams, may be transferred from military training to physical education, as are regular members of the College athletic teams. Grades in the two subjects are also to be reported in a similar manner.

Men in the College teams, in the freshman athletic teams, or on trial for these teams, must report regularly for athletic work, and any who fail in this respect are returned to the Department of Military Training at once.

All requests for transfer from military to intercollegiate athletic work must come directly from the Director of Intercollegiate Athletics, and as soon as the transfer is definitely decided upon, the Registrar and the

Dean are notified in order that a proper record of the change in assignment may be made.

Students who are due to take military science, but who expect to be on athletic teams for one or more sports, must be measured for military uniforms and order uniforms at the beginning of the term in order that they may be ready for use at once when the students are reported back to the Department of Military Training.

Intercollegiate athletics are placed under the supervision of the Athletic Board by an order of the Board of Administration. This Athletic Board consists of the President of the College, four other members of the Faculty appointed by the Board of Administration, and one member from each College class, elected by his class.

Participation in intercollegiate athletic contests is fixed by the following Missouri Valley Conference rules:

1. No student is eligible who receives pay from his institution as a regular instructor.
2. No student is eligible who receives pay for his services as player or manager of his team.
3. No student who has received pay for his athletic skill or knowledge is eligible to participate in any intercollegiate contest (except for summer baseball prior to 1912).
4. No student shall participate in contests as a member of an athletic team except on his home baseball team. No student shall play under an assumed name.
5. No student shall participate in intercollegiate sport for more than three years.
6. No postgraduate student shall participate in any intercollegiate contest.
7. No student shall participate in intercollegiate contests until he shall have been in attendance one full year before the date of contest, who has not passed in his entrance requirements, who has not passed in at least 45 hours' work during the year previous to contest, and who is not maintaining passing grades in 12 credit hours per week during the current term.
8. No person having participated in any intercollegiate contest and who fails to remain in College the remainder of that term, unless excused by his Dean for sickness, or other sufficient reason, shall participate again until he shall have completed six months of work following his last participation.

PHYSICAL TRAINING FOR 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. Physical training is required during the sophomore year for the young women who, in the judgment of the College physician and the Dean of Women, are in such condition of health as to require a second year's work in the Department of Physical Education. 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. After the two years' required physical training have been completed, women have the privilege of electing physical training for credit under the conditions stated above for the men.

PHYSICAL EXAMINATIONS

A physical examination of each young woman is made by the instructor in charge of women and the assistant College physician 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 special exercises are prescribed for the student needing individual corrective work.

A suit has been adopted which consists of an all-white middy blouse, and black-plaited serge bloomers. The white tennis shoe with the white rubber sole is used; black rubber soles are not allowed on the floor. For swimming, girls must have the regulation one-piece tank suit made from brown cotton covert according to a pattern approved by the Department of Physical Education.

For further information regarding the uniform, please write to Women's Physical Training Department, K. S. A. C., Manhattan, Kan.

INSTRUCTION IN PHYSICAL EXERCISE

1.—PHYSICAL TRAINING I. Freshman year, fall term. Three hours. Required of all young women. Assistant Professor Enyart and Miss Loring.

The first half of the term is devoted to outdoor games. The second half is devoted to floor work with light apparatus for improving posture, marching, fancy steps, song plays and games.

2.—PHYSICAL TRAINING II. Freshman year, winter term. Three hours. Required of all young women. Prerequisite: Physical Training I. Assistant Professor Enyart and Miss Loring.

In this course military marching, technique of athletic dancing, continuation of work with light apparatus, stall bars, flying rings, giant stride, work with chest weights, games and basketball are included.

3.—PHYSICAL TRAINING III. Freshman and sophomore years, spring term. Three hours. One term required of all young women; three subsequent terms, optional with music, required of all sophomore young women. Assistant Professor Enyart and Miss Loring.

Fancy marching, esthetic dancing, advanced free exercises, coördination of work with Indian clubs, wands, dumb-bells, jumping horse and parallel bars are here included, along with folk dances and song plays, tennis, and indoor baseball. Prerequisite: Physical Training II.

4.—SWIMMING. Open to all women students in the College. No credit. Individual instruction is given in this course.

Physics

Professor HAMILTON
Assistant Professor FLOYD
Assistant Professor RABURN
Instructor JENNESS
Instructor ALLEE
Instructor SMITH
Assistant BAIRD

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 everyday life.

The laboratory work which accompanies the courses in physics gives a 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. A deposit of $1.50 a term is required to cover the cost of supplies and breakage.

COURSES IN PHYSICS

FOR UNDERGRADUATES

HOUSEHOLD PHYSICS. Freshman year, fall, winter, and spring terms. Class work, four hours. Four credits. Prerequisite: One year of high-school physics or its equivalent. Professor Hamilton.

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; of some of the optical instruments used in scientific work; a study of electric lighting and illumination, and of 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.

GENERAL PHYSICS I. Sophomore year, fall term. Class work, three hours; laboratory, two hours. Four credits. Required in the course in general science. Prerequisites: Elementary Physics and Plane Trigonometry. Assistant Professor Floyd.

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 sound. Text, Reed and Guthe's *College Physics*.

Laboratory. The work is based upon laws and principles discussed in the classroom, and is so arranged that the students may have a practical illustration of the facts learned.

GENERAL PHYSICS II. Sophomore year, winter term. Class work, three hours; laboratory, two hours. Four credits. Required in the course in general science. Prerequisite: General Physics I. Mr. Allee.

This course includes a study of the theory of electricity. The class 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. Text, Reed and Guthe's *College Physics.*

Laboratory. The work follows the subjects presented in the class, and is conducted with a grade of apparatus that gives training in the use of the better class of instruments employed in scientific investigations.

GENERAL PHYSICS III. Sophomore year, spring term. Class work, three hours; laboratory, two hours. Four credits. Required in the course in general science. Prerequisite: General Physics II. Mr. Allee.

The work offered in this course includes the theory of heat and light. A study of the various effects of heat and the units employed in heat measurements. The work in light discusses not only the effects of light, but the methods used in measuring light intensities and the ways in which light may be used in physical measurements. Text, Reed and Guthe's *College Physics.*

Laboratory. The laboratory work consists of measurements in calorimetry, photometry, spectrum analysis, and light waves.

ENGINEERING PHYSICS I. Sophomore year, fall and winter terms. Class work, four hours; laboratory, two hours. Five credits. Required in all courses in the Division of Mechanic Arts; elective in the course in general science. Prerequisites: Elementary Physics and Trigonometry. Professor Hamilton or Assistant Professor Raburn.

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. Text, Kimball's *College Physics.*

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.

ENGINEERING PHYSICS II. Sophomore year, winter and spring terms. Class work, four hours; laboratory, two hours. Five credits. Required in all courses in the Division of Mechanic Arts; elective in the course in general science. Prerequisite: Engineering Physics I. Professor Hamilton.

This course treats of electricity and light. The work in electricity is of such a nature as to give the student 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 direct bearing upon light as a standard and method of measurement, are treated in this course. Text, Kimball's *College Physics.*

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 of 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.

ENGINEERING PHYSICS III. Sophomore year, fall and spring terms. Class work, four hours; laboratory, two hours. Five credits. Required in all courses in the Division of Mechanic Arts; elective in the course in

general science. Prerequisite: Engineering Physics II. Assistant Professor Raburn or Assistant Professor Floyd.

Heat is treated both theoretically and practically, and in such a manner that its relation to mechanical energy is emphasized. The method of measuring heat energy and the methods of heat transformation and transference are discussed and illustrated. The facts in sound that involve points of special use and training are discussed. Text, Spinney's *A Textbook of Physics.*

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.

AGRICULTURAL PHYSICS. Elective, spring term. Class work, four hours. Four credits. Assistant Professor Raburn.

This course includes 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.

ACOUSTICS. Junior year, fall term. Class work, one hour. One credit. Required in the course in architecture. Prerequisite: Engineering Physics III. Assistant Professor Floyd.

In this course a special study is made of the acoustic properties of buildings, of the architectural defects which give rise to poor acoustics, with a study of special methods used to avoid such troubles in construction of buildings or to correct them in constructed buildings.

FOR GRADUATES AND UNDERGRADUATES

RADIANT ENERGY. Elective, fall term. Class work, three hours; laboratory, two hours. Four credits. Elective in the course in general science. Professor Hamilton or Assistant Professor Floyd.

This course and the two courses following are arranged with the special purpose of giving a 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 the theory developed in the class work, and includes the use of the spectrometer, polariscope, interferometer, optical bench, of photometry, etc.

PHYSICAL MEASUREMENTS. Elective, winter term. Class work, two hours; laboratory, four hours. Four credits. Elective in the course in general science. Professor Hamilton or Assistant Professor Floyd.

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.

PHYSICAL MANIPULATIONS. Elective, spring term. Class work, two hours; laboratory, four hours. Four credits. Elective in the course in general science. Assistant Professor Floyd.

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.

PHOTOGRAPHY. Elective, fall or spring term. Class work, two hours; laboratory, two hours. Three credits. Prerequisite: Training in physics and chemistry. Professor Hamilton.

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 enlargement, and the prints best adapted for illustrated articles in newspapers and magazines.

Public Speaking

Instructor EMERSON in charge

It is the constant effort of the Department of Public Speaking to relate the training in public speaking with the work of all the other departments of the College; to harmonize it with the spirit of the school, which is distinctly technical and industrial. With this object in view, students are trained in the presentation and discussion of the valuable ideas acquired in their various fields of study. The method pursued in this training is that of actual practice on the platform before an audience. Conviction, not entertainment, is the dominant purpose in every case.

The department seeks to place itself at the service of those various organizations of the College which desire or need its assistance. In addition to its regular courses it aims to make itself available as far as possible for individual rehearsals; for the training of the debaters and orators of the College; and for the directing and coaching of plays. Students are urged to ally themselves with the organizations representing these various activities.

COURSES IN PUBLIC SPEAKING

FOR UNDERGRADUATES

PUBLIC SPEAKING I. Freshman year, each term. Class work, two hours. Two credits. Required in the courses in general science and industrial journalism. Mr. Emerson.

The purpose of this course is to enable the student to attain some proficiency in the art of oral interpretation. The training given seeks to develop a natural style. In connection with the practice work upon the platform the student is given such points of theory and such routine drill as are necessary for the development and use of the voice and for proper platform deportment.

PUBLIC SPEAKING II. Elective, spring term. Class work, two hours. Two credits. Elective in the courses in general science and industrial journalism. Prerequisite: Public Speaking I, or by arrangement with the head of the department. Mr. Emerson.

This course is a continuation of Public Speaking I, and involves a more advanced study of the art of oral interpretation.

EXTEMPORE SPEECH I. Sophomore, junior, and senior years, each term. Class work, two hours. Two credits. Required in the courses in general science, industrial journalism, and mechanic arts; elective elsewhere. Mr. Emerson.

The work of this course consists in the preparation and delivery of short addresses based on prepared outlines. Careful preparation of material is required. The plan of the speech is made in advance, but the choice of language is left for the moment of speaking. Criticism and points of theory given by the instructor supplement the course.

FOR GRADUATES AND UNDERGRADUATES

EXTEMPORE SPEECH II. Elective, spring term. Class work, two hours. Two credits. Prerequisite: Extempore Speech I, or its equivalent. Mr. Emerson.

This course is a continuation of Extempore Speech I. The same methods are pursued but special attention is given to the telling of humorous stories, to after-dinner speaking, and the like.

ADVANCED PUBLIC SPEAKING. Elective, spring term. One credit. Prerequisites: Extempore Speech I and II, or by special arrangement with the head of the department. Mr. Emerson.

In this course the work consists of the preparation and delivery by the student of one extended lecture-recital, lectures, or address during the term. This is supplemented by class lectures and practice, and by a study of types. It may include the preparation and delivery of institute talks, or of addresses suitable for extension work.

Zoology

Professor NABOURS
Assistant Professor ACKERT
Assistant Professor HARMAN
Instructor ALLEN
Instructor DICE
Assistant BELLOMY
Assistant REED
Assistant HAGUE

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 constantly reminded 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, and representative collections 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

FOR UNDERGRADUATES

GENERAL ZOÖLOGY I, II, AND EMBRYOLOGY. Sophomore year for students in agriculture, general science, industrial journalism, and home economics; freshman year for students in veterinary medicine. Required of all students in these courses. Fall, winter, and spring terms, respectively. Class work, two hours; laboratory, four hours. Four credits each term. Men and women are taught in separate sections. Professor Nabours, Assistant Professors Ackert and Harman, Mr. Yocum, Mr. Allen, Mr. Bellomy, and Miss Reed.

Course 1 represents an elementary study of the structure and functions of types selected to illustrate the development of the invertebrate part of the animal kingdom. Attention is given to classification and the relations of the different forms.

Course 2 consists of an elementary study of the structure and functions of types selected to illustrate the development and relations of the phylum Chordata. Some attention is given to classification, but the work mainly consists of a study of the organs and their functions.

Course 3 (Embryology) represents a study of the development of the germ cells, fertilization, and the nutrition and growth of the vertebrate embryo, with a greater emphasis on the comparative study of the development and nutrition of the fœtuses of the domestic mammals and man. This course aims to give a general idea of embryological development and a better understanding of the organs and their functions of the types in the phylum Chordata.

Laboratory. The laboratory work in courses 1 and 2 consists of observations of the form and activities of living animals, both in the field and in the vivaria, in the laboratory and museum, and of the dissection and sketching of the important systems of those animals selected as types. The laboratory work in embryology represents a microscopic study of the male and female germ cells, stages in the process of fertilization, the segmenting ovum, and the serial sections and whole mounts of the chick and pig embryos in several stages of development. Considerable attention is given to the study of the relations of the fœtus to the uterus of the mother in the cat, the pig, the cow, and man.

ADVANCED ZOÖLOGY I, II, and III. Elective, fall, winter, and spring terms, respectively. Class work, two hours; laboratory, four hours. Four credits each term. Elective in the courses in general science, agriculture, and home economics. Prerequisites: General Zoölogy I, II, and Embryology, or equivalent. Assistant Professor Ackert.

Course 4 represents a fundamental study of the structure and functions of invertebrate types.

Course 5 begins the same sort of study of chordate types. Relationships are considered from the point of view of embryology and paleontology, as well as that of comparative anatomy.

Course 6 is a continuation of the preceding. These courses form a basis for graduate work in zoölogy, entomology, animal husbandry, and veterinary medicine.

Laboratory. The laboratory work consists of the dissection and sketching of the systems of selected types and of such experiments in fundamental physiology as the time and apparatus permit.

PARASITOLOGY. Senior year, fall term. Class work, two hours; laboratory, two hours. Three credits. Required in the course in veterinary medicine; elective in the courses in general science, agriculture, and home economics. Prerequisites: General Zoölogy I and II, or the equivalent. Assistant Professor Ackert.

This course includes a study of the chief characteristics, life histories, and economic importance of the serious external and internal parasites of domestic animals and man.

Laboratory.—The laboratory work is a study of the structural and functional adaptations of a parasitic existence.

EVOLUTION OF DOMESTIC ANIMALS. Senior year, winter term. Class work, one hour. One credit. Elective in the courses in general science, agriculture, and domestic science. Professor Nabours.

This course consists of lectures and readings on general evolution with special reference to the domestic animals. The evidences of evolution and the Law of Recapitulation are considered, and studies made of the principal theories (Lamarck, Darwin, DeVries, and others) of the causes of evolution. The evolution of domestic animals is studied in the light of these theories.

ECONOMIC ZOÖLOGY. Spring term, sophomore, junior, or senior year. Lectures, two hours; laboratory, four hours. Four credits. Elective in the courses in home economics, agriculture, and general science. Assistant Professor Ackert.

This course is designed for students who desire a more comprehensive view of the bird and mammal groups than is afforded in Zoölogy II. The specimens in the museum are used extensively, both in the class and in the laboratory work.

Laboratory.—The laboratory work consists largely of four-hour field trips to a number of specially selected areas, ponds, streams, meadows, woods, and College farm. Much of the time of the trips is taken in the identification of birds and mammals, with special attention given to their adaptation and economic importance.

FOR GRADUATES AND UNDERGRADUATES

ADVANCED MAMMALIAN EMBRYOLOGY. Graduate and elective, winter term. Elective in the courses in general science, agriculture, and home economics. Lectures, two hours; laboratory and reference reading, four hours. Four credits. Prerequisites: General Zoölogy I and II, and Embryology, or equivalent. Professor Nabours and Assistant Professor Harman.

This course consists of a further study of the main facts of embryology, with a comparative study of the physiology of reproduction in the domesticated mammals and man.

ZOÖLOGICAL SEMINAR. For the staffs in entomology and zoölogy and advanced students in these departments. No credit. One two-hour session a week. Fall, winter, and spring terms, respectively.

This course consists of the presentation of papers on original investigations by members of the two departments and advanced students. Here the papers to be read at scientific meetings or published in scientific journals or bulletins are discussed. Most of the sessions are devoted to the presentation and criticism of the best thoughts on the fundamental problems of biology found in the books and periodicals in the library or reported by members from scientific meetings.

GENERAL CYTOLOGY. Graduate and elective, fall term. Prerequisites: General Zoölogy I and II, and Embryology. Lectures, two hours; laboratory, four hours. Four credits. Assistant Professor Harman.

The course deals with the methods of preparing material for microscopical study, and the development of germ cells. Various methods of killing, fixing, sectioning, and staining microscopic materials are used. The development and cytological changes of the germ cells are observed from the slides prepared by the students. Theories of cell structure and the functions of the different parts of the cell are considered. The work forms a basis for studies of inheritance and related subjects.

ANIMAL ECOLOGY. Graduate and elective, spring term. Lectures, two hours; laboratory and field work, four hours. Four credits. Prerequisites: Advanced Zoölogy I and II, General Entomology, or equivalents.

This course deals with the relation of animals to the complete environment. The associational method of study is used and the subject is considered from the descriptive, comparative, and explanatory standpoints. Special attention is given to the dynamic factors of the environment and their effect on the present status and future changes of the animal community. The field work gives practice in the methods of field ecology and deals with the application of general principles to local conditions. The fundamental principles and other general aspects of the science are presented in the form of lectures. This course leads to advanced work in Zoölogy and Entomology.

EVOLUTION AND HEREDITY. Graduate and elective, winter term. Lectures, two hours; library reference reading and reports, four hours. Four credits. Prerequisites: Consult instructor. Professor Nabours.

A lecture and reading course dealing with the development of the evolution idea, the evidence and the principal theories of the causes of evolution, problems of variation, genetics, and experimental evolution.

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 State law requiring the teaching of agriculture in the rural schools is also creating 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.

Nos. 15, 16, 17, 19, 20 and 21, on page 250, 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 sophomore years 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

EDWIN LEE HOLTON, *Director*

PURPOSE

There is no larger or better equipped plant devoted to the teaching of agriculture, home economics, mechanic arts and related subjects than Kansas has in her State Agricultural College. In order that this plant may not remain idle during the summer months, the Board of Administration has authorized the organization of a Summer School. The College is authorized by an act of Congress to expend each year a portion of the national appropriation for "providing courses for the special preparation of instructors for teaching the elements of agriculture and mechanic arts."

Each year there is an increasing demand for trained teachers of agriculture, shop work, mathematics, the sciences and home economics. The College has not been able to supply this demand. The Summer School offers an opportunity for experienced teachers to prepare themselves to meet the new demand placed upon the public schools, viz.: Preparing the boys and girls for vocational and social efficiency.

ADVANTAGES AT KANSAS STATE AGRICULTURAL COLLEGE

For the training of teachers in vocational subjects the Kansas State Agricultural College has a peculiar advantage. 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, macadamized and well-shaded avenues lead to all parts of the campus. Including the campus of 160 acres, the College owns 748 acres of land. Outside the campus proper, all the land is devoted to practical and experimental work in agriculture. 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.

The College buildings, twenty-one in number, are harmoniously grouped, and are uniformly constructed of attractive white limestone obtained from the College quarries. The College owns and operates its own system of waterworks, and is provided with a complete sewage system.

There is a growing conviction among the leading educators that the best institution in which to train teachers of vocational subjects is a well-equipped technical college, where the courses of study are pointed towards the producing vocations. The Kansas State Agricultural College is such an institution.

EXPENSES

Tuition is free. An incidental fee of $3 and a medical fee of 50 cents is charged all students whose homes are in Kansas. For nonresidents of the State an incidental fee of $10 and a medical fee of 50 cents are charged. Receipts for these fees must be presented before enrollment in the College classes. Table board varies from $3.50 to $4 per week. Room rent ranges from $6 to $12 per month. The College Young Men's Christian Association offers accommodation in its building for a limited number of students, at prices from $10 to $12 per month. The cost of rooms is reduced by half where two students room together.

COLLEGE CREDITS

Full College credit will be given for all courses satisfactorily completed by regularly matriculated students unless otherwise specified in the announcement of the courses. Students desiring College credit will not be allowed to carry more than ten credit hours; provided, that an exceptionally strong student may be permitted to carry two additional credit hours upon the approval of the Director of the Summer School.

CONVOCATION

The hours from ten to eleven on Thursdays will be reserved for general assembly of all students. A special address and music will be arranged for each of these general assembly periods.

LIBRARY

The library will be open during the summer. The librarian will place all the valuable books, bulletins, and reports at the service of the Summer School students.

EDUCATIONAL TRIPS

Trips will be arranged for those who desire to take them, to the experimental grounds on the College farm and campus, to study the work in progress. These trips will be under the leadership of trained men.

Courses in the Summer School

Division of Agriculture

W. M. JARDINE, *Dean*

AGRONOMY

Professor CALL
Associate Professor SALMON
Assistant ZAHNLEY

CEREAL CROP PRODUCTION. Class work, six hours; laboratory, eight hours. Five credits. Prerequisite: General Botany.

This course is a study of cereal crops, largely from a production viewpoint. The crops considered are: corn, wheat, oats, barley, rice, rye, buckwheat. The origin, the history of development and the factors influencing growth are studied. Facts designating the best place in the rotation of crops are presented. Proper seed-bed preparation, cultural methods, and factors which tend to maximum production, receive highest consideration.

Laboratory.—In the laboratory a study of the physical characters of the cereal crops is made.

SOILS. Class work, six hours; laboratory, eight hours. Five credits. Prerequisites: Chemistry I, II, and III.

This course comprises a study of the management of farm soils, and deals with: the origin of the soils and their physical nature; the effect of the different methods of cultivation upon the liberation of plant food; conservation of moisture, and physical conditions of the soil.

Laboratory.—The laboratory exercises supplement the class work in demonstrating the principles of soil management, as outlined in the class.

RURAL SCHOOL ELEMENTARY AGRICULTURE. Class work, seven and one-half hours. Three credits.

This course is planned primarily for teachers in the rural and village schools. The subject matter is selected and the work presented with this end in view. The course covers a year's work in elementary agriculture for the rural and village schools. All laboratory work will be presented in such a way that it can be adapted to the needs of the individual teachers. State textbook will be used.

HIGH-SCHOOL AGRICULTURE. Class work, seven and one-half hours. Three credits.

This course is planned for high-school teachers who teach one year of agriculture and who need a review in subject matter. It will cover the entire field of general agriculture, together with suggested outlines for a year's work in the laboratory. Textbooks: Waters' *New Agriculture*, and Call & Schafer's *Laboratory Manual of Agriculture.*

ANIMAL HUSBANDRY

Professor WENTWORTH
Assistant Professor VESTAL
Instructor GATEWOOD
Assistant PATERSON

MARKET TYPES AND CLASSES. Class work, two hours; laboratory, twelve hours. Four credits.

This course consists of a study of the market types and classes of horses, cattle, sheep and swine. Text, Craig's *Live-stock Judging.*

Laboratory.—Practice in scoring and judging animals.

BREEDING TYPES AND CLASSES. Class work, two hours; laboratory, twelve hours. Four credits. Prerequisite: Market Types and Classes.

This course consists of a study of the types and classes of horses, cattle, sheep and swine from the standpoint of both grade and pure-bred animals used for breeding purposes. Curtis' *Fundamentals of Live-stock Judging and Selection.*

Laboratory.—Practice is given in scoring and judging breeding animals.

PRINCIPLES OF FEEDING. Class work, eight hours. Four credits. Prerequisite: Agricultural Chemistry.

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.

PRINCIPLES OF GENETICS. Class work, eight hours. Four credits. Prerequisite: High-school Biology or its equivalent.

This course involves a study of the mechanism of the hereditary transmission of characters, the facts of inheritance in relation to sex, and of the linkage of characters in transmission. The application of these genetic principles to stock breeding and certain phases of eugenics will be shown.

HISTORY OF BREEDS AND PEDIGREES. Class work, six hours; laboratory, four hours. Four credits. Prerequisite: Breeding Types and Classes.

The origin, foundation stock and development of the different breeds of horses, beef cattle, sheep, and swine are studied. Paralleling the work in the classroom the laboratory is devoted to mastering principles of her book study and to tabulating pedigrees in the different breeds which demonstrate popular and successful blood lines.

DAIRYING

Associate Professor FITCH
Instructor TOMSON

ELEMENTS OF DAIRYING. Class work, four hours; laboratory, eight hours. Four credits.

Required in all courses in agriculture, optional in the course in industrial journalism, and elective in the course in general science.

A general course in dairying, dealing with the secretion, composition and properties of milk; care of milk and cream on the farm, a study of the different methods of creaming; construction and operation of farm separators; principles and application of the Babcock test; use of the lactometer; and butter making on the farm. Lectures supplemented by textbook.

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

DAIRY JUDGING. Laboratory, eight hours. Two credits.

Required in the course in agriculture, veterinary medicine, the agricultural option in the course of industrial journalism, and elective in the general science course.

Judging dairy stock from the standpoint of economical production and breed type. Score cards are used to teach the student to become accurate, thorough and systematic in the selection of animals as representative of breeds, or for feeding purposes.

HORTICULTURE

Professor DICKENS
Professor AHEARN

PLANT PROPAGATION. Class work, six hours; laboratory, eight hours. Five credits.

Required in all the agricultural courses and the agricultural option in the course in industrial journalism, and elective in the course in general science.

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

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

LANDSCAPE GARDENING. Class work, four hours. Two credits.

Required in the course in home economics and in the home economics option in the course in industrial journalism.

Lectures on the principles of landscape art and the means of their application to the problems of improving lawns, yards, country homes, school grounds, and larger plantations; and an acquaintance with species used for obtaining results.

ORCHARDING. Class work, six 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. Prerequisites: Plant Propagation and Pomology II.

VEGETABLE GARDENING. Class work, two hours; laboratory, two hours. Three credits. Required in the course in horticulture.

This course comprises a study of the problems and possibilities of the market garden, the necessary equipment, and soil requirements thereof; the value and cost of fertilizers.

PLANT MATERIALS. Class work, two hours; laboratory, two hours. Four credits.

A study of trees, shrubs, vines and other ornamental plants with reference to their value for Kansas planting. A thorough study of their form, texture and flowering habits.

MARKET GARDENING. Class work, four hours; laboratory, four hours. Four credits. Elective in the course in agriculture.

This course comprises a study of the problems and possibilities of the market garden, the necessary equipment, and soil requirements therefor; the value and cost of fertilizers. Text, Lloyd's *Productive Vegetable Gardening.*

Laboratory.—The laboratory work consists of the preparation of the 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.

POULTRY

Assistant MUSSEHL

FARM POULTRY PRODUCTION. Class work, four hours; laboratory, four hours. Three credits. Required in the agricultural course and elective in the course in general science.

This takes up the problems of poultry management on the general farm. The subjects of feeding, breeding, incubating, brooding, housing, and preparing poultry products for market are studied.

PRACTICE IN CAPONIZING AND DRESSING. Elective. Laboratory, two hours. One credit.

In this course work is given in caponizing, killing, bleeding, packing, cooling, shaping and grading poultry for market.

PRACTICE IN CANDLING. Elective. Laboratory, two hours. One credit.

This course consists in making a first-hand study of the commercial grades of eggs. Particular attention is given to those forms of deterioration found in Kansas, including blood rings, spots, heats and green whites, which are likely to be overlooked by egg buyers. A study is also made of the relative deterioration of fertile and infertile eggs.

POULTRY BREEDS AND TYPES. Elective. Class work, one hour; laboratory, four hours. Three credits.

In this course a historical study is made of the various breeds commonly found on Kansas farms. Particular attention is paid to tracing the evolution of the present breed types. The laboratory is given over largely to judging the different breeds and varieties, both by score card and by comparison.

Division of Home Economics

MARY PIERCE VAN ZILE, *Dean*

DOMESTIC SCIENCE

Assistant Professor TREAT
Instructor GREEN
Assistant CAPE
Assistant ———

FOOD PREPARATION. Class work, four hours; laboratory, eight hours. Four credits.

Foods are classified, according to similarities in their composition, into groups representative of the five food types—carbohydrates, fats, proteins mineral matter, and water; their sources, composition and digestive value are considered.

Laboratory.—Principles underlying the cookery of food are illustrated in the preparation of representative foods. Fee, $1.

ADVANCED FOOD PREPARATION. Class work, four hours; laboratory, eight hours. Four credits.

A study of foods from the standpoint of needs of the body; function and digestion of different classes of foods; food habits and dietary standards.

Laboratory.—Planning, preparing and serving meals to satisfy different dietetic conditions. Prerequisite: Food Preparation. Fee, $2.50.

FOOD AND NUTRITION II. Class work, four hours; laboratory, twelve hours. Five credits. Fee, $1.50.

This course is a continuation of the course in Food and Nutrition I. Leavening agents, flour mixtures, fruit and vegetable preservation are the subjects studied.

Laboratory.—Experimental cookery continued, studying the problems connected with the use of the various leavening agents and the preservation of fruits and vegetables. Prerequisite: Food and Nutrition I.

INSTITUTIONAL COOKERY. Conference, two hours; laboratory, twenty hours. Four credits.

This course aims to teach the equipment and management of lunch room, tea room, or cafeteria. In the laboratory, food in quantities will be prepared and practical work will be given in serving the noon lunch during the summer vacation.

This course is planned to meet the needs of teachers managing lunch rooms in the high school or advanced students who wish to follow this line of work. Prerequisites: Food and Nutrition I and II or the equivalent. Fee, $4.

DOMESTIC ART

Professor BIRDSALL
Instructor FECHT
Assistant PALMER
Assistant ———

DOMESTIC ART I AND II. Laboratory, sixteen hours. Four credits.

The principles of teaching and the practice of hand and machine sewing as presented in the grades and high school. The discussion and utilization of cost of clothing to income; comparison of home- and factory-made garments. This course includes practice in drafting, and the making of simple garments and a shirt-waist suit.

DRAFTING AND PATTERN MAKING. Laboratory, eight hours. Two credits.

This course begins with crinoline modeling, establishing the principal lines for measurements and developing an appreciation of the relation of the lines of pattern to different forms.

All foundation patterns are drafted to measure and fitted; designs are worked out upon the paper patterns and upon forms without the use of patterns, using cheesecloth or other soft material for draping. Notebook work is required.

Prerequisites: Domestic Art I and II or the equivalent.

TEXTILES. Class work, four hours; laboratory, eight hours. Four credits.

This course considers the primitive forms of textile industries and their development; the present method of spinning and weaving; classification; manufacture and finish of all important fibers.

Laboratory.—The laboratory work considers the identification of fibers and substituted materials by means of the microscope; chemical tests to determine adulteration and admixtures of cloth; identifying material, names, pieces, widths, variations of names; cleaning and dyeing.

Prerequisites: Chemistry I and II.

MILLINERY. Laboratory, eight hours. Two credits.

This course includes practical and artistic principles of millinery, preparing various materials for trimmings; practice in making bows, rosettes, and other forms of hat decoration; making wire and buckram frames; use of velvet, silk and straw; renovating and use of old material.

Prerequisites: Domestic Art I and II or the equivalent.

HOME ART

Instructor HOLMAN

DESIGN. Laboratory, twelve hours. Three credits.

Color study with reference to value, hue and intensity. Color harmonies and design principles developed and adapted to object, constructed on paper, cloth and leather.

PUBLIC-SCHOOL DRAWING. Laboratory, sixteen hours. Four credits.

This course presents representation, color, design, construction work and picture study for rural and grade schools.

HOME ECONOMICS EDUCATION

MRS. ANN GILCHRIST STRONG, Professor of Household Arts, University of Cincinnati
MISS HALM, Assistant Professor of Home Economics Education

These courses deal with the place of home economics in secondary education, the organization of the course in schools of various types, viz., academic, technical, trade, prevocational, and junior or intermediate schools. It includes the development of topics relating to nutrition, foods, sanitation, housewifery, home nursing, textiles, clothing, costume design, laundry, house furnishing and decoration, and the method of presenting the same.

Division A, open to experienced teachers of home economics. Eight hours a week. Four credits.

Division B, open to all teachers of home economics. To be accompanied by practice teaching and observation. Five credits. Six hours a week. Eight hours of practice teaching. Fee, $1.

DIVISION OF MECHANIC ARTS

A. A. POTTER, *Dean*

APPLIED MECHANICS AND MECHANICAL DRAWING

Professor SEATON

MANUAL-TRAINING DRAWING. Drafting, eight hours. No credit.

Instruction and practice in lettering and the use of instruments. Isometric and orthographic projection drawings are made of manual-training problems. Practice is also given in tracing and blue printing.

MECHANICAL DRAWING I. Class work, two hours; drafting, four hours. Two credits. Required of all students in engineering courses.

The course includes the use and care of drawing instruments, with 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.

The following supplies are required: Triangles, T-square, scale, pencils, pens, ink, eraser, thumb tacks, drawing paper, and a set of drawing instruments. Students are advised not to purchase these supplies until after consulting with the instructor. Text, French's *Engineering Drawing*.

MECHANICAL DRAWING II. Class work, two hours; drafting, eight hours. Three credits. Required of all students in engineering courses.

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 the dimensioning of the drawings. Text, French's *Engineering Drawing*.

KINEMATICS I. Lectures and recitations, eight hours. Four credits. Prerequisites, if taken for credit: Plane Trigonometry, Descriptive Geometry II. Persons not taking the work for credit may be assigned to it without these prerequisites, by permission from the head of the department.

An analysis of the motions and forms of the parts of machines constitutes this course. Among the subjects discussed are: bearings, screws, worm and wheel, rolling cylinders, cones, and other surfaces; belts, cord and chains, levers, cams and linkwork, with the velocity and motion diagrams; quick returns, straight-line motions, and other special forms of linkages; wheels in trains; curves for gear teeth. The solution of a

large number of graphical and mathematical problems is required in this course. Text, Schwamb and Merrill's *Elements of Mechanism.*

APPLIED MECHANICS I. Class work, eight hours. Four credits. Prerequisites: Integral Calculus and Engineering Physics.

This course includes 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. Text, Hancock's *Applied Mechanics for Engineers.*

MANUAL TRAINING

Professor G. E. BRAY
Assistant WM. BALL

MANUAL TRAINING METHODS AND ORGANIZATION. Class work, four hours. Two credits.

A course dealing with the history of manual training in the United States as well as a similar development in foreign countries. A study is made of the different systems, the various forms of hand work, and the grades to which they are best adapted; the equipment and material required for each of the various lines of work, together with their cost and where they can be secured; also the best arrangement of equipment and its proper installation. The course will include lectures, recitations, discussions, readings, and written reports.

MANUAL TRAINING FOR PRIMARY GRADES. Ten hours laboratory. Two credits.

This course is designed to give instruction to teachers in those forms of hand work that have been found most profitable in the lower grades. The possibilities and adaptations of the different mediums are studied and methods of teaching the work are carefully considered. This work will include weaving, cord work, raffia, reed work, and cardboard construction. Lectures, discussions, and reports.

SHOP PRACTICE

Professor CARLSON
Instructor LYNCH
Assistant BROWN
Assistant BALL

WOODWORKING FOR GRAMMAR GRADES. Ten hours laboratory. Two credits. Mr. Ball.

This is a course suitable for teachers of woodworking for the grammar grades. Suitable exercises for pupils of the grammar grades will be made, together with the construction of models, showing progressive steps for class work. Library assignments and reports will be required, as well as a careful study of the tools and processes used for woodworking for these grades.

WOODWORKING FOR THE HIGH SCHOOLS. Ten hours laboratory. Two credits. Mr. Ball.

A course suitable for the teacher of woodworking for high schools, in which a number of the most important exercises in joinery are carried out with a study of their application, after which a series of articles in practical elementary cabinet construction is made, together with a study of the proper methods of finishing same. A collection and study is made of the common varieties of wood. Library assignments and reports will be required on assigned subjects bearing upon the work. A careful study will also be made of the method of staining, filling, waxing,

varnishing and rubbing the articles constructed. Considerable emphasis will be laid upon the proper use and care of tools and machines.

ADVANCED WOODWORKING. Ten hours laboratory. Two credits. Professor Carlson, Mr. Ball.

A continuation of woodworking for high schools, in which an opportunity is furnished for taking more advanced cabinet construction. The framing of a model of a cottage, the construction of windows and door frames or of inside finishing. The students will be required to draw up the floor plans for a shop, select the full equipment and arrange same to the best advantage, select and obtain prices on equipment and supplies, and outline the course for a year's work in a high school.

WOOD TURNING. Ten hours laboratory. Two credits. Mr. Brown, Mr. Ball.

A course designed to prepare teachers for teaching wood turning in high schools. The work includes typical application of tools and processes, in turning between centers, on faceplates, and by means of hollow chucks. Exercises are given in turning cylinders, cones, beads, convex and concave curves, after which articles are made from drawings which have a practical application in a student's home or social life, such as handles, mallets, rolling-pins, circular boxes with covers, Indian clubs, dumb-bells, napkin rings, bowls, towel rings, typical vase forms, cups, goblets, frames, ornamental stools, etc. While many of these articles are made from blue prints, it is the aim to have the student make some object of value from his own design, both as project in turning and as a practical lesson in designing. In connection with the laboratory work a careful study is made of the commercial value of wood turning, kinds of wood suitable for this work, methods of polishing and finishing work in the lathe, together with a study of suitable power transmission, shafting, belting, tight and loose pulleys, proper speeds, etc.

FORGING I. Twelve hours laboratory. Three credits. Mr. Lynch.

In this course the field of hand-forging as related to high school is covered. The work includes practical exercises in making articles of use, which involve the operations of drawing, upsetting, welding, twisting, splitting, and shaping. Sufficient instruction is given the student in the forging of tool steel to enable him to make and temper many of the tools that will be needed in this and other branches of manual training in the high school. Lectures, discussions and reports.

FORGING II. Twelve hours laboratory. Three credits. Mr. Lynch.

Advance work in the forging of iron and in the manufacture of tools, such as punches, chisels, drills, scrapers and hammers. Instruction is given in the proper methods of heating, forging, hardening, tempering, annealing and working the various kinds of tool steel, and in the case-hardening of mild steel.

FORGING III. Twelve hours laboratory. Three credits. Mr. Lynch.

Special work is given in the forging of iron and steel to impart skill in the different operations. Some practice will be given in the making of ornamental iron work.

MACHINE TOOL WORK I. Twelve hours laboratory. Three credits. Professor Carlson, Mr. Brown.

This course includes both bench and machine tool work, in which practice is given in chipping, filing, shaper and planer work, scraping, drilling, cutting, right- and left-hand and multiple threads, and knurling on the lathe. Lectures and discussions accompany the work, so that the fundamental principles are more easily grasped by the student.

MACHINE TOOL WORK II. Twelve hours laboratory. Three credits. Professor Carlson, Mr. Brown.

This course consists of progressive problems in turning and calipering, boring, reaming and taper turning and threading on the lathe, exercises in chucking, the use of forming tools, practice on the key-seating machine, and the making of a spur gear on the milling machine. A study is also made of cutting edges and tool adjustments best suited to the different metals, together with a study of cutting speeds and feeds.

MACHINE TOOL WORK III. Twelve hours laboratory. Three credits. Professor Carlson, Mr. Brown.

This course takes up work on the turret lathe and boring mill; practical work is also given with jigs, templets, and a study made of the rapid production of duplicate parts, belts, lacings, and methods of belt connections, compound and differential indexing and the cutting of spiral gears on the milling machine.

Division of General Science

J. T. WILLARD, *Dean*

BOTANY

Professor ROBERTS
Assistant Professor DAVIS

GENERAL BOTANY. Class work, five hours; laboratory, eight hours. Five credits.

This is a general introduction to botany. A careful study is made of the morphology of the chief great groups of plants, of their elementary physiology and ecology, of the classification and geographic distribution of the plant kingdom, and its economic relation to man. Text, *Nature and Development of Plants*, C. C. Curtis.

Laboratory.—The aim of the laboratory work in this course is to give as thorough a study as may be of the morphology of the chief important groups in the plant kingdom, taken in the order of their relative complexity, and of their probable relations to one another as parts of an evolutionary series. An excellent and a very complete series of prepared slides is of assistance in this work. Laboratory outlines are furnished by the department.

AGRICULTURAL BOTANY. Class work, four hours; laboratory, eight hours. Four credits for entrance or in the School of Agriculture.

The purpose of this course is to give high-school teachers a method of teaching botany that will bring the subject into closer relation to the farm and its problems. It is an attempt to render possible the study of botany in a scientific sense, but by the use, so far as practicable, of strictly economic plants for laboratory material. Considerable emphasis is laid on the study of plants from the natural history standpoint. Most of the larger and more important groups of plants are studied from this point of view. This course will fall into the following divisions: (1) The plant and its work, two weeks; (2) the kind of plants, one week; (3) the diseases of plants, one week; (4) weeds and their eradication, one week; (5) the improvement of plants, one week. Text, Bergen and Caldwell's *Practical Botany.*

PLANT BREEDING. Class work, four hours; laboratory, eight hours. Four credits.

This course is intended especially as a practical course for teachers who wish to introduce work in plant breeding into schools and home gardens. A survey is given of the work that has been accomplished in the improvement of plants, and of the methods that have been followed

by the breeders. Considerable time is given to practical work in the selection of plants for pedigree breeding purposes, to the hybridization of plants, and to the study of the field and greenhouse methods and technique used in breeding of agricultural, horticultural, and ornamental plants. The material used for study includes, so far as the season will permit, both ornamental flowering plants, orchard, and fruit plants, and agricultural field plants. Enough of the fundamental and underlying principles of plant genetics are given to make the practical work intelligible. Text, Bailey's *Plant Breeding* (new edition). Lectures and syllabi are furnished by the department, in addition.

CHEMISTRY

Associate Professor KING
Assistant Professor HUGHES
Assistant Professor BRUBAKER

CHEMISTRY I. Lectures and recitations, six hours. Laboratory, four hours. Four credits.

This term's work begins the study of elementary inorganic chemistry, and covers the elements of oxygen, hydrogen and chlorine and their compounds, this being accompanied by theoretical treatment of the subjects of matter, energy, properties of gases, chemical law, theory, solution, electrolytic dissociation, acids, bases and salts, and chemical change as related to light, heat and electricity. Newell's *Inorganic Chemistry for Colleges* is used, this term's work covering the first 209 pages. The text is supplemented by lectures and amply illustrated by experimental demonstrations.

Laboratory.—As far as the 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. *Laboratory Exercises in Elementary Chemistry*, by William McPherson, is used as the laboratory guide.

CHEMISTRY II. Lectures and recitations, four hours; laboratory, eight hours. Four credits.

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.

CHEMISTRY III. Lectures and recitations, six hours; laboratory, four hours. Four credits.

This work completes the study of elementary inorganic chemistry begun in the preceding terms, and includes consideration of fluorine, bromine, iodine, silicon, phosphorus, arsenic, antimony, and the metals.

Laboratory.—The laboratory work in this course is a continuation of that of the preceding terms.

HOUSEHOLD CHEMISTRY. Class work, two hours; laboratory, twelve hours. Four credits.

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, fuel, fabrics, disinfectants, metals, and other materials used in and about the home are the subjects of numerous experiments touching

their properties, usefulness and defects. Prerequisites: Qualitative Analysis and Elementary Organic Chemistry.

ORGANIC CHEMISTRY. Eight hours a week. Four credits.

Required in the courses in agronomy, animal husbandry, dairy husbandry, horticulture, home economics and general science, and in the options in the course in industrial journalism. A systematic study is made of examples of the more important classes of organic compounds in their logical chemical relations. Such substances as the hydrocarbons, alcohols, organic acids, fats, soaps, sugars, starch, proteids, and other less-known substances are treated with greater detail. Compounds used for clothing, food, fuel, light, antiseptics, disinfectants, anæsthetics, poisons, medicines, solvents, etc., are included. The subject is amply illustrated by experiments in the lecture room. Chemistry III is a prerequisite.

QUALITATIVE ANALYSIS. Lecture, four hours; laboratory, eight hours. Four credits.

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 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 laboratory study of the chemical properties of substances. Laboratory manual, *Qualitative Analysis*, by W. A. Noyes.

ECONOMICS

Professor KAMMEYER

ECONOMICS. Eight hours. Four credits.

An introductory course in which the fundamentals of the science are presented. A study of man in relation to his social and physical environment, and to his wealth-getting and wealth-using activities. Problems of distribution, transportation, public utilities, insurance, finance, etc., will be studied in the light of present-day facts and current events. The aim is to give the student a broad view of the whole subject, such as every citizen and especially teachers should have.

Instruction by topical assignments for library reading, lectures, and reports. Any standard text may be used.

RURAL ECONOMICS. Eight hours. Four credits.

This course includes a study of economics, principles and concepts in their relation to the business of farming. Such topics as rent, size of farms, ownership and tenancy, coöperative marketing, rural credits, the new banking law as it affects the farmer, the rural labor problem, and others of like character will be emphasized.

Instruction by assigned topics for library reference, recitations thereon, lectures and reports. The student should supply himself with a copy of either Carver's *Rural Economics*, or Taylor's *Agricultural Economics*.

Both of the above courses will be adapted to the character and needs of the membership in each class.

EDUCATION

Associate Professor KENT
Associate Professor REISNER
Dr. LAYTON S. HAWKINS
Assistant Professor HALM

EDUCATIONAL ADMINISTRATION. Eight hours. Four credits.
This course will include a consideration of such subjects as the following: School and classroom management, the relation of the various ranks of school officers to one another, administrative measures and methods as practiced by State, county and local school authorities, and the important features of the Kansas school laws.

VOCATIONAL EDUCATION. Eight hours. Four credits.
The development and significance of vocational education; careful study of the trade and continuation schools in Germany, Massachusetts and elsewhere; practical schools of agriculture in France; folkhehojskoler (people's high schools) in Denmark; agricultural colleges in the United States; Wisconsin and Minnesota county schools of agriculture and home economics; the social and economic phases of vocational education for the producer; its relation to moral welfare and social conditions; its place in the city, town and county schools; outlining of tentative courses in shop work, agriculture and home economics for Kansas schools; the relation of vocational education to the other school subjects; plans, equipment, and cost of shop and laboratories. A study of the principles of pedagogy as applied to the teaching of vocational subjects in the high school and in the seventh and eighth grades.

HISTORY OF EDUCATION. Eight hours. Four credits.
This course is intended to present the successive relationships that have existed between educational machinery and practices, and the changing political, economic, scientific, cultural and ideal environments from primitive times to the present.

PRINCIPLES OF EDUCATION. Eight hours. Four credits.
Taking the purpose of education to be the preparation of the child for efficient participation in the life of society, the course aims at presenting the biological, psychological, economic, cultural and moral aspects of the educative process. Textbook, ———.

METHODS OF TEACHING AGRICULTURE (*a*). Eight hours. Four credits.
This course is planned for teachers in high schools that offer one year only in agriculture. The subject matter will be based upon Waters' *Essentials of Agriculture*. A laboratory will be equipped about as the average high-school laboratory is equipped. Doctor Hawkins and Mr. Zahnley.

METHODS OF TEACHING AGRICULTURE (*b*). Eight hours. Four credits.
This course is planned primarily for teachers who have had experience in teaching agriculture. Doctor Hawkins.

SEMINAR ON TEACHING OF AGRICULTURE. Two hours. Two credits.
This course is primarily for college teachers of agriculture, principals of high schools and superintendents of public schools. It consists of reports and discussions on teaching of agriculture. Doctor Hawkins, President Waters and heads of all departments in the Division of Agriculture.

ENGLISH

Professor SEARSON
Professor MACARTHUR
Associate Professor DAVIS

LITERATURE FROM THE READERS. Eight hours. Four credits.

This course is planned to meet the needs of teachers of rural and graded schools. The aim of the course is to stimulate the teacher's love for good literature until she becomes conscious of her power to interest, impress and inspire boys and girls. Reading is considered both as a fundamental means of acquiring knowledge and as a stepping-stone to the appreciation of the world's best literature. Special emphasis will be placed upon teaching children how to study the reading lesson, and upon the necessity to use in the reading lessons more of the literature of rural life. One hour each week is devoted to special methods of teaching reading.

CONSTRUCTIVE ENGLISH. Eight hours. Four credits.

This course is of special value to grammar-grade and high-school teachers desiring to learn practical present-day methods of teaching language and composition. The aim of the course is to train the student to express his thoughts clearly and accurately. The assignments of work are based on the experience and vital interests of the students, thus stimulating clear thinking as a practical basis for clear-cut, effective writing. One hour a week is devoted to the discussion of special methods of teaching grammar-grade and high-school English, and to a definite working program in the teaching of English.

AMERICAN LITERATURE. Eight hours. Four credits.

This course is designed for those desiring to take a special course in literature, and is open to all who have completed the course in college rhetoric or its equivalent. The course includes a rapid survey of American literature from colonial times to the present, and the intensive study and appreciation of the works of representative men of letters. Suggested supplementary readings enable the students to explore the richest fields of American literature. One hour a week is devoted to a consideration of current literature.

HIGH-SCHOOL CLASSICS. Eight hours. Four credits.

This course is intended especially for those teaching or desiring to teach high-school English and literature. The class work consists of lectures by the instructor, supplementary readings, and of interpretation by the class of passages assigned for study. The aim of this course is to awaken warm, vital appreciation of the best literature for high schools, and to inspire teachers to bring the deeper message of that literature to the heart of the pupils. One hour each week is devoted to a discussion of the best methods of teaching literature and English in the high school.

ENGLISH LITERATURE. Eight hours. Four credits.

A general survey of English literature, such as should be had by every well-informed person, is offered in this course. Not only the best representative selections in the old literature, but crisp, interesting and inspiring selections from current literature are studied. An interesting feature of the course is a study of the literature inspired by fundamental industries. It is the aim to make the course practical alike to students and teachers of literature and English.

VOCATIONAL ENGLISH. Eight hours. Four credits.

This is an advanced course in language and composition, dealing more particularly with English as applied in the common vocations. Correct speaking, debating, letter writing, common business forms, effective farm advertising, news writing, proof-reading, editing, and the preparation of industrial papers, addresses, and bulletins, will receive emphasis in the course. The course is planned to give students and high-school teachers a working knowledge of English as used in busy life.

ENTOMOLOGY

Doctor ACKERT

GENERAL ENTOMOLOGY. Eight hours. Four credits.

This course consists of a general survey of entomology in which the needs of the high-school teacher are kept in the foreground. The various subdivisions of the subject are considered and correlated in such a way as to give a broad, comprehensive understanding of the fundamentals of the science. The course includes a somewhat detailed consideration of the following: essentials of classification, morphology and its bearing on physiology, relations to the complete environment and economic problems. Familiarity with original entomological literature and the different sources of information is encouraged. Instruction is given in the approved methods of collection and preservation of class materials. Lectures, recitations, assigned readings, laboratory and field work.

GERMAN

Professor CORTELYOU

ELEMENTARY GERMAN I. Eight hours. Four credits.

Required in the course in home economics; 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 pronouns, the indicative mode of the verb, 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, Becker and Rhoades' *Elements of German* (first twenty-five lessons).

ELEMENTARY GERMAN II. Eight hours. Four credits.

Required in the course in home economics; 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 general 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. Conversation exercises in German and written translations from English into German are frequent. Prerequisite: Elementary German I. Text, Becker and Rhoades' *Elements of German* (completed).

GERMAN READINGS. Eight hours. Four credits.

Required in the course in home economics; 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 also continued, with occasional sight readings and translations into German. Prerequisite: Elementary German II. Text, Bacon's *Im Vaterland.*

HISTORY AND CIVICS

Professor PRICE
Associate Professor ILES
Assistant Professor TAYLOR
Assistant Professor JAMES

AMERICAN HISTORY I (*or* NATIONALITY AND DEMOCRACY). Eight hours. Four credits. Professor Price.

This course gives emphasis to the industrial development of the American nation. It includes our constitutional and political development, especially with reference to cause and effect in history. It aims

to develop historic-mindedness; that is, training the student to put himself in the other fellow's place and understand fairly "the why." The European origin and background of American history; the evolution of colonial life, industries, and institutions; why we became an independent nation; our westward expansion; the establishing of nationality, and the development of government by the people, are phases definitely emphasized. Lectures, readings and recitations.

AMERICAN HISTORY II (*or* SLAVERY AND EXPANSION). Eight hours. Four credits. Professor Price.

The course starts with the Missouri compromise and the abolition movement, together with the conditions, the issues, and the leaders of the middle period. It includes a careful comparative study of the industrial, social, constitutional and political development, North and South, first before, then during, and finally after the Civil War. It includes such a study of our new industrial age and of the new international relations as to give an understanding of the conditions and problems in the midst of which we live and of which we are a part. The course also incorporates a thorough study of early Kansas.

This course and the one described above are both based on the American History notebook approved by the State School Book Commission, and will include a thorough consideration of the State texts, James and Sanford's *American History*, Foster's *History of the United States*, and Arnold's *History of Kansas*. Chiefly a lecture course.

ENGLISH HISTORY. Eight hours. Four credits. Assistant Professor Taylor.

A survey of the whole field, with special emphasis on the modern period. The Tudor and Stuart régimes, with their bearings on constitutional development and New World history; the growth and organization of the empire, and recent political, social and industrial advances will be studied in detail. Based on Cheyney's *Short History of England* as a text, with lectures and assigned readings.

MODERN EUROPE. Eight hours. Four credits. Assistant Professor Taylor.

A course in European history since 1648, with special emphasis on the period since 1815. This course is calculated to meet the needs of teachers who will teach the subject in the high schools, of students wishing advanced work in history, and of those who desire a better understanding of present-day European affairs. The political, social and industrial development of the principal nations will be traced, as well as the progress of international relations and the development of international law. Current European history, including the present war, will be studied in its proper relation and in the light of the development of the nineteenth and twentieth centuries. Based on Robinson and Beard, *Outlines of European History*, Part II, with lectures and assigned readings.

THE ORIENT AND GREECE, TO THE PELOPONNESIAN WAR. Accepted for Ancient History I. Eight hours. Four credits in the School of Agriculture. Assistant Professor James.

This course will trace the story of human progress from its earliest beginnings and its later development in Egypt, Babylonia, Assyria, Persia and Palestine through its expansion westward into the Grecian peninsula. A survey will be made of the social, intellectual and political life of the Grecian world, with special attention to the forces making for the expansion of the Hellenic world and the contributions of the Greeks to later civilization.

THE ROMAN EMPIRE AND THE WEST TO 800 A. D. Accepted for Ancient History III. Eight hours. Four credits in the School of Agriculture. Assistant Professor James.

A few lectures on the rise and development of the Roman city-state down to the last century of the Roman republic will first be given as a setting for this course, which embodies a study of the organization and government of the empire; its political, military and institutional development; the social and economic problems of Rome and her provinces; the rise of Christianity; the dismemberment of the Roman Empire; the formation of the barbaric kingdoms and the bequest of the imperial period to civilization.

In both this and the preceding course the two State texts, Westermann, *The Story of the Ancient Nations*, and Robinson and Beard, *Outlines of European History*, Part I, will be carefully studied and critically compared. The text will be supplemented by lectures and assigned readings. These courses will give an excellent opportunity for high-school students or students in the School of Agriculture to make up work in ancient history. To high-school teachers of ancient history who choose to take these courses extra time will be given on the method and the material of the subject.

AMERICAN GOVERNMENT. Eight hours. Four credits. Associate Professor Iles.

A course in government and politics, with especial reference to the actual operation of local, state and national political machinery, and the newer devices for securing a more effective popular control, such as the direct primary, initiative, referendum, short ballot, and recall. A comparative study of the constitution and government of Kansas is supplemented by a discussion of the present tendencies in legislation and administration. Recitations, lectures, assigned readings. Text, Beard, *American Government and Politics.*

CIVICS. Eight hours. Four credits in the School of Agriculture, or one-half unit for College entrance. Associate Professor Iles.

A course emphasizing the functions rather than the structure of government and giving special attention to Kansas; designed to meet the needs of teachers of civics in grammar schools and in high schools, and of those preparing for college. Recitations and assigned readings, with constant reference to the State texts. Arnold, *Civics and Citizenship*, and Guitteau, *Government and Politics in the United States*, Kansas edition.

TEACHERS' COURSE IN HISTORY. Four credits. Professor Price and others.

This is a seminar course of discussions based on Henry Johnson's excellent new text, *Teaching of History in Elementary and Secondary Schools*, together with Mace's revised work on *Method in History*, and supplemented by a study of the Report of the Committee of Seven, and of the Committee of Five on History in the Secondary Schools, and of the Committee of Eight on History in the Elementary Schools. A critical examination is made of special books on method in history and civics, and of special articles in the *History Teacher's Magazine.* This course is accepted for credit in securing a State teacher's certificate.

INDUSTRIAL JOURNALISM AND PRINTING

Professor CRAWFORD
Assistant KEITH

ELEMENTARY JOURNALISM. Class work, four hours. Two credits. This course should be accompanied by Journalism Practice I to give four credits.

The course endeavors to give the students practical experience in the fundamentals of newspaper work. It is intended to prepare for more advanced courses in journalism or to give necessary training for the effective use of the written article in farm bureau, educational, and other

vocational activities. Methods of obtaining news of various types, the writing of the lead, and the general style of the news story are carefully considered. The duties of the reporter and the physical, mental, and ethical demands made upon him are briefly presented. Attention is given to the history and scope of journalism.

JOURNALISM PRACTICE I. Laboratory practice, eight hours. Two credits.

This course embodies actual practice in journalism, as closely approximated as possible to actual newspaper work. Students are required to gather news, both assigned and unassigned, and to write the stories in the department work room. The college campus is divided into "runs" which the students cover at regular intervals, and assignments are given at specific times as in a newspaper office. The work is adapted to the needs and qualifications of each student.

JOURNALISM FOR TEACHERS. Eight hours. Four credits.

This course is offered both to meet the demands for teachers of English who can offer news writing and the study of modern periodicals in connection with their class work, and to enable all teachers to use effective publicity in connection with the work of their schools. How to read the newspapers, how to recognize different types of journalism, and how to write school news that will be acceptable to local papers, are taken up in the course. Several hundred newspapers and magazines received by the Department of Industrial Journalism afford practical material. Careful attention is given to the publication of high-school papers, and problems of staff organization, editorial methods, business management, mechanical make-up, and faculty advice are discussed. A large number of high-school publications of both newspaper and magazine types are available for use by students in the course.

PRINTING PRACTICE. Laboratory practice, eight hours. Two credits.

A study of composition and of general printing-shop practice, including cost-finding, is made in this course. The work is adapted to the needs of those taking it, but is intended particularly for high-school teachers of printing and for those who expect to have editorial supervision of publications, including high-school papers. Lectures are given on such subjects as the history of printing, artistic typographical arrangement, and the use of printing as an aid in the study of spelling, punctuation, and English composition.

MATHEMATICS

Associate Professor ANDREWS
Associate Professor WHITE
Assistant Professor STRATTON

ALGEBRA III. Eight hours. Four credits.

The quadratic equation, ratio and proportion, variation, arithmetical and geometrical progression. This course will also include a review of simple equations in two and three variables. Textbook, Hawkes, Luby and Touton, *First Course in Algebra.*

PLANE GEOMETRY I AND II. Eight hours. Four credits.

The usual theorems and constructions, including the general properties of plane rectilinear figures, the circle and measurement of angles. Problems and original exercises will have an important place in the course. Textbook, Wentworth-Smith, *Plane and Solid Geometry.*

SOLID GEOMETRY. Eight hours. Four credits.

The usual theorems and constructions, including the relation of planes and lines in space; the properties and measurements of prisms, pyramids, cylinders and cones; the sphere and the spherical triangle. The solution of many numerical and original exercises will be required; mensuration of surfaces and solids. Textbook, Wentworth-Smith, *Plane and Solid Geometry.*

PLANE TRIGONOMETRY. Eight hours. Four credits.
Measurement of angles, functions and any angle, functions of multiple and submultiple angles, sum and difference formulæ. The solution of triangles, trigonometric equations and inverse functions. Textbook, Wentworth-Smith, *Plane and Spherical Trigonometry*.

ANALYTICAL GEOMETRY. Eight hours. Four credits.
Coördinate systems and applications; loci; the straight line, circle, parabola, ellipse and hyperbola. The subjects included are those usually treated in the first course. Textbook, Ashton, *Plane and Solid Analytical Geometry*.

CALCULUS I. Eight hours. Four credits.
The principles and processes of differentiation of functions of one variable. Geometrical and mechanical application of the derivative. Maxima and minima. Use of differentials. Theory of curvature.
CALCULUS II. Eight hours. Four credits.
Indeterminate forms, series. Partial differentiation. Geometry of space. Integral calculus through the technique of integration. Simple applications in geometry and mechanics.

CALCULUS III. Eight hours. Four credits.
Application of the integral calculus to problems in geometry and engineering. Integration in two and in three variables. Textbook in course, Granville, *Differential and Integral Calculus*.

SECONDARY MATHEMATICS. Four hours. Two credits.
A critical examination of the field of secondary mathematics. The subject matter for the courses is secondary algebra, geometry and trigonometry will receive careful attention. Consideration will be given to the reports of the International Commission on the Teaching of Mathematics. The different pedagogic theories of presenting secondary mathematics, resources available for secondary mathematics, and the objective points in teaching, all will receive careful attention. The work will proceed by readings, lectures and reports.

TEACHER'S COURSE IN ARITHMETIC. Four hours. Two credits.
A course for rural and grade teachers and those interested in the applications of arithmetic to the everyday problems of the farm, shop and home. Special attention will be given to a study of the sources and the preparation of supplementary problems for schools. Some attention will be given to the history, recent studies and advancements, and approved methods of presenting the subject. Textbooks, Stratton and Remick's *Agricultural Arithmetic*, and Brown and Coffman's *How to Teach Arithmetic*.

STATISTICAL ANALYSIS. Eight hours. Four credits.
Methods of dealing with statistics. Principles of charting. The purpose is to discover means of obtaining from a group of observations their result in compact form. Only elementary mathematics will be used.

MUSIC

Professor WESBROOK
Assistant Professor BROWN

PUBLIC-SCHOOL MUSIC. Class work, four hours. Two credits.
This course is a general survey of music in public schools from the primary grades through the high school. Methods of presenting music to children in the different stages of development are taught and materials for such work studied. Suggestions for community music work are also given.

VOICE. Private and class instruction.
Classes with four in class, meeting once each week for one and one-half hour periods, will be formed. No credit is granted for this work.

Hours to suit the convenience of students will be arranged for those wishing private vocal instruction. For two half-hour private vocal lessons per week one hour credit will be given. A fee of $7.50 will be charged for private vocal lessons.

VIOLIN. Private and class instruction.
This work will be organized after the same plan as vocal instruction. Credit of one hour will be given for private instruction and a fee of $7.50 charged for private work; no credit will be given for class work.

PIANO. Private and class instruction. Same as voice and violin.

HARMONY. Four hours. Two credits.
The course in harmony includes the study of scales and intervals, primary and secondary chords and their inversions, harmonizing given bases and melodies, ear training, the chord of the dominant seventh, and keyboard harmony.
Students contemplating teaching music in public schools will find this work invaluable to them as it is the grammar and mathematics of music. At least five must enroll for harmony or the class will not be organized.

MUSICAL HISTORY. Two hours. One credit.
A brief survey of the primitive development of the art is given, together with special attention to the classical and romantic periods and present-day conditions and tendencies. The work is made especially interesting by use of copious illustrations on the phonograph.

CHORUS. Three hours. One credit. (Meet twice a week, one and one-half hour periods.)
Every student enrolled in the Summer School is urged to sing in the chorus. This work will be the study and public presentation of beautiful choruses.

ORCHESTRA. Three hours. One credit.
Every individual who plays an orchestral instrument is urged to bring that instrument and play in the Summer School Orchestra. High-grade orchestra music will be studied and will be presented in public performances.

PHYSICAL EDUCATION

Professor LOWMAN
Coach BENDER
Miss LORING

These courses are offered to meet the needs of the teachers who wish to qualify themselves for more efficient direction of and instruction in physical education in the public schools. The courses are planned to meet the needs in both the theoretical and practical phases of the work. The course in practical work will be beneficial to those who are interested in their own health development. Hours of credit will depend upon amount of work.

The courses for men are designed primarily to instruct those who desire expert, practical knowledge of the best methods of coaching football, baseball, basket ball and track and field athletics. These courses should appeal strongly to men who plan to take up coaching as well as men already engaged in coaching in high schools and colleges.

This work is conducted by lectures and by practical demonstrations, the necessary equipment being furnished by the College.

PHYSICAL EDUCATION IN THE PUBLIC SCHOOLS. Four hours. Two credits.

This course consists of lectures and discussions three times a week, with one hour for outside reading. The history and development of physical education, its present status, and the development of a rational system of physical education are studied. The subject is considered in two phases.

(*a*) *Elementary Schools.* Emphasis is placed on the growth and development of the child, the factors controlling this growth and development, and the place of motor activities among these factors. Organization and methods are discussed in detail. The introduction of rational gymnastics, plays, and games is considered.

(*b*) *High Schools.* Following a summary and study of the characteristics, tendencies and needs of adolescence, this course considers the exercises to be used, the condition of the individual students, the methods of studying such conditions, the social and moral leadership necessary and the administration of competitive exercises, especially intramural athletics. Hygiene and medical inspection will also be given a place in this course.

PLAYGROUND METHODS. Four hours. Two credits.

Methods. This course treats of the development of the playground movement in the United States; the necessity of the playground; playgrounds in large cities and in the small town; how to start and maintain playgrounds; supervisory organizations, financing, location, construction, administration and equipment.

Suggestions are given to playground directors in regard to (*a*) the educational value of direct play, (*b*) equipment of the grounds, (*c*) publicity work, (*d*) time and hours, (*e*) the daily playground, (*f*) special days, (*g*) clubs, (*h*) government on the playground, (*i*) activities to encourage, (*j*) special games for the playground, with special emphasis on the rural problem.

GAMES. (Men.) Two hours. One credit.

This course offers the opportunity for practice in playground and group games such as can be used both in the school and on the playground. Particular attention will be given to the method of presenting these games to students or children.

PRACTICAL WORK IN GYMNASTICS. (Men.) Four hours. Two credits.

This course offers the opportunity for practice in free-hand gymnastics, dumb-bells, clubs, wands, elementary work, tumbling and heavy gymnastics. Especial attention is given to exercises adaptable to school conditions. Inspection and medical examinations are also included.

INTRAMURAL ATHLETICS. Six lectures, no credit.

Special attention will be given to the organization and administration for large numbers of participants, events, scoring, points awarded, trophies, values of such participation and results.

FOOTBALL. Three hours. One credit.

Lectures and practical work; spirit of the game, discussion of rules, tackling the dummy, charging sled, handling the ball, passing, open field running, defense in general, line defense, secondary defense, kick-off, punting, place kick, drop kick, direct pass, plays, quarter-back pass plays, interference, signals, training, equipment.

BASEBALL. Three hours. One credit.

Lectures and practical work; discussion of rules, fielding, batting, bunting, base running, sliding, team work, indoor and outdoor practice methods, pitching and catching, proper way to play each position, coaching, signals, training.

BASKET BALL. Three hours. One credit.

Lectures and practical work; discussion of rules, technique of basket shooting, foul throwing, catching and passing, dribbling, reverse turn, selection of players, different styles of play. The offense, the defense, team work, training, equipment.

TRACK AND FIELD SPORTS. Three hours. One credit.

Lectures and practical work; discussion of rules, starting, sprinting, distance running, hurdling, jumping, vaulting, shot putting, discus throw, javelin, training and conditioning, diet.

SWIMMING. (Men.) 4:30 to 6:00 daily.

Many schools and colleges now require swimming before graduation. Swimming is an art and there is probably no single exercise or game which will produce such wonderfully good results in health, strength, and power, if the correct methods be employed. Life-saving and methods and demonstrations are given, as well as elementary instruction in swimming. Enrollment in the department is necessary in order to secure the privilege of the pool.

GYMNASTICS. (Women.) Four hours. Two credits.

Graded free exercises, wands, dumb-bells, clubs and elementary apparatus work are included. This course is especially planned for the needs of the teacher in the public school where no special teacher in this subject is employed. The general theory of gymnastics and physiological reason for different exercises will be discussed. Opportunity for practice teaching will be given.

FOLK DANCING. (Women.) Two hours. One credit.

This course offers graded folk dances of the different nations, suitable for use in the school rooms or yards of public schools.

GAMES. (Women.) Four hours. Two credits.

This course offers the opportunity for practice in games for primary and grammar school boys and girls. Particular attention is given to the technique of group games, and to the methods of presenting them to students. Games for the different types of playgrounds also have a prominent place in this course.

SWIMMING. (Women.)

Opportunity will be given for swimming. Hours are to be arranged with instructor. No credit is given.

PHYSICS

Professor HAMILTON
Assistant Professor FLOYD
Assistant Professor RABURN

INTRODUCTORY PHYSICS. Class work, five hours a week; laboratory, two hours. Assistant Professor Raburn.

This course is designed for those teachers who desire some knowledge of elementary physics and yet have not time to take the three regular courses offered in this subject. The entire subject will be covered and some time given to working problems. Simple experiments and demonstrations will be given. The course will be a good review for those who have had high-school physics. Students who expect to take county examination for certificates to teach are advised to take this course. No College credit is given. Textbook, Black and Davis.

ELEMENTARY PHYSICS I. Class Work, five hours a week; laboratory work, two hours. Four credits. Assistant Professor Raburn.

The 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, Black and Davis. Prerequisite: Algebra III.

ELEMENTARY PHYSICS II. Class work, five hours a week; laboratory work, two hours. Four credits. Assistant Professor Floyd.

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 everyday phenomena, is followed by problems. Prerequisite: Elementary Physics I. Textbook, Black and Davis.

ELEMENTARY PHYSICS III. Class work, five hours a week; laboratory work, two hours. Four credits. Assistant Professor Floyd.

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 discussion. Prerequisite: Elementary Physics I. Textbook, Black and Davis.

Students receiving credit in either of the elementary courses may substitute the grade for similar required work in the School of Agriculture.

PEDAGOGY OF PHYSICS. Class work, five hours a week; laboratory and library, two hours. Four credits. Assistant Professor Floyd.

The course includes a study of the modern texts, manuals and methods in high-school physics. Students are given an opportunity to help assemble apparatus and to assist in lecture demonstrations, such as lantern, X-ray, manipulation of generator and motor, induction coils, storage cells, spectroscope, nickel plating, etc. The laboratory will include the usual experiments required in the elementary course in physics. The purpose of the course is to discuss methods best adapted for the presentation of those topics which present special difficulty, to devise methods of illustrating and demonstrating the fundamental principles, and to select from a large number of possible laboratory experiments a list which might be used in any of our Kansas high schools. This course is intended for those who are either teaching or expect to teach physics in secondary schools.

HOUSEHOLD PHYSICS. Class work, eight hours. Four credits. Professor Hamilton.

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; of some of the optical instruments used in scientific work; 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.

ELECTRICITY. Class work, four hours; laboratory, four hours. Four credits. Professor Hamilton.

An advanced course in electricity. The course is the same as is required of all engineering and general science students, and gives the student a working knowledge of the units employed in measuring current, the various methods of producing current, and acquaints him with the electrical appliances used in both current production and electrical measurements. The laboratory work includes the work with generators and motors, photometers, lamp tests, spectrometer, and advanced problems in both electrical measurements and light. Text, Spinney.

PHOTOGRAPHY. Class work, two hours; laboratory, two hours. Three credits. Professor Hamilton.

The importance of a record of exact details, as shown in photography, 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 enlargement, and the prints best adapted for illustrated articles in newspapers and magazines.

HEAT AND SOUND. Class work, four hours; laboratory, four hours. Four credits. Assistant Professor Raburn.

An advanced course in heat and sound. This course is the same as that which is required of all Engineering and General Science students.

Thermometry, calorimetry, fuel values, and refrigeration are treated both practically and theoretically. The lecture work on sound is illustrated by many lecture-table demonstrations. Text, Kimball.

PUBLIC SPEAKING

Instructor EMERSON

PUBLIC SPEAKING IN THE PUBLIC SCHOOLS. Eight hours. Four credits.

A course designed for teachers in the public schools. Work will consist of the discussion of methods to be employed in teaching public speaking in the public schools, together with actual practice in platform presentation.

PUBLIC SPEAKING. Eight hours. Four credits.

A course for those who have practical ideas to impart and who desire to attain a greater proficiency in imparting them in a clear and convincing manner. Work will consist of the preparation and delivery of short talks or addresses by the students, together with criticisms and points of theory by the instructor.

ZOOLOGY

Professor NABOURS

GENERAL ZOÖLOGY I. Eight hours. Four credits.

This course consists of a study of types of animals selected to illustrate the development of invertebrates. Excursions are made to ponds, streams and meadows, where students collect their material in order to become acquainted with habitats. Animals found are studied in relation to their own species, and to other animals, including man. The laboratory exercises follow mainly those of General Zoölogy I.

ECONOMIC ZOÖLOGY. Eight hours. Four credits.

For prerequisites, consult instructor. Elective in the courses in home economics, agriculture and general science.

This course consists of a study of the different phyla of animals and their dependence on one another, and special studies of birds and mammals. The publications of the experiment stations and the Department of Agriculture and the specimens in the museum are used extensively, both in the class and in connection with the field work.

Laboratory.—The laboratory work consists largely of four-hour field trips to a number of specially selected areas, ponds, streams, meadows, woods, and College farm. Much of the time of the trips is taken in the identification of birds and mammals, with special attention given to their adaptation and economic importance.

Division of College Extension

EDWARD CARL JOHNSON, *Dean*

The people of Kansas believe in using their educational institutions to their full capacity, not only for the students privileged to come to them, but also for the State at large. They know that the number who complete the College course in agriculture, engineering or home economics is small in comparison to the great majority of the people who can not go to college, and it is their wish that this majority also may be served. With this desire the Agricultural College is in full sympathy, and it is its ambition not only to give its resident students the best possible training for leadership in life's work but to be of direct service to every community of the State.

To be of state-wide service has been the policy of the Agricultural College from its early history. As far back as 1864 conventions of the farmers of Manhattan and vicinity were held at the College. The first well-organized farmers' institute conducted under the auspices of the Faculty was held at Manhattan, November 14, 1868, and this was followed by a similar gathering at Wabaunsee, November 21 and 22 of the same year. In 1868 the Board of Regents adopted a resolution recommending "that a system of lecturing on agricultural subjects at this College and the populous settlements of the several counties of the State should be conducted so that the benefits of farming according to correct agricultural principles may be disseminated throughout the State."

A few meetings were held each year for the next several years, increasing in number from 1879, but no definite appropriation for extension work was made until 1899, when $2000 per year was appropriated for this purpose by the State legislature. The annual appropriation remained at this figure until 1905, when the legislature appropriated $4000 for the work, to which the College added $800. Up to 1905 no regular staff for extension work was employed, and all extension activities were conducted by a committee. In October of that year, however, a superintendent to organize the institute work was selected by the Board of Regents, and in July, 1906, the Department of Farmers' Institutes was formally organized.

The interest in extension work throughout the State now developed rapidly. In 1907 the legislature appropriated $10,500 for the two years, to which the College added $1000. In 1909 the belief in the value of agricultural extension was so great that $52,500 was appropriated by the legislature for the bien-

nium, and this amount has been increased by each succeeding legislature, $35,000 being appropriated for 1912, $40,000 for the year 1913, $45,000 for 1914, and $50,000 for the year ending June 30, 1915.

This rapid development of extension work was made possible not only because the people of the State wished to have such work done, but because much new light has been thrown on the essentials in agriculture by the effective experimental work done by the Experiment Stations and by the United States Department of Agriculture.

In 1914 the federal government felt that the useful and practical information on subjects connected with agriculture and home economics developed by the experiment stations, the Department of Agriculture, and by the experience of the best farmers and farm homes should be made more readily available to every one, and in order that it might be more fully and effectively diffused among the people of the several states and its practical application encouraged, the Congress of the United States, in 1914, passed the Smith-Lever bill, which provides for "coöperative agricultural extension work between the agricultural colleges in the several states receiving the benefits of an act of Congress approved July 2, 1862, and of acts supplementary thereto, and the United States Department of Agriculture." To further this act the Congress provided for an annual appropriation of $480,000, of which $10,000 is paid each year to each state which assents to the provisions of the act. This initial appropriation is increased each year for seven years, such increase being allotted annually to each state in the proportion which the rural population of each state bears to the total rural population of all the states, providing an equal sum has been appropriated for that year by the legislature of such state, or has otherwise been provided from within the state, for the maintenance of the coöperative agricultural extension work.

Under this act the coöperation of the agricultural colleges and the United States Department of Agriculture has been assured, extension work has become a national as well as state project, and its effectiveness has been greatly increased.

The governor of the State and the Kansas legislature of 1914 accepted the provision of the Smith-Lever act immediately, and $10,000, therefore, was secured from the federal government for extension work for the year ending July 30, 1915. The additional sums coming from the federal funds under this act to the State for the year ending June 30, 1916, and 1917, respectively, are $14,555.45 and $26,685. These sums were offset by an equal appropriation by the legislature of Kansas, and in addition, from the appropriation made to the Agricultural College for all its work, $40,000 was set aside for extension work for the year ending June 30, 1916. The

total sum for extension work under the Smith-Lever act and from State funds for the year ending June 30, 1916, therefore, is as follows: From the federal government through the Smith-Lever act, $24,555.55; from the State through the Agricultural College, $40,000; from the State direct appropriation to offset the Smith-Lever appropriation, $14,555.55; total, $79,111.10.

Another act of the legislature, of very great importance to the extension activities of the Agricultural College and to the State, went into effect July 1, 1916. This is known as the county farm bureau law, or "An act providing for State and county appropriations for the support of county farm bureaus." It provides "that whenever there shall be organized in any county in the State of Kansas a county farm bureau having a membership of 25 per cent of the *bona fide* farmers of the county, or as many as 250 farmers, and having for its purpose the giving of instructions in agriculture and home economics to the people of said county through practical demonstrations and otherwise, and the employment of a county agricultural agent or agents to prosecute this work, the Kansas State Agricultural College shall contribute, from federal and State funds granted for demonstrations in agriculture and home economics, not less than $800 nor more than $1600 per annum, as far as such funds are available, towards the salary of such county agricultural agent; . . . provided, that before such appropriation is made the county farm bureau shall present to the county commissioners of its county a copy of the constitution and by-laws adopted by the farm bureau and approved by the Kansas State Agricultural College, and a certified statement of deposit in a local bank of the county of not less than $800, which shall be used, subject to the order of the county farm bureau, for providing the necessary equipment for said bureau." It is provided further that when these conditions have been fulfilled the "board of county commissioners shall appropriate from the public funds of the county a sum of money not less than $800 per annum and not to exceed $1600 per annum to assist in the payment of the salary of the county agricultural agent and the expenses of the farm bureau."

The administration of this law was placed in the hands of the Kansas State Agricultural College by a general clause providing that the work of the agricultural agent shall be "under the general direction and supervision of the Kansas State Agricultural College" and "the constitution and by-laws of each bureau and all accounts and expenditures of funds provided for by this act shall be subject to the approval of the director of extension of the Kansas State Agricultural College."

Since this act became effective, July 1, 1915, five of the ten established county farm bureaus have qualified and have availed themselves of its provisions, and five additional

counties have organized farm bureaus, qualified to receive the benefits of this act.

The rapid growth of extension work has demanded efficient administrative machinery. In the judgment of the President of the College and the Board of Regents it became necessary to create, in December, 1912, the Division of College Extension, consisting of four distinct sections—the Department of Farmers' Institutes and Demonstrations; the Department of Highway, Drainage and Irrigation Engineering; the Department of Home Economics; and the Department of Correspondence Study—each with its own head and staff. The Board of Regents made the Director of Extension the Dean of the Division of College Extension. In May, 1914, the Board of Administration added the Department of Rural Service, with a director in charge. Through this organization it has been possible to administer the extension work effectively and economically, and the Kansas State Agricultural College, through these several lines of extension service, has been able to reach directly for several years more than 300,000 people in the State and has conducted some activity in every county.

Publications covering practical subjects in the field of agriculture, home economics and rural engineering are issued from time to time by the Division of College Extension as bulletins, circulars and leaflets. The authors of these publications are the extension specialists or the specialists of the Departments in the other divisions of the College. The regular publications of the Experiment Station also are used extensively in the extension work. A series of publications in coöperation with the United States Department of Agriculture has been commenced and is receiving special attention. Extension publications are mailed regularly to a list, composed of members of farm and home institutes, home-makers' clubs, extension schools, and farm bureaus; *i. e.*, to members of organizations coöperating closely with the Agricultural College. Any citizen of the State, however, on request, may secure copies of individual publications.

While the extension work is directed by the Division of College Extension for administrative efficiency, its scope would be very limited were it not for the close coöperation of the other divisions and departments of the College, which help not only in supplying lecturers for agricultural meetings and extension schools, material for publication, assistance in demonstration work and helpful counsel, but also are responsible for all subject matter taught by the extension specialists.

Farmers' Institutes and Demonstrations

EDW. C. JOHNSON, Superintendent
* H. J. UMBERGER, Demonstration Supervisor Agricultural Agent Work
A. S. NEALE, Dairying and Assistant Superintendent, Extension Schools
* OTIS E. HALL, Boys' and Girls' Clubs
L. C. WILLIAMS, Assistant to the Superintendent
H. J. BOWER, Soils
GEO. O. GREENE, Horticulture
* P. E. MCNALL, Farm Management
T. H. PARKS, Entomology
ROSS M. SHERWOOD, Poultry Husbandry
CARL P. THOMPSON, Animal Husbandry
G. E. THOMPSON, Crops
* W. A. BOYS, District Agricultural Agent, Hays
P. E. Crabtree, District Agricultural Agent, Scott City
* C. G. ELLING, District Agricultural Agent, Parsons
* LEE H. GOULD, District Agricultural Agent, Dodge City
* H. T. NIELSEN, District Agricultural Agent, Norton
V. M. EMMERT, County Agricultural Agent, McPherson County
* A. D. FOLKER, County Agricultural Agent, Jewell County
* J. C. HOLMES, County Agricultural Agent, Cowley County
* O. C. HAGANS, County Agricultural Agent, Miami County
KARL KNAUS, County Agricultural Agent, Cloud County
* F. P. LANE, County Agricultural Agent, Harvey County
* E. J. MACY, County Agricultural Agent, Montgomery County
* C. K. PECK, County Agricultural Agent, Linn County
* H. L. POPENOE, County Agricultural Agent, Lyon County
* P. H. ROSS, County Agricultural Agent, Leavenworth County
R. O. SMITH, County Agricultural Agent, Wilson county
* C. H. TAYLOR, County Agricultural Agent, Atchison County
* W. E. WATKINS, County Agricultural Agent, Allen County

* The U. S. Department of Agriculture coöperates in furnishing directly a part of the salaries and the franking privilege. The county farm bureaus served furnish a part of the salaries and the expenses of the county agricultural agents.

Each farm and home institute of the State is an association or farmers' club, with regular officers, constitution and by-laws, and is required by law to meet at least annually. Many of these organizations hold six or more monthly meetings. The College plans to send two specialists to present at the annual meeting certain well-defined lessons in some branch of agriculture and home economics. The specialists and their subjects are chosen because of a known need or interest in a particular community, or with a view to starting or encouraging certain definite lines of work.

The programs for all annual meetings are based on suggestive outlines sent out by the institute department. These are completed and returned by the local committees. Programs and posters then are printed and sent out free. The department furnishes literature, on request, for members who are to take part in the program of an institute, grange, farmers' union, or other organization.

During the institute campaigns of the last two seasons, an average of 390 annual institute meetings have been held with College assistance, with an attendance of approximately 100,000 people.

Special meetings are held by many of the institutes for the discussion, on certain designated days, of special subjects, such as alfalfa, poultry, good roads, seed selection, the farm horse, marketing of farm products, and so on.

The excellent monthly meetings which are held by many of the local organizations in this State are one of the most important features of the institute work. These meetings are held usually on the second Saturday afternoon of each month from September to May. The Department of

Institutes and Demonstrations suggests the subject for discussion and the same subject is discussed in each and every institute in the State. In this way certain very important subjects have been discussed by thousands of farmers, at seasonable times, thus promoting a general uniformity of action.

Each year some special topic, such as Farm Management, the Management of 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.

Among the subjects discussed at these monthly meetings the following are good examples: The Home Orchard, The Silo, Seed-bed Preparation for Wheat, The Sorghums, Community Breeding, Farm Accounting, The Marketing of Farm Products, Road Improvement, Consolidation of Rural Schools, and so on. Every institute is required to hold at least three monthly meetings in addition to the annual meeting before it is entitled to county aid.

Every institute has a membership paying a definite membership fee. The membership lists constitute the mailing list for the publications issued by this department. In addition to receiving these pamphlets, each member who fills out and returns a membership blank receives from the College, from the government, or from some state experiment station such other obtainable literature as his interests demand.

EXTENSION SCHOOLS

The demand among men and women for instruction in the essentials of agriculture and home economics is steadily increasing. Owing to the nature of the farm and home institute it is able to meet this demand only in part, and for that reason extension schools have been organized in communities which desire more complete courses in these subjects than can be given at the institute.

The College through its Extension Division now conducts extension schools in agriculture and home economics of five days' duration, with five instructors to conduct the work. Here well-planned, comprehensive courses are given in the various lines of agriculture and home economics, so that in a week's work some of the essentials of these subjects may be learned.

In addition to these general schools, special schools in dairying, poultry, orcharding, road making and cement construction are held in communities desiring them and willing to defray the local expense. Five-day schools in home economics with cooking, home nursing, sewing and millinery may be had on request.

Extension schools have been popular from the first. During the season of 1914-'15 there were eight general extension schools held with an average attendance of 119. These schools proved so satisfactory that five out of the eight communities in which they were conducted immediately made arrangements to hold schools the next season. In addition to these, eleven other towns sent in petitions, making a total of sixteen five-day schools held during the season of 1915-'16. An average of twenty special poultry schools have also been held each season.

DEMONSTRATION FARMING

GENERAL FIELD DEMONSTRATIONS. After specialists from the Agricultural College have attended institute meetings and extension schools, requests have come from farmers that the College send these men into their communities to help put to a practical test the methods and plans advocated. Therefore, the specialists of the department spend much of the time from March to July in various field demonstrations, including pruning and spraying orchards, building silos, inspecting dairy herds, making plans for farm buildings, visiting farmers and advising as to farm management.

AGRICULTURAL AGENT WORK. The activities of agricultural agents consist of conducting demonstrations, assisting farmers with suggestions and plans relative to the farm business and in organization for rural activities. The field demonstrations are conducted for the purpose of introducing new crops, testing relative values of varieties already grown and methods of cultivation and of harvesting. Demonstrations in proper methods of feeding, care and management of live stock are conducted. Methods of controlling insects and diseases of farm crops, orchard and garden and diseases of live stock are demonstrated. Surveys of the farm business are made in order to study the conditions prevailing in typical areas, and possible improvements in farm management methods employed. Community welfare in which better social relations are fostered is also an important feature of this work. The agent interests himself in practically every farm activity, especially where there is need of improvement.

DISTRICT AGENTS. The College has employed five district agricultural agents, each one confining his activities to a few counties. One has headquarters at Norton, conducting demonstration work in several counties in the northwestern corner of the State, another at Hays, conducting work in counties along the Union Pacific lines in western Kansas; a third at Scott City, working in counties from Rush west to the Colorado line; a fourth at Dodge City, conducting demonstrations in the counties in the southwestern part of the State; and a fifth at Parsons, working in several counties in southeastern Kansas. These men conduct demonstrations on from four to six or more farms in each county in the assigned territory, in the growing of crops, in the handling of stock, and in general farm management.

COUNTY AGENTS. In addition to the district agents, the College has assisted in locating thirteen county agricultural agents in the following counties: Leavenworth, Montgomery, Cowley, Allen, Harvey, Linn, Miami, Lyon, Jewell, Atchison, Cloud, Wilson and McPherson.

Previous to July 1, 1915, ten of these were employing a county agricultural agent each, who devoted his entire time to agricultural demonstration work in the county. This work was supported partly by appropriations from the United States Department of Agriculture, partly from appropriations under the federal Smith-Lever act, and partly from farm-bureau membership fees and private subscriptions.

Following the enactment of the farm-bureau law, in 1915, five of the ten established county bureaus have increased their membership to more than the required 250 in order to avail themselves of county appropriations. The remaining six counties continue under the old plan, as they are provided with sufficient funds for another year. In five additional counties farm bureaus have been organized (April 4, 1916). Each of these made its initial move by procuring 250 members, and have been maintained from the first directly from county appropriations, Smith-Lever funds and membership fees. In all, there are thirteen counties in which farm bureaus and agricultural agents are conducting work in coöperation with the Agricultural College. Two additional counties are ready to secure agricultural agents, and a large number of counties are at work organizing bureaus.

FARM-MANAGEMENT DEMONSTRATIONS

Farm-management demonstrations are conducted by a farm-management specialist in coöperation with the agricultural agents. In these demonstrations such records are taken as are essential to the determination of the net profits of individual farms. The classification of these records according to different types of farming, the determination of the profits from each type, and the comparison of individual record with the averages are made, and the results of the study are made known to each farmer interested in order that he may use the suggestions received in any needed reorganization of his own business.

This work was begun in September, 1914. By March 15, 1916, thirteen counties had made definite arrangements for one or more areas in which to conduct such demonstrations.

BOYS' AND GIRLS' CLUBS

The Department of Institutes and Demonstrations is now promoting boys' and girls' club work as a definite and practical line of extension service in agriculture and home economics. The club work is divided into club projects, and each club project represents some specific farm or home activity, such as corn growing, pig feeding, gardening, canning, bread baking, and sewing. Through these clubs some of the best methods and practices which the College has to recommend are being put into operation by boys and girls who may never be able to get help from the College in any other way. The work of these clubs is also opening the way for such organizations as the farm and home institutes, extension schools, farm bureaus, community welfare centers, boys' and girls' Christian associations, and other organizations that are trying to serve rural and village people.

The club membership is in the main composed of those boys and girls who are in earnest about their work and who are trying to make the farm and farm life more attractive as well as more profitable. They organize into club groups, and under the direction of the county farm agent, institute officer, teacher or other local leader, they carry out the instructions which are sent from the College. The leaders help the club members to keep the proper records for all work done. They also help the College to see that the boys and girls take the proper projects—

those which are suited to their respective sections of the State. For example, the growing of corn as one of the club projects is discouraged in those sections where kafir or feterita have been found to be more profitable. After the club projects are decided upon, the local leader helps the club members to organize by choosing from the memberships a president, vice president and secretary. Regular meetings are planned where this is practicable, and in this way the social phase of the work is encouraged. In 1915 ten different club projects were promoted and there were 206 clubs in the State with a registered membership of 3004 boys and girls.

Highway, Drainage and Irrigation Engineering

W. S. GEARHART, State Engineer
H. B. WALKER, Drainage and Irrigation Engineer
A. R. LOSH, Assistant Engineer
C. I. FELPS, Assistant Engineer
W. J. KING, Assistant Engineer

HIGHWAY ENGINEERING

Since the public highways have a vital relation to the agricultural development of the State, to the country school, the country church, and the civic conditions of rural life, it is very proper that the Agricultural College should assist as far as it may in solving such highway problems as arise. This is recognized in chapter 248 of the Session Laws of Kansas for 1911, where it is provided that the State Agricultural College and the State engineer shall advise with the county and township highway officers of the State and furnish scientific information concerning road, bridge and culvert plans and specifications, road materials, proper methods of road grading and draining and the construction and maintenance of highways whenever asked to do so. Upon request, therefore, of the highway officers of any township or county, plans, specifications and estimates for road, bridge and culvert construction and maintenance are furnished and assistance given in advertising the letting, in supervision of construction, and in inspection of finished work before acceptance. This service is free of charge to counties and townships except for the actual traveling expenses incurred, and the taxpayers at a very small cost thus are assured that the work done is of the proper character and first class in every respect.

DRAINAGE AND IRRIGATION ENGINEERING

Reclamation of farm land by drainage and irrigation is important in the development of the agricultural resources of Kansas. The eastern portion of the State has problems of flood control and of drainage of wet lands. In the western area irrigation by pumping is an important agency in development. The Agricultural College employs and maintains a drainage and irrigation engineer and assistants for the purpose of giving scientific and practical help to persons or communities interested in field irrigation or land drainage. It is the duty of this engineer to render assistance in the organization and management of drainage districts; to give advice to farmers contemplating farm drainage

projects; to advise with individuals or communities interested in irrigation development; to prepare and approve plans, estimates and specifications for drainage and irrigation projects and to carry on a general campaign of education for the best methods of land reclamation. The services of this engineer are free except for the usual charge for traveling and local expenses.

Home Economics

MISS FRANCES L. BROWN, Director
MISS MARION P. BROUGHTEN, Extension Schools, Domestic Science
MISS M. WINIFRED FORTNEY, Extension Schools, Domestic Art
MISS STELLA MATHER, Specialist in Home Economics
MISS LOUISE CALDWELL, Specialist in Home Economics
MISS ALICE POULTER, Specialist in Home Economics
——— ———, Specialist in Home Economics
MISS MATILDA J. WILSON, Correspondence Courses and General Secretary

Instruction in home economics is secured by about 800 women annually at the Agricultural College, and there are many thousand others throughout the State who have had the advantages of resident instruction either in this or some other institution. Large as this number may seem, it is small when compared to the great number of women and girls throughout the State to whom these courses are not available. To carry as much assistance to this vast majority of women as possible is the aim of the Department of Home Economics in Extension, and with this in view, seven women are regularly employed and three others have been employed part time as special assistants during 1915. The extension work in home economics is conducted through farm and home institutes, extension schools, special women's meetings, county normal institutes, girls' home economics clubs, Kansas home-makers' clubs, by judging at fairs, through lectures at Chautauquas, and by means of personal correspondence. During the institute season from October to March four women spend full time in giving lectures and demonstrations before farm and home institutes, and home-makers' clubs conducted in connection with them. From March to September, inclusive, the same specialists assist in women's meetings, in county normal institutes, and in judging at fairs, at Chautauquas and in special extension schools.

EXTENSION SCHOOLS IN HOME ECONOMICS

The extension schools in home economics covering a period of a week in a place and giving definite courses of instruction enable the women of the State to avail themselves of the opportunities offered by the Agricultural College at their very doors. The sessions of the school are conducted from 9:30 to 12 in the forenoon and from 1:30 to 4 in the afternoon, each half day being divided into a lecture period of one hour and a demonstration period of one hour and one-half. For any one school two courses from the following list may be selected: Food preparation, home management, home nursing, sewing, canning, dietetics, and home art. The minimum required membership for a school of this kind is fifteen, but as many more may become members as the room in which the school is to be held can accommodate. A tuition fee of $1 per member usually is collected by the local committee to be used in defraying the local ex-

penses. Schools in home economics alone are held from March until October, and in connection with extension schools in agriculture from November until March.

Special schools in dressmaking are held on request. These are two weeks in length, lasting from Monday afternoon until the second Friday evening. An enrollment of not less than twenty nor more than thirty is required, the tuition fee usually being $1.50. The dressmaking schools are designed primarily to give general instruction in sewing and individual help to the members in making their own dresses.

GIRLS' HOME-ECONOMICS CLUBS

About eight hundred young women receive instruction in home economics at the College each year. Through the extension schools about one thousand others are reached annually. Through the farmers' institute and home makers' clubs, probably an additional fifteen thousand receive some assistance. Through correspondence courses several hundred are reached each year. In order that more may be served, the College has undertaken the organization of girls' home economics clubs in town and village high schools and in rural communities. Printed lessons in cooking and sewing are supplied by the College to the secretary of the club, together with blanks for reports which are to be handed in after each lesson. Here, then, is a form of local class work combined with correspondence study, and girls can to a considerable extent be prepared either for regular home-study courses, for domestic science work in high school or college or for their everyday home duties. This work also prepares the way for the teaching of domestic science and art in the high schools of the State. A small fee to help pay postage is required by the College of each club organized under its auspices.

RURAL SERVICE

WALTER BURR, Director

Wherever rural communities show a desire to progress in any phase of organized life, the Rural Service Department is ready to render assistance. Instruction by lectures is given on new school movements, such as consolidation, rural high-school development, vocational training and social-center work. Where desired and timely, assistance is given to secure organized permanency to these movements in the local community.

Lectures and assistance dealing with educational and social phases of rural church activities are furnished by this department, and presentations of coöperative organization work also are available.

A rural-life conference, or school for rural leaders, conducted during the past two years has served a large number of leaders interested in rural organization work. This is a short conference conducted at the Agricultural College, and consists of lectures, class work and conference periods.

Rural community surveys are conducted in communities in the State when requests come from an organized group with influence to inaugurate a community development program based on the results of such a survey.

During the summer months community assemblies are conducted in rural communities by this department. These assemblies are four-day sessions conducted in the community. The programs consist of popular presentations of home economics and agriculture by lectures and demonstrations, community welfare, pageantry, community music and educational moving pictures. The assemblies combine some of the features of demonstration schools and chautauquas and in addition include the play and pageant training. Six assemblies were held in 1915 and fourteen will be conducted in 1916.

Home-study Service

(Correspondence Study.)

M. G. BURTON, Director
GEORGE E. BRAY, Industrial Subjects
E. M. TIFFANY, Agricultural Subjects
M. G. KIRKPATRICK, Educational Subjects

NOTE.—The corps of instructors employed in the Department of Home-study Service devote their entire time to the work of teaching by correspondence. They closely correlate all of their work with the various divisions and departments of the institution, and keep all the credit work under the direct supervision of the regular members of the faculty.

The Kansas State Agricultural College, believing that it is as much a part of the function of the institution to offer its advantages to those who can not attend the College classes as it is to offer instruction to those who are able to undertake residence work, offers to the citizens of Kansas an opportunity to study at home the various lines of agriculture, home economics, mechanic arts, farm engineering, and many high-school subjects.

Opportunity, therefore, is offered for systematic study by correspondence in many subjects which have a direct bearing upon the various problems of the farm, home, and community. In order to meet the widely varying needs and conditions of the different classes of people, and to make it practicable for those who are not accustomed to regular habits of study as well as for those who are studiously inclined, the service of this department is rendered by three different methods:

I. *By the Reading Courses*, each of which is devoted to the discussion of a single subject or problem in a simple, brief and nontechnical way. Every word is right to the point and so clear that it can not be misunderstood. In order to make these Reading Courses a perfect boon to every home, a very comprehensive list of subjects is offered, and no fee is required for the service. Full explanation of the details, as well as the list of subjects offered under the Free Reading Courses will be found in Home-study Service Bulletin, Part I.

II. *By Extension Courses*, where complete comprehensive courses covering a number of related subjects are presented. This line of service is adapted to the needs of those who are ambitious for scientific training, but who may not have met the requirements for college entrance. It is the nearest possible home parallel to a college education. For full explanation of the extension courses see Home-study Service Bulletin, Part II.

III. *By College Credit Courses*, where college subjects are offered by the correspondence method for regular credit. For detailed information relative to this work offered for college credit see Home-study Service Bulletin, Part III.

FOR WHOM INTENDED

The work of the Department of Home-study Service has been made sufficiently broad so that it will offer valuable assistance to all citizens who are in any way interested in the various agricultural, mechanic-art and home problems. The extension and the credit courses will be of special 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 what has been discovered by the scientific research of others;

(7) Capitalists and business men who are holding investments in land, and who should know how to make those investments increase in value; and

(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, and who wish to prepare in other subjects for examination.

Only a small percentage of the farming population of Kansas is able to attend the classes in the Agricultural College; about 100,000 people attend the farmers' institutes; a few thousand attend the extension schools; about 50,000 come in more or less direct contact with agricultural agent work. 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. These are the people for whom this work is designed.

READING COURSES

The following Reading Courses, based on free bulletins, have been prepared, others will be added as need arises.

AGRICULTURAL READING COURSES

Soils and Fertility

RA 1. The Soil.
RA 2. How Plants Feed and Grow.
RA 3. Humus.
RA 4. Barnyard Manure.
RA 5. Green Manuring.
RA 6. Commercial Fertilizers.

Farm Crops

RA 101. Varieties of Corn.
RA 102. Corn Culture.
RA 103. Wheat and Its Culture.
RA 104. Wheat in Western Kansas.
RA 105. Preparing the Land for Wheat.
RA 106. Oats and Their Culture.
RA 107. Barley and Its Culture.
RA 108. Grain Smuts.
RA 109. Kafir and Its Culture.
RA 110. Feterita and Its Culture.
RA 111. Milo and Its Culture.
RA 112. Sweet Sorghums and Their Culture.
RA 113. Sorghum Sirup Manufacture.
RA 114. Sudan Grass and Its Culture.
RA 115. Broom Corn and Its Culture.
RA 116. Millets and Their Culture.
RA 117. Meadow and Pasture Grasses.
RA 118. Rape and Its Culture.
RA 119. Peanuts and Their Culture.
RA 120. Cowpeas and Their Culture.
RA 121. Soy Beans and Their Culture.
RA 122. Alfalfa and Its Culture.
RA 123. Red Clover and Its Culture.
RA 124. Sweet Clover and Its Culture.

Garden Crops

RA 201. The Home Vegetable Garden.
RA 202. The Potato and Its Culture.
RA 203. Potato Diseases.
RA 204. Sweet Potatoes and Their Culture.
RA 205. Tomatoes and Their Culture.
RA 206. Cabbage and Its Culture.
RA 207. Diseases of Cabbage and Cauliflower.
RA 208. The Onion and Its Culture.
RA 209. Cucumbers and Their Culture.
RA 210. Asparagus and Its Culture.
RA 211. Celery and Its Culture.
RA 212. Popcorn and Its Culture.

Orchard Crops

RA 301. The Apple and Its Culture.
RA 302. Apple Orchard Management.
RA 303. Pruning.
RA 304. Insect and Fungous Enemies of the Apple.
RA 305. The Peach and Its Culture.
RA 306. Spraying Peaches.
RA 307. The Pear and Its Culture.

Small Fruits

RA 401. The Home Fruit Garden.
RA 402. Plant Propagation.
RA 403. Strawberries and Their Culture.
RA 404. Raspberries and Their Culture.
RA 405. Grapes and Their Culture.
RA 406. Grape Diseases and Pests.
RA 407. Orchard Spraying.

Ornamental Plants

RA 501. Annual Flowers.
RA 502. Lawns.
RA 503. Beautifying the Home Grounds.
RA 504. Tree Culture.
RA 505. Trees for Western Kansas.
RA 506. Black Walnuts.
RA 507. The Hardy Catalpa.

Farm Animals

RA 601. Breeds of Draft Horses.
RA 602. Feeding Horses.
RA 603. Unsoundness in Horses.
RA 604. Blind Staggers.
RA 605. Navel Ill.
RA 607. Breeds of Beef Cattle.
RA 608. Feeding Cattle.
RA 609. Making and Feeding Silage.
RA 610. Breeds of Dairy Cattle.
RA 611. Dairy Farming.
RA 612. How to Raise Calves on Skim Milk.
RA 613. Production of Clean Milk.
RA 614. Breeds of Sheep.
RA 615. Sheep Raising.
RA 616. Foot-and-mouth Disease.
RA 617. Tuberculosis.
RA 618. Lumpy Jaw.
RA 619. Breeds of Hogs.
RA 620. Hog Feeding.
RA 621. Hog Cholera.
RA 622. Breeds of Poultry.
RA 623. Poultry Management.
RA 624. Capons and Caponizing.
RA 625. Incubation of Eggs.
RA 626. Brooding of Chickens.
RA 627. Turkeys.
RA 628. Ducks and Geese.
RA 629. Poultry Diseases.

Insects

RA 701. The Chinch Bug.
RA 702. The Hessian Fly.
RA 703. Insect Pests of Alfalfa.
RA 704. The Spring Cankerworm.

AGRICULTURAL READING COURSES—*continued*

RA 705. Insects Injurious to Stored Grains.
RA 706. The White Grub.
RA 707. The Stable Fly.
RA 708. The Honey Bee.
RA 709. Comb Honey Production.
RA 710. Treatment of Bee Diseases.

Agricultural Economics and Sociology

RA 801. How to Use Farm Credit.
RA 802. The Farmer's Living.
RA 803. Community Welfare.

Miscellaneous Agricultural Subjects

RA 901. Bindweed.
RA 902. Canada Thistles.
RA 903. Some Useful Birds.
RA 904. The Pocket Gopher.
RA 905. Hogging Down Crops.

INDUSTRIAL READING COURSES

Farm Machinery

RI 1. Gasoline Engines.
RI 2. Corn Cultivators.
RI 3. Corn Harvesting Machinery.
RI 4. Care of the Farm Machinery.

Farm Shop

RI 101. Repair of Farm Equipment.
RI 102. The Use of Paint.
RI 103. Horseshoeing.

Storage of Perishable Farm Produce

RI 201. Fruits.
RI 202. Root Crops.

Farm Concrete Work

RI 301. Cement, Mortar, and Concrete.
RI 302. Use of Concrete on the Farm.
RI 303. Concrete Silo Construction.
RI 304. Concrete Fence Posts.
RI 305. Underground Silos.

Roads in the Country

RI 401. Benefits of Improved Roads.
RI 402. Sand, Clay and Burnt Clay Roads.
RI 403. The Road Drag and How to Use It.

Irrigation

RI 501. Information for Beginners.
RI 502. The Construction of Small Irrigation Ditches.
RI 503. Gardens.
RI 504. Orchards.
RI 505. Grain Fields.
RI 506. Sugar Beets.
RI 507. Alfalfa.
RI 508. Drainage of Irrigated Lands.
RI 509. Windmills in Irrigation.

Farm Buildings

RI 601. Practical Suggestions for Farm Builders.
RI 602. Laying Out Improvements.
RI 603. The Farm Home.
RI 604. Ice Houses.
RI 605. Poultry Houses.
RI 606. Hog Houses.
RI 607. Ventilation of Stables.
RI 608. Care of Farm Buildings.

Miscellaneous Industrial Subjects

RI 701. Farm Woodlot.
RI 702. Farm Water-supply Systems.
RI 703. Farm Sewage Disposal.
RI 704. Farm Drainage.
RI 705. Farm Power.
RI 706. Farm Lighting.
RI 707. Preservative Treatment of Farm Timbers.
RI 708. Farm Mechanics.
RI 709. Breaking and Training Colts.
RI 710. Lightning and Lightning Conductors.
RI 711. Ice-box Construction.
RI 712. Trap Nest Construction.
RI 713. Fly Trap Construction.
RI 714. Hoppers for Poultry Feeding.
RI 715. Bird House Construction.

HOME ECONOMIC READING COURSES

Foods and Nutrition

RHE 1. Nutrition.

Preparation of Foods

RHE 101. Bread.
RHE 102. Cheese.
RHE 103. Butter.
RHE 104. Vegetables.

Proteins

RHE 201. Milk.
RHE 202. Eggs.
RHE 203. Legumes.
RHE 204. Nuts.
RHE 205. Meats.
RHE 206. Fish.
RHE 207. Mutton.
RHE 208. Economy in the Use of Meat.

Carbohydrates or Starches and Sugars

RHE 301. Sugar as Food.
RHE 302. Maple Sugar.
RHE 303. Sorghum Sirup.
RHE 304. Use of Honey.
RHE 305. Root Crops as Food.

Cereals

RHE 401. Food Value of Corn, Kafir and Cowpeas.
RHE 402. Ways of Using Cornmeal.
RHE 403. Popcorn.
RHE 404. Corn as Food.
RHE 405. Breakfast Foods.

HOME ECONOMIC READING COURSES—*continued*

Preservation of Foods

RHE 501. Home Care of Foods.
RHE 502. Milk.
RHE 503. Milk and Its Bacterial Content.
RHE 504. Vegetable Canning.
RHE 505. Tomato Canning.
RHE 506. Peach Canning.
RHE 507. Grape Juice.
RHE 508. Preserving Apples by Evaporation.
RHE 509. Fruits and Jellies.

Household Pests

RHE 601. Mosquitoes.
RHE 602. House Flies.
RHE 603. Carpet Beetle.
RHE 604. House Centipede.
RHE 605. Cockroaches.
RHE 606. Moths.
RHE 607. Insects and Their Effect on Health.

EXTENSION COURSES

The following Extension or Noncredit Courses are based on standard textbooks. Each subject consists of from sixteen to twenty assignments. These subjects are so arranged as to present complete courses consisting of eight related subjects each in:

Agronomy
Horticulture
Animal Husbandry
Dairying
Poultry Husbandry
Carpentry and Building
Farm Engineering
Stationary Engineering
Highway Improvement
Machine Shop and General Repairing
Domestic Science
Domestic Art
General Home Economics

A period of twelve months from date of enrollment is allowed in which to complete a subject. A fee of $3 per subject is charged for residents of Kansas; for nonresidents the fee is $6. Full details are to be found in Home-study Service Bulletin, Part III.

EXTENSION COURSES

Agricultural Courses

EA 1. Essentials of Agriculture.
EA 2. Elementary Agricultural Chemistry.
EA 3. Soils.
EA 4. Cereal Crops.
EA 5. Forage Crops.
EA 6. Market Gardening.
EA 7. Orcharding.
EA 8. Feeds and Feeding.
EA 9. Animal Breeding.
EA 10. Types and Breeds.
EA 11. Farm Dairying.
EA 12. Poultry Production.
EA 13. Insects Injurious to Farm Crops.
EA 14. Insects Injurious to Orchard Crops.
EA 15. Insects Injurious to Garden Crops.
EA 16. Greenhouse Management.
EA 17. Floriculture.
EA 18. Landscape Gardening.
EA 19. Farm Forestry.
EA 20. Tree Surgery.
EA 21. Dairy Manufacturing.
EA 22. Diseases of Animals.
EA 23. Diseases of Poultry.
EA 24. Horse Production.
EA 25. Dry-land Farming.
EA 26. Beef Production.
EA 27. Hog Raising.
EA 28. Sheep Feeding.
EA 29. Sheep Raising.

Industrial Subjects

EI 1. Shop Mathematics.
EI 2. Mechanical Drawing, Applied.
EI 3. Architectural Drawing.
EI 4. Constructive Carpentry and Inside Finishing.
EI 5. Heating and Ventilating.
EI 6. Farm Drainage.
EI 7. Farm Buildings.
EI 8. Concrete Construction.

EXTENSION COURSES—*continued*

EI 9. Farm Blacksmithing.
EI 10. Farm Machinery.
EI 11. Steam Boilers and Engines.
EI 12. Gasoline Engines.
EI 13. Blacksmithing.
EI 14. Plane Surveying.
EI 15. Highway Construction.
EI 16. Roads and Pavements.
EI 17. Automobiles.
EI 18. Machine Shop Work.
EI 19. Bridge and Culvert Construction.
EI 20. Elementary Woodworking.
EI 21. Farm Woodworking.
EI 22. Foundry Practice.
EI 23. Gasoline and Oil Traction Engines.
EI 24. Patternmaking.
EI 25. Plumbing.
EI 26. Practical Electricity.
EI 27. Sheet Metal Drafting.
EI 28. Strength of Materials.
EI 29. Steam Traction Engines.
EI 30. Structural Engineering.

Home Economics

EH 1. Household Management.
EH 2. Foods and Cookery I.
EH 3. Foods and Cookery II.
EH 4. Foods and Cookery III.
EH 5. Sewing I.
EH 6. Sewing II.
EH 8. Educative Millinery.
EH 9. Home Nursing.
EH 10. Home Sanitation.
EH 11. Home Decoration.
EH 12. Personal Hygiene.
EH 13. Household Bacteriology.
EH 14. Child Life and Care of Children.
EH 15. Household Chemistry.

CREDIT COURSES

The following subjects are offered for College credit or entrance credit. They have the same prerequisites as residence work, and carry the same number of credits, with the exception of laboratory work. A fee of $1 per credit hour is charged for this work; thus a subject carrying four credit hours requires a fee of $4. For nonresidents of Kansas this fee is doubled.

NOTE.—Other subjects are in preparation. For full information see Home-study Service Bulletin, Part III.

ENTRANCE CREDIT SUBJECTS

PCA 2. Elementary Agriculture II.
PCM 1. Algebra I.
PCM 2. Algebra II.
PCM 3. Algebra III.
PCM 4. Plane Geometry I.
PCM 5. Plane Geometry II.
PCM 6. Solid Geometry.
PCE 1. Grammar and Composition.
PCE 2. English Composition.
PCE 3. English Readings.
PCE 4. Theme Writing.
PCE 5. English Classics.
PCH 1. Ancient History.
PCH 5. Modern History.
PCH 8. American History.
PCD 1. Freehand Drawing.
PCD 2. Geometrical Drawing.
PCD 3. Shop Mechanical Drawing I.
PCD 4. Shop Mechanical Drawing II.
PCA 1. Elementary Agriculture I.

COLLEGE CREDIT SUBJECTS

CM 7. Trigonometry.
CE 5. Short Story Writing.
CA 2. Farm Crops.
CA 4. Forage Crops.
CH 3. Floriculture.
CH 2. Vegetable Gardening.
CH 1. Fruit Growing.
CH 4. Greenhouse Management.
CF 1. Farm Forestry.
CZ 1. Geology.
CL 1. Animal Breeding.
CP 1. Poultry Management.
CS 4. History of Education.
CS 6. Methods of Teaching.
CS 5. Philosophy of Education.
CS 8. Psychology.
CS 7. School Law and Management.
CS 9. School Discipline.
CS 1. Vocational Education.
CS 10. Rural Education.
CS 2. Rural Sociology.
CS 3. Sociology.
CR 1. Highway Engineering I.
CR 2. Mechanical Drawing I.
CR 3. Farm Motors.
CE 1. Economics.
CE 2. Agricultural Economics.

Student Organizations

THE 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 School of Agriculture elects a delegate, who has the privilege of speaking on subjects pertaining to his school, 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 Association in colleges stands 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, committee rooms, students' living rooms, gymnasium, etc. All young men are welcome to make use of the privileges of the building, whether members or not. No fixed fees for membership are charged, each member giving whatever he feels able to afford. 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 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.

THE 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 com-

mittee 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.

THE NEWMAN CLUB

The Newman Club, an organization of Catholic students, holds a social meeting every other Friday evening, and on the alternate Friday evenings the time is devoted to some line of religious study under the direction of the local pastor. The College authorities recognize this Bible study by allowing a two-hour credit for it when properly certified. In further recognition of the club's efforts the College has placed a set of the new Catholic Encyclopedia on its library shelves. Furthermore, the club has purchased and placed in the College library nearly one hundred dollars' worth of Catholic books and pamphlets.

The club is now on a sound basis and is qualifying for affiliation with a national organization of Newman clubs of the various state universities and colleges. Its aim is to favorably influence new Catholic students in the knowledge and practice of their faith, to foster sound morality and good character.

LITERARY AND SCIENTIFIC SOCIETIES

The literary societies of the College, eight in number, are wholly student organizations, holding weekly meetings in the College buildings. The Alpha Beta and Franklin societies are open to both sexes; the Ionian, Eurodelphian and Browning societies admit only young women to membership; 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 inter-society oratorical contest.

In the School of Agriculture there are three literary societies: one for young men, the Lincoln; one for young women, the Philomathian; and one for both young men and young women, the Hesperian. These societies have the same general aims and purposes as those in the College.

AGRICULTURAL SOCIETIES

The Saddle and Sirloin Club meets on the first and third Mondays of each month. Membership is open to all animal husbandry students above the freshman year. The object of the club is to promote the interests of animal husbandry in the College and in the State. Live-stock problems of all kinds are taken up, and members of the Faculty and outside speakers are secured for addresses on special topics. The College section of the American Society of Agronomy meets on call of the president of the society. The membership includes students and instructors interested in agronomy and in allied subjects. The purpose of the society is to promote the development of agronomic work and methods, in harmony with the purpose of the organization of this name. The Agricultural Association meets Monday evenings. All students interested in agriculture are eligible to membership. The object of the association is to promote the general interests of agriculture in the College and State.

ENGINEERING SOCIETIES

The Architectural Club, composed of students and instructors in architecture, meets monthly for the discussion of topics related to architecture, and for social purposes.

A student branch of the American Society of Mechanical Engineers, the national mechanical engineering society, was established at the College in 1914. Meetings are held in the Engineering Amphitheatre the first Thursday evening of each month. Papers and discussions are presented by the members based on their experience and study, and the articles of the *A. S. M. E. Journal* are abstracted and discussed. Practicing engineers are frequently secured to address the society. All engineering students are eligible to membership, and instructors who belong to the A. S. M. E. are honorary members.

The American Institute of Electrical Engineers has a local branch at the College which meets in the Engineering Amphitheatre the third Thursday of each month of the school year. For these meetings papers and abstracts are prepared by the students and also prominent engineers are secured as speakers whenever possible. All engineering students are eligible to membership.

The Civil Engineers' Society is composed of students and instructors in civil and highway engineering. It meets monthly to discuss topics of interest to civil engineers, and to develop sociability among its members.

The Engineers' Association is composed of students from all courses of the Division of Engineering. Its objects are to further the interests of the division in the College and the State, and to promote acquaintanceship and fellowship among the students of the division. It meets the first Monday of each month at 10 a. m. in the Engineering Amphitheatre.

THE COLLEGE BAND

The College Band is a military organization, 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, basketball; 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. Basketball and tennis teams are organized among the young women.

HONORARY ORGANIZATIONS

The honorary organizations consist of fraternities, sororities, and societies. Of these, Alpha Zeta and Gamma Sigma Delta draw their members from students in the Division of Agriculture; Alpha Psi draws its members from the Veterinary Department; Sigma Tau from the Division of Engineering; Omicron Nu from the Division of Home Economics. There are chapters of Sigma Delta Chi, the journalistic fraternity; of Pi Kappa Delta, the debating fraternity; of Zeta Kappa Psi. the debating sorority. The military students have a chapter of "Scabbard and Blade," the national fraternity; and the athletic men have the "K" fraternity. Of honorary societies there are the Quill Club, composed of those who have gained distinction in writing, and the "Forum," for those who have secured forensic honors.

In addition to these student organizations there is a chapter of Phi Kappa Phi, to which students of the highest scholarship are elected. (See "Honor Societies.")

Degrees and Certificates Conferred

In the Year 1915

FIRST DIVISION, JUNE 17, 1915

DEGREES CONFERRED

GRADUATE COURSES

MASTER OF SCIENCE

Frank Alfred Gougler, B. S., Oklahoma Agricultural and Mechanical College, 1909.
Herbert Hiram King, A. B., 1904, A. M., Ewing College, 1906.
Lyman Dalton LaTourrette, B. S. A., University of Arizona, 1913.
Rolla Woods Miller, A. B., Wabash College, 1913.
John Beardsley Sieglinger, B. S., Oklahoma Agricultural and Mechanical College, 1913.
Blanche Beatrice Vanderlip, B. S., Kansas State Agricultural College, 1910.

UNDER-GRADUATE COURSES

DIVISION OF AGRICULTURE

BACHELOR OF SCIENCE IN AGRICULTURE

Course in Agronomy

Fred Miles Bealey
Percy Walter Cockerill
Roy Frank Hagans
John Vern Hepler
John Dealy Hungerford
James Laurence Jacobson
Floyd William Johnson
Foo Kau Lee
James Marshall McArthur
Arthur Erskine McClymonds
Charles Ernest Millar
Fred Weymouth Milner
Lawrence Maston Nabours
Edward Quinby Perry
Wilbur Nielson Skourup
John William Stockebrand
Arthur Unruh
Julius Patterson Van Vliet
George Isidore Walsh
Willits Reeve Worthington

Course in Animal Husbandry

George Herbert Bunnel
Arthur Lowell Burkholder
Henry Samuel Collins
Merrill Leonard Gould
Evan Liston Jenkins
Oscar LeRoy Johnson
Romney Carlyle Ketterman
Fred Morris Layton
Harry Strawn Loyd
Wallace McIlrath
Lorenzo Beckley Mann
Wray Robert Reeves
Leon Warden Taylor

Course in Dairy Husbandry

Albert William Aicher
Otto Lincoln Hubp
James Walton Linn
William Symington Morrow
Victor Fred Stuewe
Graydon Tilbury
George Washington Williams

Course in Horticulture

Anson Lane Ford
James Ralph Little
Archie Lee Marble

DOCTOR OF VETERINARY MEDICINE

Merrill Ellsworth Agnew
William Albert Bright
Laurence Vernon Cummings
Ira Loren Fowler
William Arthur Hagan
Paul King
William Clarence McConnell
Zara Harman McDonnall
John William Meyer
Howard Casper Reed
William James Scanlon
Cameron Mac Smith
Thomas Kaisinger Toothaker

DIVISION OF MECHANIC ARTS

BACHELOR OF SCIENCE IN CIVIL ENGINEERING

Frank Harmon Freeto
George Barney Hickok

BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING

Joel Emanuel Bengston
Chester Arthur Carter
Bruce Henry Cummings
Albert Hilrey Ganshird
Charles Wallace Giffin
William Witt Haggard
William Albert Lathrop
George Mawhirter
Royal Reno Myers
John Dwight Parsons
William Leon Rhoades
Ralph Allen Shelly
Roy Leander Swenson
Carl Walter Wyland

BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING

James Edgar Alsop
Henry Bradford Brown
Shelby Glasgow Fell
Lawrence Vale Fickel
Gerald Laurence Fitzgerald
Louis Charles Samuel Geisendorf
Maynard Goudy
Lawrence Gaylord Gross
Calvin Andrew Hooker
Paul Edward Jackson
Homer Earl Newhouse
Corwin Crittenden Smith
Henry Walter Stockebrand

BACHELOR OF SCIENCE IN ARCHITECTURE

Charles William Shaver

DIVISION OF HOME ECONOMICS

BACHELOR OF SCIENCE IN HOME ECONOMICS

Harriet Ruth Aiman
Maurine Dorothy Allison
Elsie Loretta Baird
Bertha Fern Baker
Edna Frances Barber
Cleio Lucille Beall
Mabel Kate Bennett
Clara Louise Blair
Elsie Mae Blaylock
Myrtle Pearl Blythe
Marie Anita Boyle
Ena Bess Brown
Ruth Brown
D'Elsie Bryan
Elsie Luella Buchheim
Eliza Burkdoll
Effie May Carp
Cecyl Delois Carter
Ethel Esther Cary
Mary Rosena Churchward
Pauline Frances Clarke
Minerva Clare Cooper
Mary Margaret Courter
Verral Janice Craven
Pearl Artena Cross
Juanita Davis
Myrtle DeFever
Elizabeth Dempewolf
Laura Belle Falkenrich
Velora Augusta Fry
Mary Ellen Glenn
Amy Pearl Gould
Edythe Seavert Groome
Minnie Agnes Gugenhan
Mary Gurnea
Esther Jane Hammerli

BACHELOR OF SCIENCE IN HOME ECONOMICS—*continued*

Carrie Harper
Rembert Lydia Harshbarger
Elsie Catharine Hellwig
Ida Viola Hepler
Ruth Lucile Hill
Mildred Calista Hollingsworth
Crystal Helene Kelley
Mabel Beatrice Kessler
Sara Katharine Laing
Mary Inez Mann
Esther Serida Nelson
Ethel Elverne Newkirk
Ruth Sabina Nygren
Gertrude Emeline Palmer
Pauline Parkhurst
Eleanor Beverly Patrick
Eva Mae Pease
Georgia Emma Roberts
Madge Rowell
Jennie Ellen Shoup
Lois Katharine Stewart
Edna Isabel St. John
Emma May Stratton
Frieda Matilda Stuewe
Anna Elizabeth Thomas
Berenice Elena Wilson
Jessie Belle Woodworth
Gertrude Wunder
Esther Louise Zeininger

DIVISION OF GENERAL SCIENCE

BACHELOR OF SCIENCE

Ernest Baird
Ira William Baker
Katharine Maxwell Bower
Howard Verne Brothers
Herbert Spencer Coith
Harry Herschell Coxen
Edwin Davis
Nicholas Freidrich Enns
Harold Goble
Edna Gulick
Charles Axtell Hunter
Mary Alberta Johnson
Eva Marguerite Kell
May Belle Landis
Lee Roy Light
John Barlow Lund
Kathrina Munger
Clara Anna Peairs
Josephine Price Perrill
Harold Edward Rose
Frank Sargent
Erle Hazlett Smith
Orliff Elmer Smith
Walter Francis Smith
Fred Stevenson
Erwin Milton Tiffany
Augustus Grant Vinson
Ina Belle Wilson
Hachiro Yuasa

CERTIFICATES CONFERRED

THE CERTIFICATE IN HOME ECONOMICS

Rena Leon Almgren
Dorothy Baker
Ruth Sarah Barnes
Hannah Pauline Bergstrom
Ethelyn Pearl Beverly
Tillie Bircher
Catharine Louise Bixler
Hattie Alice Bowlus
Ruth Hazel Branch
Eva Brittain
Ella Hutchason Brown
Ruth Claire Button
Bertha Alyce Campbell
Mary Evaline Clayton
Lucretia Frances Coughlin
Hazel Iris Crabb
Helen Crane
Margaret Ellen Crawford
Eva Rose Davis
Elsie Frizzelle Deming
Jessie Josephine Erickson
Maud Irene Falkinburgh
Mary Finnigan
Bessie Laura Fitts
Helen Funk
Mary Kathryn Garnett
Mary Louise Greene
Lucy Angel Hamilton
Dorothy Waite Hartzell
Helen Ruth Havens
Eunice Mary Hazen
Elzoe Roberta Hewett
Clara Elizabeth Hill
May Frances Hollingsworth
Gertrude Lucile Howard
Edith Cecile Jacob
Alice Johnson
Goldie Ruth Kennedy
Nettie May Kingsley
Laura Ethel Knapp
Grace Malinda Kohler
Zelma Fay Kyner

THE CERTIFICATE IN HOME ECONOMICS—*continued*

Laura Leota Lilly
Emma Linscheid
Lizzie Katherine Linschaid
Edith McDougal
Lillian Ellen McIntosh
Lora Maude McKinney
Eulah Markley
Mattie Sarah Mathews
Grace Hilton Willis Middleton
Martha Bertha Musch
Mable Naumann
Anna Christine Olsen
Elva Lorena Owings
Marie Lydia Anna Palmquist
Irene Marguerite Parsons
Clara Kathrine Peterson
Bertha Dorothea Ploog
Geneva Price
Clara Emelia Rasmusson
Olive Belle Rude
Bernice Winifred Riley
Anna Margaret Schlegel
Martha Amelia Schoen
Helen Schroeder
Henrietta Schroeder
Ada Violet Sebring
Julia Frances Shaughnessy
Rose Elizabeth Sleichter
Ada Snyder
Frances Amanda Splitter
Sophia Aurelia Timpe
Olive Emeline Troutman
Rebecca Meadows Welty
Emma Della White
Eva Marie White
Edythe May Wilson
Genevieve Wilson
Flossie Velma Woody
Emma Mary Zimmerman

THE CERTIFICATE IN AGRICULTURE

Arthur Webster Arner
Charles Ernest Arnold
Carl Assel
Earl Francis Bunge
Claude Ernest Cashatt
John DeWald
Ray Arthur Foster
Virgil Howell
William Thomas Knouse
John Francis Komarek
Henry August Lantz
Gustav Theodore Larson
Lars Larson
Elbert Lee
John Crawford Lewis
Robert Donald McCallum
Jesse Maninger
Robert Lee Roglin
Edmond Barstow Sayler
Edward Schlegel
Cloyd Farmer Seaman
Charles Frank Shoemaker
Glen Godfrey Smith
Vernon Lee Wallace
John Johnson Wells
Marvin John Wineland

THE CERTIFICATE IN CREAMERY SHORT COURSE

Alexander Mort Davis
Jerome Charles Horner
John Charles McGinty

THE CERTIFICATE IN STEAM AND GAS TRACTION ENGINES

Marcus Almgren
William Palmer Ball
Earl William Callabresi
Joseph Philip Collins
Hollis Thomas Cook
Richard Linwood Dewell
Oscar Hall
George Judd Hedges
George Lynch
Clarence Homer McCully
Reuben Miller
Adel Morris Peterson
Linton Robertson
Earl Robertson
Irl Kersey Robinson
William John Seidel
Glenn Ellis Shell
Dean Shepherd
Hubert Dade Sherman
Emil Svoboda
Edwin Mark Stoneman
Edgar Karl Strickert
William Arthur Swanson
Abraham McKinley Tidball
Charles Wirth
Fred Yarrow

THE CERTIFICATE IN SHOP WORK

James Thistlethwait Baker
Kenneth Shaw Dobbs
Isaac Burd James
Dan Parker Moorman
William Arthur Rosenberger
Paul August Schimming
Chauncey Willis Waltz

THE CERTIFICATE IN ROAD BUILDING, IRRIGATION AND DRAINAGE

Walter Tope Hole
John Long
Ralph Pierce Van Zile
Harry Wood

SECOND DIVISION, DECEMBER 15, 1915

DEGREES CONFERRED

DIVISION OF AGRICULTURE

BACHELOR OF SCIENCE IN AGRICULTURE

Course in Agronomy

John Jasper Bayles
Lester Jay Bell
Robert Everett Freeto
Charles William Gartrell
Herbert Henley Haymaker
John Howard Loomis

Course in Animal Husbandry

Harold Clay Ewers
Ralph Waldo Taylor
†Wilmer Homer Wilson

Course in Dairy Husbandry

Harry Homer Wilson

DIVISION OF MECHANIC ARTS

BACHELOR OF SCIENCE IN ARCHITECTURE

Alvin Theodore Coith
Harold Lester Hurtt

BACHELOR OF SCIENCE IN CIVIL ENGINEERING

George Arthur Hopp

DIVISION OF HOME ECONOMICS

BACHELOR OF SCIENCE IN HOME ECONOMICS

Lulu May Albers
Ruth Arbuthnot
Grace Adeline Barker
Florence Beatrice Caton
Mary Virginia Dodd
Valeda Edith Downing
Emma Evaline Evans
Marion Rosina Fowler
Carrie Belle Gardner
Mamie Blanche Gorrell
Ida Jane Kingan
Esther Grace Lyon
Pearle Irene McHenry
Sadie Mindie Marvin
Ella Mae Miltner
Helen Munger
Sara Jane Patton
Evelyn Marie Potter
Clara Louise Robbins
Anna Winifred Searl
Verma Treadway
Louise Chester Walbridge
Vera Glendolyn Warren
Clara Willis
Grace Willits

DIVISION OF GENERAL SCIENCE

BACHELOR OF SCIENCE

James Dennison Colt
Marion Greenleaf Kirkpatrick
Leird Astor Richards
Fred Woodward

† Deceased.

LIST OF STUDENTS

GRADUATE STUDENTS

CANDIDATES FOR MASTER'S DEGREE, 1916

Walter Albert Buck, B. S. 1908 (Kansas State Agricultural College), *Engineering*
Manhattan
Harry Winfield Cave, B. S. A. 1914 (Iowa State College), *Dairying*
Manhattan
Jesse Johnathan Frey, D. V. M. 1914 (Kansas State Agricultural College), *Chemistry, Bacteriology*
Manhattan
Lee Roy Light, B. S. 1915 (Kansas State Agricultural College), *Education*
Manhattan
Lloyd Franklin Metzler, A. B. 1911 (Kansas State Normal School), *Bacteriology, Chemistry*
Spearville
John Carson Ripperton, A. B. 1913 (Fairmont College), *Agronomy, Bacteriology*
Wichita
Lawrence Paul Wehrle, B. S. A. 1914 (Kansas State Agricultural College), *Entomology*
Scranton

OTHER GRADUATE STUDENTS

Walter Goldsberry Allee, B. S. 1903 (Earlham College), *Chemistry*
Manhattan
Clyde Harrison Alspaugh, B. S. 1909 (Kansas State Agricultural College), *Agriculture*
Manhattan
William Hiddleson Andrews, A. B. 1900 (University of Chicago), *Mathematics*
Manhattan
Cliff Errett Aubel, B. S. 1915 (Pennsylvania State College), *Agriculture*
New Castle, Pa.
Harry Charles Baird, B. S. 1914 (Kansas State Agricultural College), *Dairying*
Kensington
Albert William Bellomy, B. S. 1914 (Kansas State Agricultural College), *Zoölogy*
Manhattan
James William Benner, D. V. M. 1911 (Kansas State Agricultural College), *Animal Husbandry*
Manhattan
John Sterling Bird, B. A. 1912 (Kansas State Normal School), *Education*
Hays
Myron Ralph Bowerman, B. S. 1909 (Michigan Agricultural College), *Mathematics*
Manhattan
Lola Edna Brethour, B. S. 1913 (Kansas State Agricultural College), *Education*
Green
Alfred Lester Clapp, B. S. 1914 (Kansas State Agricultural College), *Agronomy*
Manhattan
Lowell Edwin Conrad, B. S. 1904 (Cornell College), M. S. 1908 (Lehigh University), *Mathematics*
Manhattan
Lena Adelle Conrow, B. S. 1913 (Kansas State Agricultural College), *Chemistry*
Manhattan
Grace Lucile Craven, B. S. 1914 (Kansas State Agricultural College), *Education, Music*
Erie
Verral Janice Craven, B. S. 1915 (Kansas State Agricultural College), *Education, Music*
Erie
Ernest Edward Dale, A. B. 1913 (University of Nebraska), *Botany*
Greenwood, Neb.
Lyle McFealters Dean, A. B. 1914 (Park College), *Chemistry*
Edgerton
Jane Mary Dow, B. S. 1911 (Kansas State Agricultural College), *Education*
Manhattan
Leila Dunton, B. S. 1910, M. S. 1912 (Kansas State Agricultural College), *Chemistry, Botany*
Manhattan
Benjamin Ray Ellis, B. S. 1914 (Kansas State Agricultural College), *Entomology*
Pleasanton
Frank Leroy Fleming, B. S. 1914 (Kansas State Agricultural College), *Agronomy*
Reading
Anson Lane Ford, B. S. 1915 (Kansas State Agricultural College), *Entomology, Zoölogy*
Manhattan
Perry John Freeman, B. S. 1907 (University of Illinois), *Mathematics*
Manhattan

Percy Leigh Gainey, B. Agr. 1908 (North Carolina College of Agriculture and Mechanic Arts), *Chemistry*
Manhattan
Mary Ellen Glenn, B. S. 1915 (Kansas State Agricultural College), *Education*
Waverly
Helen Haines, B. S. 1913 (Kansas State Agricultural College), *English, Education*
Manhattan
Frank Clyde Harris, B. S. 1908 (Kansas State Agricultural College), *Architecture*
Manhattan
Ella Hathaway, B. S. 1910 (Kansas State Agricultural College), *Home Economics, Chemistry*
Mankato
William Patrick Hayes, B. S. 1913 (Kansas State Agricultural College), *Entomology, Agronomy*
Manhattan
Adelaide Julia Holmes, B. S. 1909 (Kansas State Agricultural College), *Education*
Manhattan
Ina Emma Holroyd, B. S. 1897 (Kansas State Agricultural College), *Mathematics*
Manhattan
Mary Hoover, B. S. 1914 (Kansas State Agricultural College), *English*
Canton
John Hungerford, B. S. 1915 (Kansas State Agricultural College), *Chemistry*
Manhattan
Edna Jones, B. S. 1910 (Kansas State Agricultural College), *Education*
Manhattan
Elma Sage Jones, B. S. 1913 (Kansas State Agricultural College), *Education*
Barrett
Miner Justin, B. S. 1907 (Kansas State Agricultural College), *Agriculture*
Manhattan
Edgar Keith, B. S. 1909 (Kansas State Agricultural College), *Music*
Manhattan
Harry Llewellyn Kent, A. B. 1912 (Kansas State Normal School), B. S. 1913 (Kansas State Agricultural College), *History, Education*
Manhattan
Herbert Hiram King, B. S. 1904 (Ewing College), M. S. 1915 (Kansas State Agricultural College), *Physics*
Manhattan
Walter Leroy Latshaw, B. S. 1912 (Pennsylvania State College), *Bacteriology*
Manhattan
John Robinson McClung, B. S. 1910 (Kansas State Agricultural College), M. A. 1913 (University of the South), *Chemistry*
Manhattan
James Walker McColloch, B. S. 1912 (Kansas State Agricultural College), *Entomology*
Manhattan
Menzo Edwin McDonald, D. V. M. 1912 (Kansas State Agricultural College), *Physics, German, Economics*
St. Joseph, Mo.
Lorenzo Beckley Mann, B. S. 1915 (Kansas State Agricultural College), *Economics, Animal Husbandry*
Manhattan
Robert Ellsworth Mohler, 1912 (Michigan Agricultural College), *Agriculture*
McPherson
Clyde William Mullen, B. S. 1915 (Oklahoma Agriculture and Mechanic Arts), *Agronomy*
Lawton, Okla.
Selma Emilia Nelson, B. S. 1912 (Kansas State Agricultural College), *Education*
Randolph
Porter Joseph Newman, B. S. 1908, M. S. 1910 (Franklin College), *Chemistry*
Manhattan
Dora Marie Otto, B. S. 1911 (Kansas State Agricultural College), *Home Economics, Journalism, English*
Riley
Andrew Minie Paterson, B. S. 1913 (Kansas State Agricultural College), *English*
Manhattan
James Plummer Poole, B. S. 1912 (University of Maine), *Physics*
Manhattan
Harrison Eleazer Porter, B. S. 1907 (Kansas State Agricultural College), *Mathematics, Music*
Manhattan
(Mrs.) Mabel Alvord Purdy, B. S. 1910 (Kansas State Agricultural College), *Education*
Manhattan
George Ellsworth Raburn, A. B. 1910 (University of Michigan), *Physics*
Manhattan
Nellie Evelyn Reed, B. S. 1914 (Kansas State Agricultural College), *Cytology*
Manhattan
Herschel Scott, B. S. 1915 (Kentucky State University), *Chemistry, Agronomy*
Manhattan
Vergie Guinevere Sherwood, B. S. 1912 (Kansas State Agricultural College), *Education, English*
Manhattan
John Shutt, B. S. 1913 (Highland Park College), *Mathematics*
Saint Charles, Iowa

John Earl Smith, A. B. 1912 (Indiana University), A. M. 1915 (University of Wisconsin), *Chemistry*
Manhattan
Stanley Albert Smith, B. S. 1913 (Kansas State Agricultural College), *Architecture*
Manhattan
John William Stockbrand, B. S. 1915 (Kansas State Agricultural College), *Education*
Vernon
Constance Miriam Syford, A. B. 1909 (University of Nebraska), *Music*
Manhattan
Ira Earl Taylor, B. S. 1913 (Kansas State Agricultural College), *Chemistry, Mathematics*
Manhattan
Edward Norris Wentworth, B. S. 1907, M. S. 1909 (Iowa State College), *Mathematics, German*
Manhattan
Philip Cornelius Vilander, B. S. 1911 (Kansas State Agricultural College, *Education*
Manhattan
Esther Steinhoff Wilson, B. S. 1910 (Kansas State Agricultural College), *Education, Home Economics*
Manhattan
(Mrs.) Lucile Berry Wolf, B. S. 1913 (Kansas State Agricultural College), *Music*
Manhattan
Francis Buckner Williams, B. S. 1909 (Kansas State Agricultural College), *Agronomy*
Manhattan
Hachiro Yuasa, B. S. 1915 (Kansas State Agricultural College), *Botany, Entomology*
Manhattan

SENIORS

AGRONOMY

LeRoy Alt, Manhattan
Lester Ford Barnes, Fontana
John Jasper Bayles, Manhattan
Lester Jay Bell, Wellsville
Will Ray Bolen, Le Roy
Ira Nichols Chapman, Manhattan
Kim Ak Ching, Honolulu, Hawaii
William Bayles Coffman, Manhattan
William Deitz, Overland
George Ernest Denman, Manhattan
Ralph Cleland Erskine, Edgerton
Fred Ira Fix, Manhattan
Irl Ferris Fleming, Manhattan
Claude Fletcher, Hiawatha
Robert Everett Freeto, Cheney
Samuel Ray Gardner, Hartford
J. Lawrence Garlough, Cedarville, Ohio
Charles William Gartrell, Kansas City, Mo.
Nathan Gish, Manhattan
Frank Simon Hagy, Wichita
Robert John Hanna, Mankato
Elmer Herman Jantz, Larned
Nicholas Tichon Jerebzoff, Manhattan
Amwel Edwin Jones, Manhattan
John Kiene, Valencia
Marc Atchison Lindsay, Kansas City
Reuben Edward Lofinck, Manhattan
John Howard Loomis, Colby
Claude Ewing Lovett, Eureka
Charles Gottlieb Lueker, Manhattan
Willard Earl Lyness, Walnut
Milton Carl Lytle, Wellsville
James Hendrix McAdams, Salina
Albert John Mangelsdorf, Atchison
Edwin Isaac Maris, Nortonville
James Robert Mason, Seneca
Albert Rufus Miller, Bonner Springs
Raymond Jack Montgomery, Topeka
Ralph Vernon O'Neil, Wellsville
Percival Button Potter, Manhattan
Grosvenor Ward Putnam, Manhattan
Joseph Vincent Quigley, Blaine
Roy Ralph Reppert, Valley Falls
Archie Monroe Richards, Manhattan
Daniel Andrew Robbins, Colony
Paul Robinson, Oswego
Rudolph George Rodewald, Yates Center
Edward Russell, McPherson
Glenn Charles Salisbury, Hays City
George McClellan Schick, Plainview, Texas
Ralph Powell Schnacke, Topeka
Edward Loy You Shim, Kahului, Hawaii
Elbert Lewis Smith, Soldier
Guy Cephus Smith, Great Bend
Charles George Stiensmeyer, Leavenworth
Harlan Randolph Sumner, Manhattan
Francis Marion Wadley, Newton
Price Harlan Wheeler, Garden City
Luther Earle Willoughby, Alton

ANIMAL HUSBANDRY

Walter Brown Adair, Osawatomie
Raymond Voiles Adams, Eureka
Harold Amos, Manhattan
Bernard Martin Anderson, Manhattan
George Harold Ansdell, Jamestown
Alfred Carroll Apitz, Manhattan
Malcolm Aye, Manhattan
Hugh Edwin Baird, Formoso
Keatley Graham Baker, Manhattan
Henry Benjamin Bayer, Toronto
Orie Walter Beeler, Mankato
Ary Clay Berry, Topeka
Omar Olin Browning, Linwood
McArthur Baptist Brush, Newton
Orville Brown Burtis, Fredonia
Fred Cromer, Manhattan
James William Crumbaker, Onaga
Robert Eliott Curtis, Manhattan
Frank Harold Dillenback, Walnut
Harold Clay Ewers, Topeka
Herbert Horace Frizzell, Cherokee, Okla.
Paul Bernard Gwin, Morrowville
Preston Orin Hale, Manhattan
Louis Samuel Hodgson, Harveyville
Robert Roy Lancaster, Manhattan
Ernest Lawson, Mankato
Jason Paul Loomis, Manhattan
Jay Lawrence Lush, Altamont
Evermont McGinnis, Kansas City, Mo.
Clinton Fisk McIlrath, Kingman
Eugene Roy Martin, Eureka
Lewis Augustine Maury, San Antonio, Texas
William O'Connell, Kiowa
Raymond Smith Orr, Manhattan

SENIORS—*continued*

Walter John Ott, Greenleaf
Earl Ramsey, Solomon
Ralph Paul Ramsey, Solomon
William Herbert Robinson, Holton
James Edward Rouse, Manhattan
Richard Jerome Sedivy, Blue Rapids
Emmett Warren Skinner, Manhattan
Sik Hung Taam, Canton, China —
Ralph Waldo Taylor, Sedgwick
Frank Andrew Unruh, Haddam
Glenn F. Wallace, Siloam Springs, Ark.
Wayne Lycurgus Willhoite, Manhattan
Clarence Burton Williams, Bigelow
Lewis Arthur Williams, Sylvan Grove
John Southwell Wood, Cleveland, Ohio

DAIRY HUSBANDRY

George Murray Arnold, Piedmont
George Rigg Campbell, Fulton
Luzerne Hallock Fairchild, Manhattan
Donald Smith Jordan, Topeka
Howard Allyn Lindsley, Manhattan
Paul Campbell McGilliard, Manhattan
Thomas Edwin Moore, Manhattan
Chintaman Vishnu Sané, Saroda, India
Rudolph Emil Stuewe, Alma
Robert Terrill, Hays
Archie Glenn Van Horn, Overbrook
Raymond Hazelton Whitenack, Manhattan
Harry Homer Wilson, Silver Lake

HORTICULTURE

Morgan Thomas Binney, Kansas City, Mo.
William Cecil Calvert, Kansas City
Joseph Lyndon Davis, Belleville
Archibald Alexander Glenn, Webb City, Mo.
Harry Alexander Gunning, Kansas City
Everett Raymond McGalliard, Troy
Lowell Marston Mason, Belle Plaine
James Curtis Riney, Pratt
James Homer Sharpe, Council Grove
David Riley Shull, Kansas City
Jay Webster Stratton, Kansas City
Sidney Rendall Vanderberg, Kansas City, Mo.
Walter Harris Washington, Manhattan
Edmund Francis Wilson, Kansas City, Mo.

VETERINARY MEDICINE

Richard Clay Chatman, Manhattan
George Holland Dean, Arkansas City
Earl Morris Dobbs, Manhattan
Cecil Elder, Argonia
Gerald Woodward Fitzgerald, Roswell, N. M.
Asa Forrest Flanagan, Chapman
Fred Hartwig, Goodland
Eddell Charles Jones, Emporia
Robert McArthur, Walton
Charles Ernest O'Neal, Wiggins, Miss.
Eugene Franklin Pile, Manhattan
George Thomas Reaugh, Burns
Glenn Amiel Riley, Manhattan
Richard Thomas Wilson, Manhattan

AGRICULTURAL ENGINEERING

John Hanna Welsh, Kansas City, Mo.

ARCHITECTURE

Stanley Bushnell Baker, Manhattan
George Wilson Christie, Manhattan
George Campbell Ferrier, Osborne
Henry Robert Horak, Munden
Harold Lester Hurtt, Wichita
Fred Albert Korsmeier, Nevada, Mo.
Lloyd Martin Reudy, Dodge City
Robert Edwin Sellers, Emporia
Elmer Warren Wilson, Manhattan

CIVIL AND HIGHWAY ENGINEERING

George Shearer Douglass, Beattie
Forrest Everette Gilmore, Manhattan
George Noel Herron, Kansas City, Kan.
Charlie William Hickok, New Ulysses
George Arthur Hopp, Manhattan
Irwin Joseph Jacques, Manhattan
Lawrence Antoine Leonard, Wamego
Robert Francis Mirick, Otis
Wayne Ramage, Arkansas City

ELECTRICAL ENGINEERING

Benjamin McKinley Andrews, Manhattan
Ralph Gahan Baker, Malta Bend, Mo.
Antis Monteville Butcher, Solomon
Nelson Harry Davis, Delavan
Walter Emil Deal, Great Bend
George Louis Farmer, Wichita
James Sidney Hagan, Manhattan
Charles Thomas Halbert, Agra
Andrew Herold, Seneca
William Kennedy Hervey, Centralia
Arthur Edward Hopkins, Tonganoxie
Arlie Noel Johnson, Manhattan
Talbot Roy Knowles, Manhattan
Paul Revier Lemly, Ramona
Robert Bruce Leydig, El Dorado
Henry Dall Linscott, Milford
Otto Irl Markham, Manhattan
Frank Moore, Tribune
Louis Reynold Parkerson, Manhattan
Joseph Glen Phinney, Manhattan
John Prossor Rathbun, Downs
Gilbert Haven Sechrist, Meriden
John Thomas Steele, jr., Manhattan
Doddridge Calvin Tate, Manhattan
George Lin Usselman, Coldwater
Leland Roy Varcoe, Wilsey
Thomas Kenneth Vincent, Kansas City, Mo.

MECHANICAL ENGINEERING

Joseph Jesse Abernethy, Manhattan
Arthur Douglas, Manhattan
John Irl Michaels, Osawatomie
Frank Richard Rawson, Wamego
Charles David Sappin, Manhattan
Harold Adlai Wagner, Manhattan
Leslie Adam Wilsey, Chapman
Charles Herman Zimmerman, Stilwell

SENIORS—*continued.*

HOME ECONOMICS

Agnes Redmond Abbott, Manhattan
Ruth Ione Adams, Manhattan
Lulu Emma LouCena Albers, Manhattan
Mamie Arnold, Manhattan
Florence Annie Baker, Kansas City
Anne Estella Barnum, Simpson
Edith Nell Beaubein, Dodge City
Ada Grace Billings, Vermilion
Edith Alice Boyle, Spivey
Mildred Branson, Cambridge
Amy May Briggs, Sedgwick
Mary Weir Bright, Manhattan
Fannie Ernestine Brooks, Tescott
Margaret Isla Bruce, Marquette
Wilma Burtis, Fredonia
Hannah Margaret Campbell, Manhattan
Ruth Marian Connor, El Paso, Texas.
Martha Christabel Conrad, Manhattan
Kathleen Lenore Conroy, Manhattan
Grace Nancy Cool, Glasco
Grace Lydia Currie, Manhattan
Cora Ellen DeVault, Ocheltree
Florence Edith Dodd, Langdon
Mary Rebecca Dunlap, Eureka
Ethel Brown Duvall, Hutchinson
Faith Elizabeth Earnest, Washington
Marguerite Martha Elliot, Manhattan
Emma Evalyn Evans, Liberal
Frances Floetta Ewalt, Manhattan
Martha Fern Faubion, Manhattan
Anna Judith Ferguson, Mankato
Elizabeth Fitzgerald, Roswell, N. M.
Nelle Flinn, Admire
Anna Grace Fox, Larned
Ruth Ester Frush, Kansas City, Kan.
Margaret Elizabeth Fuller, Topeka
Helen Moore Gardner, Manhattan
Elizabeth Emma Gish, Manhattan
Mary Alice Gish, Sterling
Gladys Gist, Manhattan
Mamie Blanche Gorrell, Wa Keeney
Roma Lillian Greene, Newton
Louise Greenman, Kansas City, Kan.
Josie Margaret Griffith, Manhattan
Hazel Kathryn Groff, Nortonville
Leota Lee Gromer, Manhattan
Esther Gygax, Osborne
Blanche Mary Haggman, Kackley
Hildegrade Ellulia Harlan, Manhattan
Verda Harris, Manhattan
Elsie Elnora Hart, Edgar, Neb.
Edna Avis Hawkins, Lincoln
Louise Jacobs Hayes, Council Grove
Helene Held, Clay Center
Marie Margaret Hellwig, Oswego
Nettie Hendrickson, Manhattan
Vivian Herron, Topeka
Bessie May Hildreth, Altamont
Clara Frances Hodges, Ottawa
Ruth Brandt Hoffman, Newton
Lydia Helena Hokanson, Marquette
Bertha Belle Hole, Manhattan
Esther Grace Hole, Manhattan
Ruth Amelia Hutchings, Manhattan
Agnes McCord Irwin, Manhattan
Pearl LaClair Jacques, Manhattan
Lillian Clair Jeter, Alden
Mary Florence Jones, Salina
Florence Justin, Manhattan
Vera Elma King, Milo
Ida Jane Kingan, Topeka
Flora Einsel Kirk, Manhattan
Vera Belle Kizer, Manhattan
Mary Steven Lane, Eskridge
Lillian Antoinette Lathrop, Manhattan
Bertha Blanche Lauger, Manhattan
Eva Myrtle Lawson, McPherson
Anna Virginia Layton, Blue Rapids
Mayme Elizabeth Linton, Denison
Reah Jeannette Lynch, St. Louis, Mo.
Esther Grace Lyon, Nickerson
Grace Margaret Lyons Manhattan
Mary Elizabeth McKinlay, Udall
Ora Mae McMillen, Topeka
Elizabeth Abbie March, Topeka
Sarah Marty, Manhattan
Sadie Mindie Marvin, Emporia
Lucile Maughlin, Sterling
Bodie Eleanor Mickelson, Lyndon
Anna Lora Miller, Hoisington
Cecil Elizabeth Miller, Hoisington
Ella Ruth Milton, Stafford
Alice Montgomery, Wilsey
Vera Idol Moore, Hiawatha
Marie Moses, Manhattan
Mary Rose Moss, Eureka
Corinne Myers, Marion, Ohio
Vivian Nieswender, North Topeka
Alma Dale Newell, Matfield
Cleda May Pace, Osawatomie
Susan Rufina Paddock, Blue Mound
Sara Jane Patton, Hiawatha
Helen Payne, Parsons
Hazel Berdella Peck, Manhattan
Florence Nell Peppiatt, Ellsworth
Olivia Esther Peugh, Hutchinson
Ella Dunlap Phenicie, Tonganoxie
Edna Pickrell, Manhattan
Marie Pickrell, Manhattan
Helen Mitchell Pitcairn, Manhattan
Cora Alberta Pitman, Manhattan
Thurza Elizabeth Pitman, Manhattan
Mary Elizabeth Polson, Fredonia
Iva Holt Porter, Glen Elder
Evelyn Marie Potter, Barnes
Mary Louise Price, Winfield, Iowa
Gourney Augusta Prier, Marion
Eula Bess Pyle, Lawrence
Elizabeth Quinlan, Manhattan
Juanita Reynolds, Canton
Sara Bunitta Richardson, Kansas City, Kan.
Nannie Clytice Ross, Burrton
Grace Ethelyn Rudy, Manhattan
Mabel Gertrude Ruggels, Beverly
Margaret Ursula Schneider, Logan
Pearl Eunice Scholwalter, Halstead
Evelyn Schriver, Halstead
Mary Logan Scott, Parsons
Meta Viola Sheaff, Kansas City, Kan.
Esther Emily St. John, Manhattan
Hazel Belle St. John, Manhattan
Dorothy Marie Story, Manhattan
Julia Rena Strand, Independence
Kate Elizabeth Sumners, Riley
Mary Franc Sweet, Manhattan
Blanche Lovina Tanner, Manhattan
Emma Elizabeth Taylor, Wichita
Rhoda Ethel Tharp, Nickerson
Rose Viola Tipton, McPherson
Mildred Tolles, Lawrence
Eva Estherson Townsend, Nickerson
Verma Treadway, Newton
Alberlina Tulloss, Ottawa
Mary Tunstall, Manhattan
Mary Edith Updegraff, Topeka
Wilma Irene Van Horn, Overbrook
Nellie Maude Vedder, Franklin, Neb.
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Natilie Helen Goldsmith, Athol
Charles Warren Hestwood, Wichita
Sarah Katrina Kimport, Dellvale
Fred Clarence Lewis, Manhattan
Bessie Olive McMillan, Howe
Edna Mabel Metz, Jewell
Ernest Walter Mitchell, Manhattan
Harrison E. Mitchell, Sterling
Zenith Mullen, Labette
Frances Perry, Manhattan
Mary Hazel Phinney, Russell
Zeno Clifford Rechel, Hutchinson
Harry Latto Robinson, Salina
Winfield Foster Runyen, Topeka
Lloyd Emerald Souders, Manhattan
Arthur Bradley Sperry, Neodesha
Vern Washington Stambaugh, Maplehill
William Frank Veatch, Girard
Elizabeth Doris Wadley, Manhattan
Leon Kenneth Whitney, Lyndon
Marshall Parrish Wilder, Douglass
Eva Emmaline Wood, Manhattan
Daniel William Woolley, Wichita

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Edna Lily Boyle, Spivey
Hugh Byron Dudley, Kansas City
Lillie Elsie Lehman, Junction City
Marion Nelle Quinlan, Manhattan
Sam Sherwood, Excelsior Springs, Mo.
Balford Quinton Shields, Lost Springs
Ruth Marie Siefkin, Newton
Helen Lathrop Winne, Paducah, Kentucky

FRESHMEN

AGRICULTURE

William Maynard Agnew, Yates Center
Clarence Pat Allen, Coffeyville
Glen Allen, Burlington
Fred Denman Allison, Hazelton
Charles William Anderson, Kinsley
James Bell Angle, Courtland
Emmet Stanley Bacon, Emporia
William Aaron Ball, Coffeyville
Turner Barger, Protection
Carroll Mueller Barringer, Conover, N. C.
Roy Joseph Biays, Bunkerhill
Carlos Tomas Bischoff, Manhattan
George Yoeman Blair, Mulvane
Raymond Blair, Blue Rapids
William Blakely, Neodesha
Joseph Alvin Bogue, Manhattan
Manoog Muguerditch Bornigian, Manhattan
Mark Lee Borror, Manhattan
Hiram Sanford Bottenfield, Joplin, Mo.
Fred William Boyd, Joplin, Mo.
Orval Sheridan Brower, Sedgwick
Duke Daniel Brown, Marysville
Lester Archie Buchanan, Paola
Walter Buess, Kinsley
Charles Warren Burt, Coldwater
Frank Alvin Carlson, Garfield
Warren Cary, Downs
Joseph Edgar Cassidy, Manhattan
Charles Frank Church, Wichita
John Clarke, Manhattan
Melvil Cleland, Manhattan
Daniel Garvin Close, Kansas City
Alfred Osborn Cole, Topeka
Arthur Bright Collom, Maressa, Ill.
Arthur Everett Cook, Russell
Ellwood Ernest Cook, Eureka
Joseph Hamilton Cool, Glasco
Warren Cottingham, Le Roy
Warren Eugene Crabtree, Manhattan
Vernon Simpson Crippen, Langdon
Rex McCombs Criswell, Hardtner
Kenneth Robert Crow, Kansas City
Charles Frederick Croyle, New Cambria
Frank Nelson Dick, Parsons
Fred Hollister Dodge, Manhattan
Miles Ed Dorsey, Girard
Claudius Neil Dulaney, Winfield
Clarence Frederic Eckelman, Lincoln
Roy Elmer Einsel, Greensburg
Clarence Parker Emery, Formoso
Harry Fisher, Norhampton, England
Abijah Wilcox Foster, Fairchild, Wis.
Walter David Gardner, Kansas City
Truman Olvord Garinger, Admire
Norman Albro Giles, Hutchinson
Bernie Edward Gleason, Jericho, Vermont
Edwin Edgar Gottman, Kansas City
Austin Seymore Gregg, Beloit
Harold Reed Guilbert, Wallace
Luke Albert Guilfoyle, Wamego
Joe Cunningham Gulledge, Manhattan
Edwin Ray Gunn, Great Bend
Clinton DeWitt Guy, Kansas City, Mo.
Fred Henry Hall, Conway Springs
W. Carlton Hall, Coffeyville
Edward Haug, Leavenworth
Rufus David Hearn, Magazine, Ark.
Francis Augustin Hennessy, Fulton
Ivan Walter Herriott, Garden City
Glenn Frank Hicks, Norton
Earl Martin Hiestand, Yates Center
Philip James Hill, Manhattan
Otis Lysle Hiner, Wichita
Orin Willard Hinshaw, Eureka
Harry Steward Holden, Manhattan
Dalton Ray Hooton, Garnett
John Chester Hunt, Marysville
Paul Hurrell, Circleville
William Curtis Janssen, Lorraine
Dan Leo Jantz, Larned
Herbert Gilman Jenness, Manhattan
Arthur Norman Jones, Manhattan
Albert Kaine, Wamego
Horace Lynden Kapka, Kansas City
Kurt Herman Kecker, Frederick
Warren Keeler, Tucumcari, N. M.
Clede Rex Keller, Manhattan
John Harold Kerr, Kinsley
Bruce John Kyle, Cawker City
Dewar Ferry Kyle, Cawker City
Russell Lake, Lake City
Ira Kaull Landon, Oklahoma City, Okla.
Earl Milo Litwiller, Freeport
Elmer David McCollom, Bogard, Mo.
Preston McCracken, Manhattan
Ernest Lee McIntosh, Manhattan
Calvin Taylor McInturff, Scott City
Joseph Harold McKee, Manhattan
George Burleson MacDonnell, Austin, Tex.
Donald Clarence Meacham, Roby, Ill.
Jay Tell Mader, Manhattan
Emanuel Jesse Maninger, Harper
Carrole Dean Marquis, Manhattan
Schuyler Bailey Marshall, Dallas, Tex.
Rex Arthur Maupin, St. Joseph, Mo.
Ralph Bertrum Medlin, Manhattan
Harry Burdette Merner, Lakeside, Wash.
Albert Metz, Anthony
Paul Percy Miller, Manhattan
Robert James Milne, Atchison
John Delmont Montague, Anthony
Bryon Moore, Manhattan
Harry Allyson Moore, Manhattan
Joseph Clare Morton, Bunkerhill
Arthur Leroy Myers, Windom
Clell Ansel Newell, Matfield Green
Ralph Dale Nichols, Scranton
Charles Nitcher, Hardy, Neb.
Ralph Damen Nixon, Council Grove
Arthur Oris Park, Tyro
Richard Harry Parsons, Arkansas City
Clinton Harold Patten, Richmond
Nevels Pearson, Manhattan
Chester Parsons, Manhattan
Orin Peterson, Caney
Delbert Thomas Pollock, Burlington
Thomas Alfred Posey, Larned
Everett Jacob Price, Baileyville
Claude Elmer Prock, Manhattan
Perry Leland Putnam, Admire
Alfred Kirk Ramy, Piedmont
Ollie William Reed, Norton
Laurens Reyburn, Leavenworth
Francis Lorenzo Rimbach, Broughton
Louis Vernon Ritter, Memphis, Tenn.
Carl Otto Roda, Paradise
Irvin Thomas Rothrock, Johnson, Ark.
Homer Russell, Stafford
Carrel Bruce Sanders, Spring Valley, Ark.
Rex Brown Schnatterly, Kinsley
Elmer Houser Schultz, Manhattan
Ben Harrison Scudder, Neodesha
Ralph Chauncey Shepardson, Pittsburg
Clarence Milton Sigler, Baileyville
David Loyd Signor, Manhattan
Amos Covet Small, Anthony
Alva Edison Smith, Iola
Herbert Ralph Smith, Kinsley
William Whitney Smith, Westphalia
Karl Knox Snyder, Norton
Royle Raymond Stafford, Altoona
Oscar Steanson, Oklahoma City, Okla.
Ralph Earnest Steffe, Sedgwick
Charles Harold Stinson, Carlyle

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Forrest Ransom Stone, Stafford, Mo.
Lowell Mac Stone, Wilson
Ray Allen Stratford, El Dorado
Arthur Fretchie Swanson, Norcatur
Marc Taintor, Homer, Minn.
Fred Losey Taylor, Columbus
Glenn Taylor, Onaga
John Edward Tillotson, Manhattan
Francis Totten, Beattie
Carl Fenton Trace, Carterville, Mo.
Mark Florea Upson, Sabinal, Tex.
Baxter Vandiver, Bluffton, Ark.
Fred Brewer Van Huss, Latham
Hermon Samuel Walker, Sumter, S. C.
George Henry Washburn, Spivey
Walter Carl Wehrle, Scranton
Ralph Scoles Westcott, Galena
Carl Wettig, Valley Falls
Edwin Frederick Whedon, Oswego
Claude Allen White, Lockney, Tex.
Gilbert Clark Whitsitt, Manhattan
Claude Merlin Willhoite, Manhattan
David Albert Wilson, Broken Arrow, Okla.
Frank Wilson, Manhattan
Herbert Stephen Wise, Wichita
Thomas Jackson Wood, Manhattan
Lawrence Earl Woods, Newton
Irving Wulfekuhler, Leavenworth
Chester David Young, El Dorado

VETERINARY MEDICINE

Madison Webster Alexander, New Ulysses
Harry Jonas Austin, Manhattan
Edgar Hugh Barger, Smith Center
Arthur Esco Bate, Wichita
Fred Robert Beaudette, Wichita
James Joshua Black, Carterville, Mo.
Russell Fesler Coffey, Iola
Fred Emerson, Ottawa
John Franklin Erdley, Holton
Howard Lewis Gingery, Pawnee City, Neb.
Ernest Hartman, Raymond
Elmer John Johnson, Lawrence
Francis Norwood Jordon, Manhattan
Edward Luke McCartan, Cripple Creek, Colo.
Howard O'Brien, Luray
Roy Reece Parker, Clearwater
William Pfaff, Hazelton
William Richards, Kansas City
Evan Hart Richardson, Circleville
Winfield John Ritter, Parsons
Edward James Scott, Kansas City
Chester Orlando Sechrist, Meriden
Ray Weinheimer, Ottawa
Charles Edward Zollinger, Junction City

AGRICULTURAL ENGINEERING

Lloyd Harmon Bunnel, Iola
Paul Lowell Fetzer, Manhattan
Hubert Hamacher Giles, Hutchinson
Richard Hopper, Manhattan
Elmer Clarence Humphrey, Chapman
Harry Kenneth Shideler, Girard

ARCHITECTURE

Clarence Ellsworth Davis, Concordia
Leo Horne, Alma
Russel Rex Kendall, Tonganoxie
Harold Fred Laubert, St. Joseph, Mo.
Charles Joseph Putt, Mankato
Donnelly Joseph Tarpy, Pawnee Rock
Keen Umbehr, Alma
Walter Wilbert Weiler, Wamego

CIVIL AND HIGHWAY ENGINEERING

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Clark Fred Barb, Alton
Hugh Donald Barnes, Blue Mound
Reuben Lee Cooper, Columbus
Herbert Allen Frazier, Augusta
Edward Ora Hopkins, Woodward, Okla.
*Orville Everette Hutchinson, Clay Center
Frank Rial Loyd, Gretna
Glen Harold McCullough, Burlington
Raymond Ellsworth Means, Protection
Henry Osoba, Severy
Holly Shurtleff Poling, Phillipsburg
Lloyd William Roberts, Pomona
Cantrell Watkins Snodgrass, Salina
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John Luther Armon Wainscott, Hazelton
John Vincent Wiebeler, Lawrence, Neb.
Jay Lester Woodhouse, Sharon Springs
Keith Lyle Zeigler, Hutchinson

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Rex Hamilton Clawson, Wamego
Vernon Grant Coleman, Sharon
Bruce Fred Cossitt, Wichita
Homer Cross, Wichita
Vernon Duchesne, Great Bend
Kenneth Francis, Whitewater
Ray Franklin Glover, Wamego
John Goodale, Smith Center
Robert Earl Goure, Lincoln
Samuel Willet Honeywell, Poe
Clifford Frederick Joss, Topeka
Walter August Karlowski, Sylvan Grove
Ernest William Lentfer, Sylvan Grove
Joe Wheeler McCoskrie, Dighton
Glenn Worth McCracken, Manhattan
Earle Runkle Manners, Lucas
Frank Adopus Moyston, Wichita
William Alfred Nye, Belle Plaine
Charles O'Leary, Manzaniola, Colo.
John Stephen Painter, Beverly
Walter Bowman Palmer, Manhattan
Paul Parman, Arkansas City
John Raymond Parrott, Shaw
Wilmer Ray Pyke, Neosho Falls
William Archibald Rankin, Medicine Lodge
William Robert Rapp, Americus
John Henry Reed, Seward
Orlie Edward Rooney, Fairview
Leslie Andrew Satterthwaite, Girard
Herbert Gordon Schultz, Manhattan

* Deceased.

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June Smith jr., Cottonwood Falls
Morton Stigers, Manhattan
Earl Judson Van Antwerp, Scott City
Loyd Birch Vorhies, Alva, Okla.
Frank Edwin Wells, Shaw
Phil Whiteman, La Crosse
Floyd Terry Whitlow, Moran
Ross Arthur Williams, Manhattan

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Roy Samuel Campbell, Leavenworth
Calvin Cyrus Davidson, Yates Center
Lester Henry Drayer, Manhattan
Vernon Durand, Great Bend
Ray Bowles Eck, Mulvane
James Lough Estlock, Greensburg
Siebert Fairman, Manhattan
Otto Franklin Fisher, Sedalia, Mo.
Charles Anthony Frankenhoff, Atchison
Dewey Mason Fullington, Idana
Gordon Wilfred Hamilton, Salina
Stanley Paul Hunt, Marysville
Clarence Huycke, Ellsworth
Clifford Bunch Jones, Jewell
Homer Frederick Kennady, Topeka
Dan Glenn Lake, Lake City
Wilber Lane, Jamestown
Fred Myers, Viola
Benjamin Franklin Nemechek, Abilene
Guy Oden, Sterling
Donald Carman Servis, Rock
Albert Sims, Americus
Orloe Denzil Small, Independence
William Elton Smith, Stockton
James Sparks, Kiowa
John Titus, Harper
Mark Wentz, Burlington
Laurence William Wiest, Wamego
Paul Willard, Manhattan
Theodore Franklin Yost, La Crosse

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Elizabeth Adams, Maplehill
Alta Mae Adams, Lyons
Cora Barbara Akers, Conway
Pearl Eva Althouse, Ottawa
Myrtle Margaret Anderson, Kingman
Lucile Armstrong, Belleville
Mary Kathryn Ashbrook, El Reno, Okla.
Jessie Louise Bailey, Topeka
Edna Marie Bare, Protection
Ida May Bare, Protection
Stella Clare Beardsley, Russell
Edna Louise Bechman, Manhattan
Lila Ruth Beggs, Washington
Gladys Bergier, Manhattan
Delma Lorene Bergsten, Randolph
Sibyl Irene Blackburn, Eureka
Sarah Anna Boell, Riley
Fayne Vera Bondurant, Ness City
Elsie Bonney, Manhattan
Ruth Borthwick, Manhattan
Golda Martha Bowron, Hiawatha
Eda Mae Bradley, Blue Mound
Mary Alice Bromley, Ashland
Eula Marial Budd, Havensville
Ruth Hazel Budd, Havensville
Mary Alice Bunker, Derby
Phyllis Harriet Burt, Eureka
Evelyn Dulcina Carey, Manhattan
Helen Juanita Carey, Manhattan
Everine Carls, Wakarusa
Ruth Doreen Carter, Dodge City
Helen Cavanaugh, Dighton
Sara Chase, Manhattan
Catherine Aliph Christman, Wichita
Hazel Gertrude Clark, Denver, Colo.
Ethel Laura Cloud, Frankfort
Jeanette Delphine Cochrane, K. C., Mo.
Gertrude Vivian Conroy, Manhattan
Esther Criptle Cornett, Webb City, Mo.
Marguerite Alene Coryell, Junction City
Margaret Ruth Craig, Winchester
Lida Mary Crawford, Lincoln
Margaret Elizabeth Crumbaker, Onaga
Mary Grace Crumbaker, Onaga
Mae Luella Davis, Winchester
Louise Dawson, Clifton, Ariz.
Maude Elizabeth Deely, Norton
Theodora Deming, Derby
Margaret Elfreda Devereaux, Troy
Florence Lillian Dial, Manhattan
Edna Beulah Dickhut, Scott City
Lovie Elizabeth Dittman, Downs
Elsie Clance Dobbie, Norton
Sadie Maud Douglas, Arkansas City
Nadia Dunn, Manhattan
Ethel Laura Durham, Fairport
Ruby Anna Ellerman, Potter
Martha Dorothea Errebo, Vesper
Mary Theodora Errebo, Vesper
Alma Florence Etherington, Abilene
Mabel Lena Evans, Liberal
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Maurine Fitzgerald, Colby
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Kate Elizabeth Giles, Manhattan
Mary Emma Giles, Manhattan
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Helen Isabell Gott, Arlington
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Mamie Grimes, Manhattan
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Mary Frances Haack, Florence
Lucile Halleck, Abilene
Alice Tibbetts Harkness, Lakin
Elizabeth Harrison, Ogallah
Mary Lavina Hart, Centralia
Eva Harvey, Osborne
Maude Elmira Hassler, Chapman
Ruth Bernese Henderson, Alma
Nettie Ruth Hepler, Greensburg
Clara Higgins. Hiawatha
Ruby Elizabeth Hoatson, Topeka
Edna Letha Hoke, Manhattan
Marvel May Julia Holliday, Manhattan
Mary Leone Horttor, Blue Mound
Mable Amanda Howard, Manhattan
Hazel Dell Howe, Garrison
Lettie Leona Jeffrey, Elmdale
Gussie Christina Johnson, Wichita
Huldah Dorothy Johnson, Marquette
Geraldine Wanda Jones, Leavenworth
Ethel Maurine Joss, Topeka
Leonora Marguerite Kennedy, Fredonia
Maude Emily Kershaw, Garrison
Ruth De Verre Knapp, Kansas City, Mo.
Trixe Una Knight, Jamestown
Nelle Knowles, Caldwell
Ella Viola Kraft, Liberal
Evalene Naomi Kramer, Washington

FRESHMEN—*continued*

Elizabeth Ann Lacy, Marshall, Mo.
Olive Charlotte Lagerstrom, Manhattan
Alpha Corrine Latzke, Manhattan
Esther Naomi Latzke, Manhattan
Grace Eleanor Lightfoot, Manhattan
Hazel Marie Lindley, Leon
Helen Alice Livingston, Burden
Lucille Carol Logan, Lyons
Grace Adella Low, Stockton
Dorothy Elizabeth Lush, Altamont
Grace Loomis Lyness, Walnut
Hazel Alma Lyness, Walnut
Effie Evelyn Lyons, Topeka
Helen McIlrath, Manhattan
Doris Lena McKee, Manhattan
Eunice Loraine Maninger, Harper
Marie Manser, Burden
Gladys Marie Martin, Holton
Mary Althea Mason, Belle Plaine
Della Winafred Maulsby, Hill City
Laura Marie Maxwell, St. Joseph, Mo.
Elizabeth Cora May, Holton
Tressie Edna May, Manhattan
Lora Gertrude Mendenhall, Fairbury, Neb.
Mabel Ruth Menoher, Gravity, Iowa
Martha Minnie Metz, Talmage
Bernice Ellen Miller, Horton
Nina Irene Miller, Neodesha
Frances Inez Misner, Dodge City
Edna Mitchell, Manhattan
Mary Ethel Mitchell, Hymer
Burnice Moore, Cleburne
Emma Elizabeth Moore, Syracuse
Hilda Ruth Moore, Winfield
Margery Lucile Moore, Manhattan
Ruby Bernice Moore, Idana
Ruth Ann Morgan, Neodesha
Margaret Morton, St. Joseph, Mo.
Beth Louise Motter, Abilene
Esther Raye Nachman, Kansas City, Mo
Bertha Christine Nelson, Lindsborg
Lulu Grace Norton, Cottonwood Falls
Helen Laird Ogden, Coffeyville
Ursula Oldham, Winfield
Vera Oviatte Olmstead, Moran
Alice Eugenie Olson, Manhattan
Amanda Christine Olson, Brookville
Esther Dora Olson, Brookville
Hattie Celia Overstreet, Blue Rapids
Laura Gertrude Palmer, Phillipsburg
Flora Roccena Parker, Ottawa
Edith McAlpine Paul, Jamestown
Marion Frances Peironnet, Kansas City, Mo.
Mary Iza Potter, Clifton
Doris Hawthorne Prickett, Wamego
Phoebe Frances Rebstock, Newton
Mary Ann Redden, Manhattan
Blanche Violet Regnier, Clyde
Emma Cordelia Richards, Manhattan
Ruby Maude Roberts, Lyons
Lillian Martinette Robison, Carbondale
Maybell Rodgers, Cherryvale
Anna Belle Roswurm, Manhattan
Frances Elizabeth Russell, Scott City
Vera Leone Samuel, Paola
Ruby Pearle Scott, Manhattan
Nellie Gladys Shoup, Mulvane
Bessie Magdaleon Sloan, Salina
Lola Mae Sloop, Manhattan
Mollie Manerva Smith, Westphalia
Elizabeth Anna Speiser, Garnett, Colo.
Ethel Mary Stateler, Goodwell, Okla.
Lena Harriet Stewart, Norton
Vida Elizabeth St. John, Rocky Ford, Colo.
Cleda Geneva Taylor, Manhattan
Hazel Dora Taylor, Winfield
Ruth Georgia Taylor, Tyro
Pearle Marie Thogmartin, Fort Scott
Lotta Alma Thomas, Anthony
Ruby Thomas, Argonia
Ruth Elizabeth Thomas, Anthony
Nellie Agnes Thornburg, Jetmore
Lola Evelyn Tipton, McPherson
Georgia Tucker, Elkhart
Gertrude Uhley, Fairbury Neb.
Mary Laura Vaile, Junction City
Myrtle Cornelia Vanderwilt, Solomon
Mary Kathryn Wall, Durango, Colo.
Sybl June Marie Watts, Winfield
Martha Coats Webb, Caney
Sylvia Rose Wells, Goodland
Beulah Eva Wentz, Burlington
Joyce Ellen Wentz, Burlington
Lois White, Topeka
Marcia Esther White, Carbondale
Nelle Evangeline Wilkinson, Dodge City
Jessie Lucille Williams, Manhattan
Edythe May Wilson, Luray
Daisy Evaline Wiseman, Manhattan
Nettie May Wismer, Pomona
Dorothy Agnes Woodman, Manhattan
Elsie Edith Wright, Piedmont
Mabel Edna Wright, Olathe
Stella Wright, Oketo
Ida Yvonne Wynette, Harper

GENERAL SCIENCE

Leland Carpenter Allis, Manhattan
Nelson Joseph Anderson, Burchard, Neb.
Walton Bell, Beattie
Walter Arthur Bergen, Felsburg
Mary Avis Blain, Manhattan
Oliver Wendel Broberg, Manhattan
Arthur Newton Burditt, Ness City
Milo Glen Cary, Manhattan
Imogene Marjorie Chase, Manhattan
Lewis Lines Cobb, Wamego
Thomas Matson Collier, Marquette
Frank Harold Collins, Wellsville
Elizabeth Agnes Cotton, Wamego
Nora May Dappen, Ramona
David Everett Davis, Topeka
Lillie Margaret Davis, Burrton
Hubert Alonzo Dawson, Topeka
Hobart Fairman, Manhattan
Floyd Leslie Fletcher, Waldo
George Albert Foltz, Oswego
William Edward Forney, Cottonwood Falls
Joe Otto Hall, Minneola
Lester Dillard Hamil, Tonganoxie
Robert Stanton Hargis, Inman
Ferdinand Christian Helwig, Kansas City
Ethan Allen Herr, Medicine Lodge
Charles Wilber Howard, Colby
Lelia Mary Hughes, Kansas City, Mo.
Azel Lemon Husted, Codell
Calvin Lafayette Irwin, Le Roy
Clifford Jones, Emporia
Daniel Adelbert Kemper, Denison, Tex.
Henry John Kliwer, Emporia
William Harry Knostman, Wamego
Henry Brownell Lawton, Americus
Glen Engle Lee, Glen Elder
George Wesley Leeson, Council Grove
Reuben Calvin McCoid, Silver Lake
Merle McNamara, Manhattan
Roy William Maldoon, Marysville
Jacob George Mibeck, Independence
Pearl Lily Miltner, Wichita
Arthur Ryneer Morgan, Baldwin City
Chester Parker Neiswender, N. Topeka
Lucile Owens Norwood, Manhattan
Helen Agnes Palmer, Manhattan
Chester Iles Parker, Manhattan
James Edwin Pratt, Glen Elder

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Marion Capps Reed, Manhattan
Louis Henry Rochford, Osborne
Blanche Martha Sappenfield, Clifton
Jewell Dan Sappenfield, Clifton
George Wesley Schaefer, Russell
Charles Edgar Shaw, Louisville
John Godfrey Stutz, Utica
Leo Elmer Swenson, Lindsborg
William Tully Turnbull, Manhattan
Loren Gilbert Van Zile, Manhattan
Lowell Brown Wharton, Lyons
Hazel Verda Whitton, Kiowa
Benjamin Harrison Willard, Manhattan
Jeanette Wolferton, Holton
Nellie Flo Yantis, Garrison
Fred Frank Young, Pendennis

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Ralph Leon Foster, Courtland
Herman Andrew Gehrke, Herington
William Albro Giles, Manhattan
Floyd Hawkins, Manhattan
James Jones Huey, Belvue
Adolph Lawrence Jantz, Larned
Ray Marion Scholes, Council Grove
Romayne June Spurling, Wichita
Lewis Ellsworth Timmons, Riley

SCHOOL OF AGRICULTURE

THIRD YEAR

Harry Hamilton Bearman, Johnson
Elmer George Becker, Meriden
John Oliver Bircher, Kanopolis
Walter Oscar Bowell, Kensington
Floyd Brown, Sylvan Grove
Margaret Eunice Colwell, Emporia
Bertha Marie Frey, Manhattan
Ethel Grace Gorton, Manhattan
Fannie Harriet Gorton, Manhattan
Edith Helen Gwin, Morrowville
Walter Roy Harder, Minneapolis
Ellen Ovedia Larsen, Norway
Clyde Long, Manhattan
Harry Asa Muir, Salina
Walter George Oehrle, Lawrence
Jay Earl Potter, Barnes
Fred John Robb, Scott City
Robert Earl Saxton, Everest
William Dennis Scully, Belvue

SECOND YEAR

Marion Adaline Allen, Richfield
Phebe Antoinette Allen, Richfield
Anne Susie Amstutz, Halstead
Margaret Ashton, Manhattan
Bessie Lyla Brigham, Burlington
Jamie Irene Cameron, Manhattan
Edward Henry Cass, Wa Keeney
Glenn Jacob Chambers, Pomona
Margaret Elizabeth Chapman, Manhattan
John Warren Conrow, Manhattan
Irene Margaret Conroy, Manhattan
Ralph Morgan Davidson, Topeka
Otto Delfs, Inman
James Kingdom Detar, Springhill
Ross Ray Evarts, Hiawatha
Helen Mary Hamm, Humboldt
Buford Bean Hartman, McCune
Leonard Maxwell Hebrew, Stockton
Floyd John Innis, Hutchinson
Edmund Lorenzo Jarvis, jr., Phillipsburg.
Caroline May Keller, Chapman
Glenn Linck, Emporia
Marie Long, Manhattan
Ray Edward McMoran, Ætna
John Harold May, Lebanon
Iva Manilla Mullen, Labette
Lillian Alvina Netson, Manhattan
Carrie Ada Neusbaum, Manhattan
Ivan Thomas Peppiatt, Ellsworth
William Dale Pierce, Concordia
Henry Patrick Quinn, Manhattan
John Michael Quinn, Salina
Karl Spangler Quisenberry, Newton
Fannie Lillard Robinson, Grandview, Mo.
George Eddie Ruggles, Guilford
Arthur John Sahlberg, Osage City
Herbert Edward Senn, Lasita
Lydia Senn, Lasita
Frederick Wadsworth Sewell, Manhattan
James Frank Smid, Fowler
Joseph Earl Smid, Fowler
Cecil Van Meter, St. Joseph, Mo.
Eugene Haley Walker, Manhattan

FIRST YEAR

Everett Frank Allingham, Manhattan
Bertha May Altus, Emporia
Forrest Wilbur Barber, Manhattan
Gladys Llevetta Barrett, Manhattan
Reuel Vernon Barrington, Sedan
Ernest Bernard Benne, Morrowville
Alice Bobek, Caldwell
Emma Marguerite Bobek, Caldwell
Carl William Bower, Manhattan
Vonnie Bowles, Nash, Okla.
Harry Newkirk Bradley, Garnett
Ruth Hazel Branch, Manhattan
John Thomas Brownrigg, Mont Ida
Nellie Grace Bryan, Ensign
Howard Casford, Bird City
Burnetta Cook, Blue Rapids
Albert Mathew Cooper, Russell
John Harold Cowen, Fort Scott
Rose Violet Cox, Delia
Clifford Cressman, Emporia
Mary Cathryn Curtis, Manhattan
John Dakin, Ashland
Harvey Dewey Dam, Marysville
Frank Jay Davidson, Ranton
Lulu Myrtle Day, Concordia
Harry Oren Decker, Robinson
Wayne Finley Deming, Anthony
Jedediah Silea Dewey, Manhattan
Orville Erastis Dickerhoff, Manhattan
William Roy Dickinson, Bronson
Ray Edgar Dittemore, St. Joseph, Mo.
Leo Tharpe Dysart, Douglass
Arthur Noble Easter, Saffordville
Leonard Robert Elliot, Wichita

FIRST YEAR, SCHOOL OF AGRICULTURE—*continued*

Bryan Fellers, Mansfield, Wash.
William Ferguson, Ogden
Elmer Ernest Fesenbek, Seneca
Elmer Clem Fisher, Alta Vista
Robert Miles Forrester, Manhattan
Earley Orlando Forristall, El Dorado
George Clayton Forristall, El Dorado
Lewis Kous Foster, Manhattan
Thomas Wiley Franklin, Fort Riley
John Edgar Garvin, Capps, Ark.
Bruce Stover Gibbs, Watson, Mo.
Warren Harold Gilchrist, Fowler
Bradford Lindsey Grimes, Minneola
Frank Siegel Grimes, Ashland
William Bradford Grimes, Ashland
Mary Editha Harmon, White City
Carl Henry Healen, Barnard
Ira Mearle Hepler, Manhattan
John William Hillman, Manhattan
Wayne William Hoffman, Princeton
Ercil Addison Hoke, Manhattan
Bernice Beatrice Hudson, Williamsburg
Laura Ida Inslee, Isabel
Eber Dudley Isherwood, Carl Junction, Mo.
Harold William Johnson, Cleburne
Karl William Johnson, Roswell, N. M.
Scott Elijah Kelsey, Topeka
Harry Chan Kimball, Manhattan
Arian Belle Kiser, Clifton
Elsie Geraldine Kiser, Clifton
Mabel Kyner, Sharon Springs
Emma Christina Larson, May Day
Emma Elizabeth Lawrenz, Herington
Martha Ellen Lemley, Manhattan
Louis Frank Linscott, Farmington
Floyd Robert Lucas, Bayneville
Chester Ernest Lundberg, Manhattan
Gerard Lyle, Manhattan
Evelyn Vera McDonald, Holton
Spencer McDowell, Manhattan
Thomas Fox McKee, St, Joseph, Mo.
Curtis McKeeman, Manhattan
Chester McWilson, Rice
Ethel Lenora Manwarren, Geneseo
Rolland Sylvester Mather, Grinnell
Hazel Irene May, Manhattan
John Henry Meek, Idana
Milton Miermaster, Abilene
Lee Dewey Mortimer, Manhattan
Mark Allen Mortimer, Manhattan
George William Nordeen, Dwight
Orrie Linsey Norton, La Cygne
Ralph Nutter, Morrowville
Raymond William Oehrle, Lawrence
Emma Azalea Overstreet, Blue Rapids
Pauline Clara Petermeyer, Broughton
Reuben James Peterson, Greenleaf
Todd Roy Pickrell, Wichita
Irene Pieratt, Hartford
Paul Norman Pieratt, Hartford
Harry Eugene Pierce, Darlow
Joseph Forest Price, Kanorado
Newell Mayo Reitz, Coffeyville
Scott Wyant Richards, Bethel
John Henry Roeser, Pittsburg
Anna Elizabeth Rogers, Basil
Gerald William Roll, Wichita
Samuel Edward Rose, Paola
Charles William Rossdeutcher, Topeka
Frank August Schropfer, Wamego
Edna May Schupbach, Hiawatha
Daniel Schmidt, Halstead
Florence Hazel Sexson, Ruleton
Mary Almeda Shaner, Riley
Muriel Joy Smith, Manhattan
Ralph Rolla Snyder, Manhattan
Eddie Vincil Spaht, Elk City
George Robert Stahl, Manhattan
Ralph Clarence Stahl, Manhattan
Dean Ralph Stanley, Manhattan
Joe John Straka, McPherson
Heber Forrest Sweet, Manhattan
Royal C. Taft, Hanover
Gertrude May Taylor, Junction City
James Earl Thomas, Munden
McKinley Thomas, Colony
Ben Abraham Thompson, Densmore
Nellie Titus, Wakarusa
Harry Adolph Tobwein, Cleburne
Algeitha Lorene Vance, Elmont
Reuben Velen, Cleburne
Ethel Katherine Walter, Lecompton
Iva Gladys Walter, Penalosa
Florence Mabel Williams, Manhattan
Roy Hals Williamson, Hutchinson
Everett Gareth Wilson, Strong City
Wilson William Wolfe, Coffeyville
Ruth Rena Wolfenbarger, Winkler
John Harrison Wright, Wilmore
Raymond Evens Young, Wallace

SPECIAL

Dick Adams, Kansas City
Ida Gertrude Adee, Manhattan
James Frederick Adee, Manhattan
John Akers, Conway
Edith Undine Alexander, Oskaloosa
Malcolm Llewllyn Alsop, Wakefield
Henry Cribbs Altman, Amy
John August Anderson, Manhattan
Marian Elizabeth Anderson, Olathe
Lawrence Ardoin, Levant
William Allen Atchison, Manhattan
Ray Allen Axtell, Dimmitt, Tex.
William Baird, Cassoday
Lillian Belle Baker, Manhattan
Herbert Bales, Manhattan
Sheridan Edwin Banks, Milton, Ky.
Thurman Bryan Barker, Bethel
Charles Ronald Bauerlein, St. Joseph, Mo.
Burton Bernard Bayles, Manhattan
Montie Melvel Beaman, Macksville
Homer Glenn Beatty, Luray
Hazel Lucille Beck, Manhattan
Mary Bernice Bellinger, Manhattan
Ethel Bennett, Pomona
Verne Stanton Bentley, Jerome
Myra Lorena Blue, Detroit
Nora Margaret Boettcher, Winkler
Alva Jonathan Bogue, Manhattan
Henry Benton Bondurant, Bazine
David Francis Bradley, Hutchinson
Harold Ross Brakeman, Manhattan
Dan Matthew Braum, Denison
Henry Howard Braum, Denison
Bernice Harriett Bridwell, Gypsum
Mildred Frances Brown, Manhattan
Ruth Mildred Brown, Chiles
Homer Griffin Bryson, Manhattan
Paul Burg, Selkirk
Robert Burns, Keats
Osceola Hall Burr, Manhattan
Carl Lester Buxton, Monmouth
Alvin Carlson, Morganville
Hazel Ellen Childs, Wichita
Wallace Clapp, Logan
Frank Lester Clark, Riley
William Tracy Cleland, Manhattan
Walter Coates, Wallace
Sadie May Coffey, Manhattan
Ernest Benjamin Coffman, Lawrence
Morrill Irving Cook, Clay Center
Roy Homer Cook, Independence
Gladys Marie Counter, Enterprise

SPECIAL SCHOOL OF AGRICULTURE—*continued*

Emery Melborn Cox, White City
Willard Dearborn Crandall, Manhattan
Arthur Weston Crocker, Matfield Green
Ruth Brown Crowson, Manhattan
Verne Lloyd Culver, Wichita
Pearle Edwinnie Dakin, Green
Marion Clifford Danby, Cassoday
Kathryne Dappen, Lost Springs
Mildred Frances Davies, Manhattan
Harrison Edgar Davis, Meriden
Russell Gordon Davis, Bronson
Arthur Reginald Denman, Manhattan
Carl Depue, Drexel, Mo.
Addison Curtiss Depuy, Manhattan
Sarah May Dewey, Manhattan
Myrtle Clare Dickerhoff, Manhattan
Dora Frances Duffield, Manhattan
Carl Herbert Dunham, Havensville
Mary Edna Dunham, Sulphur Springs, Ark.
Clarence Mills Easter, Topeka
Maggie Ellis, Westmoreland
Charles Earl Erickson, Clyde
Clarence Jinks Etherington, Neal
Ray Ferree, Yates Center
Mary Mildred Fleiss, St. George
Ada Rae Raechel Flinn, Bogue
Harry Adelfert Flinn, Bogue
Clarence Edwin Freeto, Cheney
Charles Hunting French, Silver Lake
(Mrs.) Florence May Garinger, Manhattan
Jesse Verl Garvey, Wichita
Isaac Frank Gates, McPherson
Lester Frank Gfeller, Junction City
George Richmond Giles, Wichita
Fred Roy Glover, Wamego
Glover Irvin Godwin, Council Grove
Joe Goering, Galva
John Goering, Galva
Hattie Mathilda Goethe, Leonardville
Ygnacio Vazquez Gomez, San Antonio, Tex.
Charles Ernest Goodman, Lenora
Maude Elizabeth Grant, Wallace
Pearl Lydia Grant, Wallace
Basil Ambrose Green, Mankato
Hubert Gregg, Beloit
Ward Clarke Griffing, Manhattan
Willis Goodrich Griffing, Manhattan
William Thomas Grimes, Haviland
William Guilfoil, Wamego
Bertha May Gwin, Morrowville
Eva Maud Gwin, Morrowville
Lawrence Hall, Manhattan
Cecil Ray Hanna, Manhattan
Floyd Joe Hanna, Manhattan
Dorcas Margarette Hannan, Topeka
Loyal Gouin Harris, Manhattan
Isabelle Beale Hart, Newton
Nancy Eleanore Hartzler, Goodland
Frieda Louise Haslam, Manhattan
Alice Hawkins, Manhattan
Jack Edward Heasty, Fairbury, Neb.
George Hedges, Howard
Ellen Mathilda Hedstrom, Dinas
August Leonard Heisel, Scranton
Samuel Moore Henderson, Wakarusa
Emra Adam Hepler, Manhattan
Ross Wayne Hill, Manhattan
Ward Lucas Hill, Manhattan
George Winfred Hinds, Manhattan
Clarence David Hodge, Parsons
Merton Anderson Hoke, Manhattan
Bertha Lydia Holliday, Wright
Loring Alfred Hooton, Garnett
Elmer Hopp, Manhattan
Edmund Hubert Hovey, Cambridge
Cecil Howard, Fort Scott
David Marion Howard, Manhattan
Nelson Edwy Howard, Fort Scott
Esther Florence Huchsoll, Abilene
Felix Heath Hull, Eureka
Fred Harold Hull, Portis
Warren Hull, Clay Center
Ralph Edward Hunter, Palmer
Guy James Ingman, Barnes
Ray Frank Jaggers, Burlington
Gladys Irene Jordon, Argonia
Mary Winifred Jordon, Argonia
Ward Reynold Johnston, Manhattan
Barry Lucy Jones, Emporia
Charles Chester Jones, Emporia
John Victor Keene, Ottawa
Wallace Valentine Keene, Ottawa
Lawrence Woodard Kennedy, Lawrence
Archibald Kernohan, Nashville
Robert Cathcart Keys, Winchester
George Brent Kimport, Delvale
Vesta Eulela Kinyon, Vernon
Floyd Luther Kirby, Bucyrus
Raymond Scott Knox, Jetmore
Rudolph Henry Kobes, Manhattan
Herman Krauss, Sedgwick
Zelma Fay Kyner, Sharon Springs
Charlie Clayton Lawrence, Chanute
Aubrey Mac Lee, Arnett, Okla.
Vernon Russell Lee, Norton
Arthur Givens Long, Murdock
Josie Long, Manhattan
Eugene Sidney Lyons, Lawrence
Clair Raymond McCall, Brewster
Rollo Wade McCall, Brewster
Winifred Owen McCarty, Ames
Herbert McClelland, Manhattan
Emma Ruth McClenahan, Manhattan
Agnes McElroy, Manhattan
Gertrude Elizabeth McElroy, Manhattan
Jesse Madison McFarland, Belle Plaine
Fred Robert McMichael, Plainville
Franz Joseph Maas, Alta Vista
William MacKender, Riley
John Lemley Macklin, Burns
Leo Alphonsus Magrath, Williamsburg
Duella Mae Mall, Manhattan
Sylvester Samuel Marshall, Manhattan
Hobart Irwin May, Seward
Victor Mead, Wichita
William Harold Medill, Leavenworth
Calvin Medlin, Chamal Tampa, Mexico
Carlos Dewey Medlin, Dickens, Tex.
William Cloud Mills, Lake City
Joseph Henry Mitchell, Arcadia
Isaac Tennyson Mock, Idana
William C. Morrow, Des Moines, N. M.
Donald Addison Morton, Elk Falls
Royal Merritt Mullen, Labette
Hazel Ione Murphy, Manhattan
Ruth Inez Murphy, Manhattan
Maxwell Edgar Myers, Chanute
William August Naher, Kansas City, Mo.
Phillip Earl Neale, Manhattan
Oliver Franklin Nelson, Manhattan
Floyd Earl Oakes, Gypsum
Paul Harold Oliver, Perry
Elver Wayne Osbourn, May Day
Frank Stanley Papez, Milwaukee, Wis.
Lorenzo Ray Parker, Linn
George Walter Patterson, Manhattan
Gladys Isabell Patterson, Clifton
Walter Edward Paulsen, Caldwell
Thomas Harold Payne, Hutchinson
Clinton A. Perkins, Oswego
Fred E. Pollom, North Topeka
Harold William Poort, Topeka
Walter Leslie Porter, Stafford
Valentine Henry Portz, Meriden
Walter Pratt, Colby
Neil Orris Price, Manhattan
Clarence Benedict Quigley, Blaine
Randall Reid, Collyer

SPECIAL SCHOOL OF AGRICULTURE—*continued*

Margaret Hattie Reynolds, Hazelton
Anna Corinne Riley, Reece
Edith Eugene Riley, Reece
William Herman Roda, Paradise
Harold Edwin Roe, Vinland
Harold Dewey Rothrock, Lawrence
Clyde Donald Rudy, Manhattan
Lulu Ruggles, Guilford
Paul Rusmisel, Manhattan
Ethel Margaret Saintabin, Westphalia
August Ernest Schattenburg, Manhattan
Merrill Philip Schlaegel, Vermilion
Helen Schneider, Logan
Clara Schober, Hiawatha
Hilda Esther Schroer, Kansas City, Mo.
Frank Schwartz, Manhattan
Lee Ashton Scott, Westphalia
Bess Irene Seitz, Manhattan
James Jacob Seright, Lucas
Beryl Anna Severns, Marysville
Clyde Archer Sheets, Topeka
Jones Shively, Minneola
Forest Wayne Shull, Glasco
Norma Luella Shupe, Lost Springs
Russel Franklin Sidles, Wichita
Alta Beatrice Siegle, Lost Springs
Ramah Sitterson, Manhattan
Paul Walter Smith, Osborne
George William Sova, Harper
Fanny Myrtle Spaniol, Plevna
Robert Cleveland Spratt, Kansas City
Velda Elizabeth Stewart, Morganville
Mable Alice Stollar, Kensington
Roy McKinley Stout, Hazelton
Ward Clinton Stout, Arkalon
Helen Margaret Strite, Salina
Anna Lillian Summers, Manhattan
Abbie Swafford, Manhattan
Mabel Manghild Swanson, Norcatur
William Tawzer, Minneola
Harold Hetherington Theiss, Hutchinson
Leslie Morton Thomas, Dunlap
Kyle David Thompson, Densmore
Robert Newton Tidball, Wa Keeney
George Oswald Tolman, Paola
Harland Beal Town, Valencia
Harland Beal Towne, Valencia
Beulah Truesdell, Lyons
Ledrie Silvey Umberger, Larned
Alexander Urbanowich, Newton
Adelphia Ruth Vilander, Manhattan
Benjamin Harrison Wade, Meriden
Christian Weber, Abilene
John David Weber, Manhattan
Tommy Louis Weber, Manhattan
Alice Webster, Manhattan
John Everett Weeks, Belvue
Peter Weissbeck, Collyer
Alvin Julius Wendlandt, Dearing
Lula Mae Wertenberger, Manhattan
Laura Calista Whitney, Lyndon
Bertha Eunice Whitton, Kiowa
Bernice Mary Wilcox, Bancroft
Clyda Dell Wilkinson, Manhattan
George Edward Wilkinson, Russell Springs
Alice Letitia Williams, Sylvan Grove
Josiah Davis Williams, Clay Center
John Harry Williams, Lakin
Homer Bryan Willis, Manhattan
Lawrence Harold Wilson, Alida
Amy Inez Wismer, Pomona
Homer Carlton Wood, Manhattan
Earl Joel Wood, Manhattan
Howard Kingsbury Woodbury, Olivet
Blanche Woodward, Summerfield
Ray Smith Workman, Topeka
Chester Ewart Yenawine, Manhattan
Lydia Lucile Yost, Munden

SPECIAL

DIVISION OF AGRICULTURE

Morris Abeles, Leavenworth
Frank Harrison Beedle, Scott City
Lile Bevington, Jewell City
Joseph Johnson Campbell, Wichita
William Wortman Castillo, Independence
Paul Alexander Childress, Ashland
Leslie Irl Collins, Manhattan
John Vastine Colville, Wichita
Minor Wayne Davis, Manhattan
Hugh Durham, Manhattan
Ebenezer Torrey Englesby, Manhattan
Chester George Farnsworth, Wichita
Ray Arthur Foster, Portis
Edward Henry Geary, Topeka
Charles Gettys, Concordia
Arthur Gregg, Beloit
Roland Hill, Wichita
John Albert Howarth, Manhattan
Solomon Willard Jackson, Manhattan
Lafayette Poindexter Jones, Carlsbad, N. M.
William Henry Kerns, Goff
William Adams Lippincott, Manhattan
Claude McMillan, Ada, Okla.
Leon Francis Montague, Downs
Charles Cecil Newton, Wellington
Earl Fisk Olmstead, Sterling
Thomas Patten Palmer, Wamego
Marcellys Paul Piatt, Peck
Leslie Averill Plumb, Pleasanton
Robert Hall Rexroad, Darlow
James LeRoy Robinson, Nashville
John Alex Seaman, Siloam Springs, Ark.
Charles Lorn Slentz, Great Bend
Harry Irwin Woods, Topeka
James Walter Zahnley, Manhattan

VETERINARY MEDICINE

Paul Kitchell Baker, Cherryvale
Aaron Andrew Brecheisen, Edgerton
Fred Burt Broadbent, Beloit
John Monroe Dodrill, Stockton
David Maxon Greene, Manhattan
Albert William Hackerott, Osborne
Arthur James Hoffman, Manhattan
Henry Hoffman, Princeton
Charles Henry Honeywell, Poe
William Albert Houk, Americus
Fred Harrison Ives, Edmond, Okla.
Chester Anderson King, Emporia
John Fletcher Lill, Panhandle, Tex.
Charles Earl Long, Blue Mound
Newton Allen McCosh, Longford
Robert Abraham Maxwell, Independence
William Henry Moore, Tribune
Harold Newton, Manhattan
La Roy Noyes, Manhattan
William McKinley Pruett, Wichita
Hugh Fleanor Rippey, Emporia
Arthur Louis Stein, Halstead
Gail Maurice Umberger, Elmdale
Lloyd Leroy Whitney, Lyndon
Leon Brewer Wilson, Manhattan
Oliver Brown Wilson, Topeka

SPECIAL STUDENTS—*continued*

DIVISION OF MECHANIC ARTS

William Raymond Allen, Hutchinson
Marcus Almgren, Manhattan
Frank Pittenger Applebaugh, Cherryvale
George Hans Asmussen, Manhattan
Grace Cushing Averill, Whitewater, Wis.
James Thistlethwait Baker, Tonganoxie
Joseph Parker Ball, Independence
Emmet Lawrence Barkyocum, Bala
Charles Henry Blosser, Norway
Charles Winton Bodkin, Wichita
James Irwin Brady, Manhattan
Oliver Herman Brown, Manhattan
George Samuel Clinton, Leavenworth
Everett Pardon Colburn, Manhattan
Hollis Thomas Cook, Courtland
Ray James Creevan, Axtell
Maurice Dubbs, Ransom
Carol Milton Freeman, Kansas City
Henry Earl Harris, Maplehill
Chester Hedges, Chase
Orvid Theodore Horn, Garnett
Edith Loree Kelly, Olathe
Ellis Warren Lemasters, Manhattan
Chester Cecile Morse, Phillipsburg
Virgil Overstreet, Blue Rapids
Alexander Linton Robertson, Great Bend
James Lincoln Strong, Kensington
Ilo Ivan Taylor, Manhattan
Herman Martin Vesper, Topeka
Charles Richard Wareham, Kearney, Neb.

DIVISION OF HOME ECONOMICS

Hazel Iris Crabb, Attica
(Mrs.) Hazel Gough Edyvean, Chanute
Blanche Earl Enyart, Manhattan
Ethel Mae Evans, Manhattan
Mildred Pearl French, Manhattan
Leona Sanders Graves, Inman
Margaret Belle Green, El Dorado
Leona Victoria Jardon, Baldwin
Ethel Hannah Jones, Manhattan
Fern Maclean, Manhattan
Bertha Fern Rogers, Manhattan
Louise W. Stall, Kansas City
(Mrs.) O. J. Taylor, Wichita
(Mrs.) Clara Horney Tiffany, Manhattan
Wilma Elsie Whitmore, Manhattan
Nina Marie Williams, Winfield

DIVISION OF GENERAL SCIENCE

(Mrs.) N. Elizabeth Askren, Manhattan
Mabel Rose Bentley, Valhalla
Myrtle Pearl Broberg, Manhattan
(Mrs.) Elva Brubaker, Manhattan
Helen Mae Bushey, Muscotah
Bertha Alyce Campbell, Agenda
Bessie Lavera Carp, Wichita
Roy Edward Carr, Oakley
Grace Myrtle Christman, Sterling
Edward Eloe Clark, Topeka
(Mrs.) Bessie Cunningham, Manhattan
Aileen Curtis, Manhattan
Gertrude Curtis, Ogden
Charles DeForest Davis, Louisville
Jessie Hedden Davis, Manhattan
Raymond Clarence Davis, Manhattan
Mina Bellamy Dodge, Manhattan
Mary Duff, Walton
(Mrs.) Flora Ewing, Manhattan
Ruth Marie Field, Topeka
Mary Alida Fitch, Springfield, Mo.
Edna Mae Fleshman, Baldwin City
Lucy Elizabeth Fletcher, Waldo
Florence Edith Fountain, Sabetha
Hattie May Franks, Circleville
Ethel Gladys Gaston, Manhattan
Leslie Dodge Hanson, Manhattan
Anna Florence Hedges, Elk City
Marion Hepworth, Burlingame
Neta Olive Hibbs, Wakarusa
Esta Jane Hungerford, Soldier
Helen Leonora Hunter, Eureka
Edith Brooks Inskeep, Manhattan
Ambrose Mathew Johnston, Manhattan
Gladys McKinnon Jones, Rochester, N. Y.
Elizabeth Emily Kirkpatrick, Manhattan
Lewis Leroy Leeper, Manhattan
(Mrs.) Frieda Limper, Manhattan
Florence Minette McCall, Beloit
Everett Clarence Manker, Manhattan
Carl DeWitt Martin, Junction City
Sara Leslie Maxwell, Topeka
Grace Mitchell, Holton
Blanche Elizabeth Moore, Gridley
Daisy Lewelling Mortimer, Manhattan
Myrtle Dell Mortimer, Manhattan
Charles Nichols, Girard
Martha Lois Noyes, Manhattan
Cecil Richmond, Parsons
Helen Josephine Ross, Kittanning, Pa.
Mary Margaret Ryan, Manhattan
Elizabeth Ruth Scott, Baldwin
Ruth Ashmore Shotts, La Crosse
Paul Daniel Swayze, Lawrence
Erwin Milton Tiffany, Manhattan
Benjamin Alphonso Tillman, Manhattan
Prudence Elizabeth Tolbert, Gypsum
(Mrs.) Alice Douglas Tomson, Manhattan
Ethel Vanderwilt, Solomon
Leah Augusta Wallace, Vliets
Mildred Louise White, Abilene
Millicent Williamson, Haddam
Anna Alberta Wilson, Wichita
Bess Wilson, Ogden
Lena Florence Witthauer, Olathe
Augusta Amos Wright, Manhattan
Leona May Wynette, Harper
(Mrs.) Mabelle Zahnley, Manhattan

SUMMER SCHOOL

Hattie Julia Abbott, Manhattan
Jesse Bliss Adams, Mound City
Raymond Voiles Adams, Eureka
Ida Gertrude Adee, Manhattan
Harriet Ruth Aiman, Manhattan
Cora Barbara Akers, Conway
Edith Louise Alsop, Wakefield
Algot Anderson, Manhattan
Glen Anderson, Lincoln
Ruth Arbuthnot, Belleville
Chancellor Lee Archer, Glasco
Mamie Edith Arnold, Cottonwood Falls
Ardis Corinne Atkins, Manhattan
J. Malcolm Aye, Manhattan
Ernice Ann Baird, Cherryvale
Florence Willetta Baird, Cherryvale
Florence Baker, Kansas City
May Helsdon Baker, Topeka
Wallace Winfield Baker, Harper
Clint Baldwin, Cottonwood Falls
George Kilbourn Baldwin, Manhattan
Lowell Edwin Baldwin, Manhattan

SUMMER SCHOOL STUDENTS—*continued*

Rosa Mae Barber, Topeka
Grace Adeline Barker, Newton
John Otto Barnes, Manhattan
Lucy Van Baughman, Larned
Hazel Lucille Beck, Manhattan
Blanche May Berger, Sylvan Grove
Hazel Lillian Beverly, Manhattan
Willa Etta Bigby, Kansas City
Carlos Tomas Bischoff, Manhattan
Avis Blain, Manhattan
John Samuel Blosser, Huron
Clara Bogue, Manhattan
Katharine Maxwell Bower, Parsons
Arthur William Boyer, Scranton
Harvey Edgar Bradley, Phillipsburg
Harold Ross Brakeman, Manhattan
Roy Shipman Breese, Manhattan
Palmer Fair Bressler, Manhattan
Blanche Thersa Brosseau, Clyde
Corrine Mary Brosseau, Clyde
Elsa Ann Brown, Manhattan
Jennie Pearl Brown, Caldwell
Nettie Brush, Newton
Lillian Anna Buchheim, Winkler
Walter Albert Buck, Manhattan
James H. Burt, Manhattan
Gladys Lenore Callaway, Blue Rapids
William Cecil Calvert, Kansas City
Jamie Irene Cameron, Junction City
George Rigg Campbell, Fulton
John Ray Carnahan, Manhattan
Lawrence Catlin, Olathe
Florence Beatrice Caton, Foxboro, Mass.
De Loss John Chapin, Manhattan
Edna Chapin, Manhattan
Ira Nichols Chapman, Manhattan
Sara Chase, Manhattan
Nellie Cheadle, Woodruff
Arthur Alvin Christenson, Marquette
Myrtle Grace Christman, Sterling
David Charles Clarke, Manhattan
Mabel Clarke, Manhattan
Millicent Emma Clark, Riley
Pauline Frances Clarke, Paola
Hattie Cleavinger, Lowemont
Joseph Cocannoner, Manila, P.
Percy Walter Cockerill, Manhattan
Alvin Theodore Coith, Manhattan
(Mrs.) Emma McCallon Cole, Richfield, Id.
(Mrs.) Frances Perry Cole, Manhattan
Norman John Cole, Richfield, Id.
Myrtle Antonia Collins, Essex, Ia.
James Dennison Colt, Manhattan
Kathleen Conroy, Manhattan
Susan Philomena Conroy, Manhattan
Julius Edgar Cook, Ness City
Le Roy Clarence Cook, Eskridge
Ralph Andrew Cooley, Manhattan
Robert Francis Copple, Manhattan
Bernice Cosand, Cuba
Alice Janet Counter, Enterprise
Harry Herschell Coxen, Eskridge
Kathryn Louise Coyne, Linwood
Blanche Marie Crandall, Manhattan
Verda Louise Crumrine, Jewell
Verne Lloyd Culver, Wichita
Robert Curtis, Manhattan
Bertha Danheim, Blue Rapids
Arna Kathryn Dappen, Lost Springs
Nora May Dappen, Ramona
Earl Gilbert Darby, Manhattan
Mildred Frances Davies, Manhattan
Doris Margaret Davies, Manhattan
Arlene Davis, Udall
Charles Ambrose Davis, Clay Center
Glenn Wallace Davis, Manhattan
Joseph Lyndon Davis, Manhattan
Lulu Glee Davis, Udall
Wilbur Davison, Michigan Valley
Mary Adaline Dean, Nickerson
Clara Affadilla Deaver, Sabetha
Myrtle DeFever, Fall River
William Deitz, Overland
Mayme Cecelia Dempsey, Manhattan
Ralph Edmund Denham, Merriam
Eliza Bertha Dennett, Harper
Percy Le Roy DePuy, Girard
Cora Ellen Devault, Ocheltree
Mary Virginia Dodd, Langdon
Josephine Woodward Doran, Topeka
Myrtle Dougherty, Manhattan
Arthur Douglas, Manhattan
Pearl Gertrude Dowd, Bayneville
Albert Dowis, Perth
Valeda Downing, Stafford
Leigh Dudley Dowling, Saint Francis
Nadia Dunn, Manhattan
Hugh Durham, Manhattan
Faith Elizabeth Earnest, Washington
Lucy Ellis, Topeka
Juanita Engle, Abilene
Esther Elizabeth Ericson, Manhattan
Martha Dorothea Errebo, Manhattan
Mary Theodora Errebo, Manhattan
Maude Estes, Junction City
Frances Floretta Ewalt, Manhattan
Donald Benjamin Eyer, Manhattan
Florence Evans, McPherson
Clyde Faubion, Anthony
Martha Fern Faubion, Manhattan
Rena Amelia Faubion, Manhattan
John Henry Ferguson, Lyons
Ruth Marie Ferguson, Manhattan
Albert Fincham, Pratt
George Wilber Fisher, Manhattan
James Burgess Fitch, Manhattan
Fred Ira Fix, Manhattan
Jane Irene Flinn, Admire
Nelle Flinn, Admire
Forrest Custer, Flora
Yulah Foresman, Manhattan
Lena Fossler, Manhattan
Marion Rosina Fowler, Brookville
Esther Grey French, Manhattan
Letabelle Gallatin, Liberal
Carrie Belle Gardner, Newton
Frank Garnette, Manhattan
Ethel Victoria Garrett, Manhattan
Charles William Gartrell, Manhattan
Helen Rae Garvie, Abilene
Floy May Gebhardt, Alden
Lyman Earl Gessell, Woodbine
Gilbert Ghormley, Partridge
Ernest Eugene Gilbert, Manhattan
Mary Webber Gile, Scandia
Josephyne Lura Gilmore, Manhattan
Josephine Anna Giltner, Madison, Neb.
Elizabeth Emma Gish, Manhattan
Annie Goddard, Dunavant
Ruth Goheen, Clay Center
Natalie Helen Goldsmith, Athol
Clara Swearingen Goodrich, Stockton
Bess Lenora Gordon, Garden City
Alta Ann Gorman, Varner
Fannie Harriet Gorton, Manhattan
Ida Helen Greene, Manhattan
Caroline Emma Greene, Manhattan
Isa Allene Green, Manhattan
Kathryn Essie Green, Kansas City, Mo.
Josie Griffith, Manhattan
Myrtle Grover, Manhattan
Lottie Gugenhan, Manhattan
Edna Gulick, Winfield
Charles Thomas Halbert, Agra
Cecil West Hale, Manhattan
Preston Orin Hale, Manhattan
Bernice Cecelia Hall, Manhattan
Charlotte Barrett Hall, Manhattan

SUMMER SCHOOL STUDENTS—*continued*

Martha Marie Hanson, Lawrence
Alice Tibbetts Harkness, Lakin
Hildegarde Harlan, Manhattan
Miriam Ellen Harling, Manhattan
Gertrude Harris, Cottonwood Falls
Earl Raymond Harrough, Mound City
Rembert Lydia Harshbarger, Manhattan
Milton Harvey, Manhattan
Elmer Everett Hassler, Chapman
Alice Hawkins, Manhattan
Floyd Hawkins, Manhattan
Herbert Henley Haymaker, Wichita
Helene Held, Clay Center
Nettie Hendrickson, Manhattan
Clara Marie Hendriksen, Atchison
Jeffia Belle Hendrix, Manhattan
Cora Hepworth, Topeka
Marian Martha Hepworth, Burlingame
Anna Cammella Herren, Manhattan
Lola Augusta Herren, Manhattan
Andra Hill, Cedar Vale
Charles Willard Hill, Smith Center
Lora Marian Heag, Manhattan
Ruth Brandt Hoffman, Manhattan
Bertha Belle Hole, Manhattan
Harry Hollingsworth, Emporia
Vesta Allene Hollingsworth, McPherson
Ina Emma Holroyd, Manhattan
Mary Hoover, Canton
Nellie Maria Hord, Colony
Will Robert Horn, Lucas
Esther Lydia Hostetler, Manhattan
Nora Hott, Hiawatha
Anna Howard, Manhattan
Clara Belle Howard, Colby
Elsie Nora Howard, Colby
Mable Amanda Howard, Manhattan
Gladys Ellen Hudson, Fredonia
Dwight Ellsworth Hull, Manhattan
William McKinley Hungerford, Manhattan
Nellie Elizabeth Hunt, Manhattan
James Thomas Hunter, Eureka
Jessie Janette Husband, Wilsey
Ruth Amelia Hutchings, Manhattan
Gilford Ikenberry, Quinter
John Grover Jackley, Manhattan
Pansy Mary Jackson, Manhattan
Solomon Willard Jackson, Manhattan
Judith Elizabeth Jacobson, Waterville
Pauline Jacques, Independence
Pearl LaClaire Jacques, Hamlin
Elizabeth James, Lenexa
Lillian Jeter, Alden
Marguerite Hartwell Johnson, Garden City
Marie Johnston, Manhattan
Mina Jones, Dodge City
Donald Smith Jordan, Topeka
Florence Justin, Manhattan
Emma Dorothy Kammever, Manhattan
Mabel Anna Kanaga, Winfield
John Kanagy, Hesston
John Keene, Ottawa
Eva Marguerite Kell, Manhattan
Crystal Helene Kelley, Yates Center
Harry L. Kent, Manhattan
Brice John King, Centralia
Rufus Kirk, Manhattan
Elizabeth Emily Kirkpatrick, Manhattan
Vera Belle Kizer, Manhattan
Kathleen Vera Knittle, Manhattan
Mary Steven Lane, Eskridge
Lottie Lasswell, Havensville
Lillian Antoinette Lathrop, Manhattan
Bertha Blanche Lauger, Manhattan
Virginia Ann Layton, Blue Rapids
Wesley Leeson, Council Grove
Lillie Elsie Lehman, Junction City
Constance Margaret Levine, Lindsborg
Laura Elizabeth Lind, Yates Center
Howard Allen Lindsley, Manhattan
Frances Alythe Lisk, Lenexa
J. Howard Loomis, Colby
Laura Marie Loomis, Manhattan
Charles Gottlieb Lueker, Manhattan
John Lund, Manhattan
Gerard Lyle, Mendota, Tex.
Sam Patterson Lyle, Mendota, Tex.
Ruth Irene Lyman, Manhattan
Daniel Gail Lynch, Manhattan
Jessie Bernice McArdle, Lebanon
James Marshall McArthur, Walton
Margaret Eleanor McCaffrey, Tonganoxie
Elizabeth McCall, Wa Keeney
James Donald McCallum, Kansas City
Grace McCarty, Iola
Lillie McCarty, Iola
Herbert McClelland, Manhattan
Arthur Erskine McClymonds, Walton
Grace Kerns McCoppin, Phillipsburg
Rachel Nora McCoy, Wamego
Asa Effa McCracken, Cuba
Minnie Vergie McCray, Manhattan
Harriet Esther McElvain, Fort Scott
Jessie Edna McElwain, Burrton
Bernice McFarland, Lawrence
Lewis Evermont McGinnis, Kansas City, Mo.
Jessie Katharine McGuire, Hutchinson
Pearle Irene McHenry, Paola
Clayton Alexander McIntosh, Manhattan
Beulah Lillis McNall, Gaylord
Archie Lee Marble, Esbon
Elizabeth Abbie March, Topeka
Doris Elizabeth Marsh, Manhattan
Eugene Roy Martin, Eureka
Gertrude May, Manhattan
Franz Benedict Mayer, Manhattan
Catharine Lydia Mays, Lebanon
Carrie Florence Mendenhall, Burden
Ethel Mendenhall, Burden
Hildegarde Althea Mense, Kansas City, Mo.
Carl John Merner, Manhattan
Lloyd Franklin Metzler, Spearville
Anna Lora Miller, Hoisington
Cecil Elizabeth Miller, Hoisington
Charles Henry Miller, Wichita
Josephine Miller, Kansas City, Mo.
Lucy Emslie Miller, Manhattan
Ella Mae Miltner, Wichita
Minnie Martha Mischke, Long Island
Helen Mitchell, Manhattan
Robert Ellsworth Mohler, McPherson
Leon Newton Moody, Riley
Cecil Vard Moore, Manhattan
Irma Leah Moore, Holton
Laura Dwelle Moore, Chanute
Nina Moore, Topeka
(Mrs.) Vera Idol Moore, Hiawatha
Arthur Morgan, Manhattan
Hallie Margaret Morgan, Manhattan
Riley Earl Morgan, Webber
Grace Morris, Kansas City
Margaret Morris, Manhattan
Maria Morris, Manhattan
Charlotte Morton, Ellsworth
Leo Clifford Moser, Courtland
Florence Katherine Mulvey, Wichita
Flavius Albert Mundell, Nickerson
Helen Munger, Carbondale
Kathrina Munger, Manhattan
Relie Edward Nafziger, McPherson
Comfort Amanda Neale, Manhattan
Lucy Needham, Rantoul
Esther Serida Nelson, Manhattan
Oliver Franklin Nelson, Manhattan
Peter Leatherman Netterville, Manhattan
Winifred Louise Neusbaum, Manhattan
Jessie Eleanor Newland, Bridgeport
Ida Mae Northrop, Salina

SUMMER SCHOOL STUDENTS—*continued*

Lettie Maybelle Noyce, Stockton
La Roy Noyes, Manhattan
Freda Obenland, Clay Center
Valerie Almina Ogilvie, Burr Oak
Millie Sophia Oltmanns, Halstead
Ruth Elizabeth Orr, Manhattan
Helen Pierson Osgood, Parsons
(Mrs.) J. A. Paddock, Manhattan
Ellen Elizabeth Page, Topeka
Wallace Park, Manhattan
Flora Parker, Ottawa
Clarence Pate, Walnut
Gladys Isabell Patterson, Manhattan
Sara Jane Patton, Hiawatha
Felix Paulsen, Manhattan
Amos Oliver Payne, Manhattan
Blanche Payne, Pittsburg
Helen Payne, Manhattan
Nellie Maria Payne, Manhattan
Esther Virginia Peck, Manhattan
Hazel Berdella Peck, Manhattan
Laura Pendleton, Lawrence
Clara Cordelia Pennell, Junction City
Josephine Price Perrill, Troy
Ella Dunlap Phenicie, Tonganoxie
Edna Pickrell, Manhattan
Floyd Pickrell, Manhattan
Cora Alberta Pitman, Manhattan
Thurza Elizabeth Pitman, Manhattan
Izil Isabel Polson, Fredonia
Mary Elizabeth Polson, Fredonia
Iva Holt Porter, Glen Elder
Mabel Grace Powell, Hoisington
Nina Mae Powell, Athol
Anna Pratt, Burlingame
Margaret Pulley, Larned
Elliott Ranney, Manhattan
Ethel Mae Ramey, Manhattan
Lee Randels, Anthony
Ruth Berneta Rathbone, Manhattan
(Mrs.) Ola Bowman Raymond, Newton
Roy Ralph Reppert, Manhattan
Leird Astor Richards, Manhattan
Sara Bunitta Richardson, Kansas City
Addie Dea Richeson, Iola
Clara Louise Robbins, Colony
James Leroy Robinson, Nashville
Cleo Prudence Roderick, Attica
Fern Roderick, Attica
Margaret Rodgers, Manhattan
Maybell Rodgers, Manhattan
Francisco Rodriquez, Manhattan
Harold Edward Rose, Manhattan
Gail Ross, Wichita
James Edward Rouse, Manhattan
Grace Ethelyn Rudy, Manhattan
William Warren Rutter, Topeka
Ethel Margaret Saintabin, Westphalia
Amy Frances Salkeld, Manhattan
Charles David Sappin, Manhattan
Frank Sargent, Holton
Jessie Mae Saunders, Kansas City
Victoria Mildred Saunders, Manhattan
Eunice Izene Sawyer, Morrowville
Emily Adelle Scheer, Topeka
George Edman Scheer, North Topeka
Anna Frances Schloesser, Fredonia
Dorothea Schloh, Natoma
Cora Aneita Schmitt, Ellsworth
Ralph Powell Schnacke, Manhattan
Susanna Schnemayer, Topeka
Samulie Schwensen, Junction City
Anna Winifred Searl, Morland
Eva Sharpe, Chase
Herman Henry Sherrard, Winfield
Theodore Legrande Shuart, Hutchinson
George Sidwell, Wichita
Waldemar Silva, Porto Alegre, Brazil
Mabel Clara Sitterley, Manhattan
Emmett Warren Skinner, Manhattan
Georgia Yantis Sloan, Beloit
Florence Hazel Smith, Manhattan
Iva Bernice Smith, Formoso
Louberta Smith, Chivington, Colo.
Mollie Smith, Westphalia
Orliff Elmer Smith, Manhattan
Bessie Viola Smithson, Herington
Claire Leslie Smithson, Herington
Renna Maude Smithson, Herington
Florence Snell, Manhattan
(Mrs.) Fannye Cooper Snyder, K. C., Mo.
Salathael Schuyler Snyder, Manhattan
Martin Hayden Soule, Independence
Edna Grace Soupene, Manhattan
Fanny Myrtle Spaniol, Manhattan
Helen May Spencer, Hanover
Jessie Ruth Sprague, Haddam
Nellie Elma Stevenson, Altamont
Charles George Stiensmeyer, Leavenworth
John William Stockebrand, Vernon
Lola Dow Stoddard, Manhattan
Mable Alice Stollar, Kensington
Lowell Stone, Wilson
Stella Strain, Phillipsburg
Rose Elizabeth Straka, McPherson
Julia Rena Strand, Independence
(Mrs.) Ethel May Strother, Manhattan
Mary Gladys Stunz, Edgerton
Clarina May Sumners, Manhattan
Harlan Randolph Sumner, Manhattan
Harry Oscar Sutcliff, Wheaton
Leora Juanita Sutcliff, Wellington
Abbie Swafford, Manhattan
Merton Henry Swanson, Manhattan
Mary Franc Sweet, Manhattan
May Leigh Symonds, Peabody
Sik Hung Taam, Manhattan
Elsie Shields Tanner, Saint John
James Weaver Tanner, Saint John
Doddridge Calvin Tate, Manhattan
Emma Elizabeth Taylor, Wichita
Mary Fidelia Taylor, Newton
Mary Taylor, Manhattan
Susie Belle Taylor, Murdock
William Fuller Taylor, Manhattan
Corinne Bertha Thiele, Hanover
Jane Evelyn Thomas, Manhattan
Margaret Thompson, Fort Scott
Erwin Milton Tiffany, Manhattan
Marcia Edith Tillman, Manhattan
Lawrence Tilton, Garrison
Zorada Zerua Titus, Wakarusa
Gustav Peter Toews, Newton
Ethel Mary Townsend, Wichita
Josephine Trachta, Wichita
Sarah Elizabeth Tracy, Junction City
Myrtle Marie Travers, Valley Falls
Eva Lucile Travis, Manhattan
Ruby Lillian Travis, Manhattan
Ella Price True, Topeka
Bertha Truesdell, Lyons
Willard Orrin Tucker, Louisville
Mary Adaline Tunstall, Manhattan
George Turner, Manhattan
Mary Turner, Manhattan
Norman Olof Valley, Manhattan
Telitha Jane Vance, Manhattan
Frank Van Haltern, Manhattan
Avis Louise Voak, Manhattan
Harold Wagner, Manhattan
Caroline Walbridge, Manhattan
Louise Chester Walbridge, Manhattan
Margaret Esther Walbridge, Russell
Edith Mary Walsh, Manhattan
Jane Elila Walton, Wichita
Blanche Eugenia Ward, Wellington
Charlotte Pearl Wartenbee, Liberal
Mamie Bell Wartenbee, Liberal

SUMMER SCHOOL STUDENTS—*continued.*

Fern Vena Weaver, Wakefield
(Mrs.) Ada Wells, Lucas
Thornton Wells, Lucas
John Hanna Welsh, Kansas City, Mo.
Fred Wenn, Erie
Bertha Evelyn Wentworth, Wichita
Ezra Taggart Whitcomb, Manhattan
Hazel Adel White, Manhattan
Vera Whitmore, Manhattan
Ray Whitenack, Manhattan
Margaret Lee Whitney, Topeka
Alison Mary Whitten, Manhattan
Gladys Wilcox, Manhattan
Nelle Wilkie, Abilene
Clyda Dell Wilkinson, Manhattan
Jennie Williams, Meriden
Josiah Davis Williams, Clay Center
Millicent Williamson, Haddam
Arleigh Lyle Willis, Manhattan
Earl Willis, Manhattan
Grace Willits, Topeka
Harry Homer Wilson, Silver Lake
Ruth Marie Wilson, Edgerton
*Wilmer Homer Wilson, Osage City
Fred Charles Winship, Manhattan
Daisy Evaline Wiseman, Manhattan
Lois Emily Witham, Manhattan
Alice Jean Wood, Anthony
Joel Earl Wood, Manhattan
Mary Susan Wood, Belleville
Ruth Virginia Wood, Anthony
Fred Woodward, Manhattan
J. Wistar Worthington, Manhattan
Nelle Wreath, Manhattan
Wilbur William Wright, Newton
Orville Wynn, Marquette
Albert Lloyd Young, Cestos, Okla.
Charles Forrest Zeigler, Manhattan
Lulu May Zeller, Manhattan
Louis Albert Zimmerman, Belle Plaine

HOUSEKEEPERS' COURSE

Christine Ash, Garnett
Alice Marie Barg, Prarie View
Martha Bartels, Inman
Nellie Bearman, Johnson
Minnie Bedenbender, Geneva
Eva May Black, Webb City, Mo.
Mary Elva Bleich, Holden, Mo.
Vivian Cleo Blosser, Norway
Sara Brown, Alton
Frances Jane Case, Medicine Lodge
Eloise Catlin, Leavenworth
Lois Agnes Chase, Towanda
Marie Claassen, White Water
Pearl Conaway, Dodge City
Winifred Wanda Cornic, Anthony
Susie Evans Davis, Manhattan
Emma Martha Delfs, Inman
Mona Derge, Lebanon
Lizzie Dick, Buhler
Clara Mary Eickman, Belleville
Anna Enns, Buhler
Marie Enns, Buhler
Isabella Agnes Fraser, Manhattan
Leona Fry, Tulsa, Oklahoma
Hazel Marguerite Garst, Princeton
Hazel Marie Gunn, Partridge
Mary Eva Harper, Glasco
Edith Elvera Hedberg, Marquette
Hazel Belle Henderson, Minneapolis
Abbie Irene Henry, Washington
Inez Elizabeth Hesse, McLouth
Emma Christina Hubenett, Little River
Margaret Hulda Hubenett, Little River
Leila May James, Topeka
Winifred Inez Jenkins, Salina
Inez Dorothea Johnson, Lyons
Lula Anette Johnson, Walsburg
Myrtle Naomi Johnson, Leonardville
Anna Ida Kunze, Cawker City
Emma Charlotte Kunze, Cawker City
Olive Christmas Laird, Ottawa
Ethel Madge Latter, Eureka
Florence Laude, Lyons
Helene Julia Lewis, Kansas City
Ellen Wilma Lind, Zeandale
Evelyn Elizabeth Logeman, Atchison
Magdlyn Mary Logeman, Atchison
(Mrs.) Pearl May McCosh, Liberal
Lucile Esther McKay, Mankato
Lora Blanch Mack, Osborne
Clara Mitchell, Manhattan
Pansy Alice Mitchell, Valencia
Jennie Meloy Murphy, Ashland
Jean Garrard Nixon, Jewell
Ethelene Elvira Nordstrom, Leonardville
Lottie Idella O'Harra, Morganville
Flora Hazel Parli, Ellsworth
Esther Irene Peterson, Windom
Frances Marie Peterson, Leonardville
Frances Pinney, Wright
Alta Alberta Ragle, Iola
May Bell Redmond, Lyndon
Hazel Rudy, Manhattan
Ella Concordia Rundquist, Bala
Alice Ryan, Salina
Margaret Beatrice Shakeshaft, Topeka
Mabel Wilhelmine Shannon, Ellsworth
Dorothy Knostman Smith, Council Grove
Elsie Avis Smith, Portis
Grace Margie Smith, Manhattan
Leota Belle Snodgrass, Council Grove
Frieda Mattie Steffey, Oskaloosa
Dorothy Webb Sweet, East Aurora, N. Y.
Neva Dorothea Tangeman, Newton
Carrie May Tomlinson, Topeka
Anna Mary Torbet, Munden
Gladys Deans Waugh, Eskridge
Adelaide M. Wemmer, Princeton
Gertrude Wiebe, Beatrice, Neb.
Lillian Henrietta Wiegand, Inman
Anita Wientge, Santa Fe, N. M.
(Mrs.) Dot Wiershing, Eureka
Dorothy Wiseley Wolff, Council Grove
Edith May Yoho, Pratt
Clara Zimmerman, Osborne

* Deceased.

Farmers' Short Course

SECOND YEAR

Percy Lindsay Arnold, Le Raysville, Pa.
Paul Demose Adamson, Girard
Walter George Anderson, Chanute
Walter Leslie Brewer, Norway
Ivory Harold Campbell, Minneapolis
William Cook, St. Francis
Charley Cory, Lubbock, Tex.
Henry Roy DeLair, Coldwater
Ira Thomas Dick, Perry
Eugene Duvall, Hutchinson
Joseph Eble, jr., Jarbalo
Anson Elmer Ettridge, Hope
Alvin Faidley, Broughton
Alan Edwin Fitz-Simmons, Cunningham
William Hans Freienmuth, Tonganoxie
Albert William Gehrke, Herington
Bert Hommer Harding, Wichita
Harry Byron Hill, Hope
Joe Samuel Hunt, Belleville
Guy Calvin Jenkins, Coldwater
Wilfred Melancthon Johnson, Cleburne
Michael William Knapp, Leavenworth
Albert Charles Krehbiel, Pretty Prairie
Lee Fleming Lawson, Geuda Springs
Roy Walter Lee, Hutchinson
George Gilbert Leonard, White City
Leo Plato McClure, Havanna
William Henry McKee, Cedar Vale
Ralph Raymond Miller, Marienthal
Alexander Adamson Murdock, Edgerton
Ollie Gerald Noll, Flush
David Linneaus Ostlund, Clyde
George Herbert Phinney, Kingman
Harry Edward Proctor, Carwood
Albert Forbes Pyle, Milton
Raymond Curtis Redmond, Elmont
Thomas Edward Shaughnessy, Axtell
Wayne Hubert Smith, Potwin, Kansas
Floyd Edward Spencer, McCune
Henry Martin Strube, Baker
Cloice Ben Tarn, Kipp
Ralph Fromico Thompson, Cimarron
Charles Marion Tillotson, El Dorado
John Edward Tolson, Seward
Embry Loyal Wahl, Manhattan
Theodore Francis Walter, Lecompton
David Wiebe, Lehigh
George Wilson, Carlton
Hugh Jacob Winslow, Wellington
George Lawrence Yarrow, Wakefield
Floyd Denzel Young, Wichita
Miller Robert Young, Fontana

FIRST YEAR

Merrill Avery, Concordia
Victor Hugo Aley, Cedar Vale
John Russell Andrew, Madison
Andrew Bahmaier, Lecompton
Floyd Oliver Baird, Delphos
Dean Allen Beardmore, Concordia
Ernest Smith Benson, Hutchinson
Thomas Glen Betts, Detroit
William Reuel Biggs, Ashland
George Franklyn Bigham, Bethel
Rufus Book, Ramona
Claude Leveree Bowersock, Belleville
James Brownrigg, Mont Ida
Robert Brownrigg, Mont Ida
Millard Bull, Lenora
David Burns, Vesper
Roy Cadle, Sedgwick
James Henry Caldwell, Glen Elder
William Frederick Carls, Wakarusa
Arthur Clarence Carlson, Marquette
Daniel Joe Cass, Colyer
Edgar Kinney Chase, Hiawatha
Ralph Donald Collier, Alta Vista
Fred Cooper Conrow, Brookville
Clarence Valerian Corcoran, Oberlin
Charlie Cary Courter, Severy
William Claude Cox, Lyons
Solon Eugene Cronic, Greensburg
Charles Dalke, Hillsboro
Merle Leslie Davis, Walton
Warren Leroy Day, Belleville
Ralph Emerson De Lair, Coldwater
Albert Harry Dick, Perry
George Owen Dutton, Concordia
Lawrence William Eickman, Belleville
Sam Eitzen, Hillsboro
Riley William Eller, Colby
Edward Everet Fisk, Cherryvale
Cecil Fowler, Lucas
George Gustav Freeburg, Halstead
Glen Wesley Frisbie, Kingman
John Herman Fuhrman, Lancaster
Glen Wood Goddard, Phillipsburg
George Harold Graham, Logan
Ralph Arthur Grimm, Caldwell
Hugo Fred Hallman, Hudson
Elmer Alfred Hammarlund, St. Marys
Scott Hansen, Vinland
Harry Herschel Harmon, White City
William Julius Heine, Lucas
Abram Lincoln Hess, Hesston
Harvey Rex Hibner, Lawrence
Charles Edward Hill, Manhattan
Laud Reeves Hill, Manhattan
Arthur Holmberg, Clyde
Clarence Horchem, Ransom
Louis Horchem, Ransom
George Horton, Geuda Springs
Earl Cameron Howard, Oakley
Harry Hunt, Belleville
Charlie Robertson Jackson, Mayo
Francis Raymond Jesseph, Manhattan
Stephen Edgar Jester, Marysville
David Bernhard Johnson, Paxton, Ill.
Henry Phil Keller, Geneseo
Charles Milton Kissinger, Ransomville
Walter William Knapp, Leavenworth
Levi Frank Kurtz, Hiawatha
George Luther Lady, Abilene
Ira Lawless Laidig, Danbury, Neb.
Samuel Fred Langenwalter, Halstead
Frank Larkins, Belleville
Ray Larson, Chicago, Ill.
Reuben Fred Larson, Olsburg
J. T. Lear, Stafford
Alvin Lehman, Alleman, Ia.
John Gustav Lentfer, Sylvan Grove
Guilford Dudley Leslie, Ashland
Reuben Carl Lindstrom, Cleburne
Richard Lewis Lohrmuller, Centralia
Chester Earl Louthian, Huron
Randolph Louthian, Huron
Elmer Walden Lundquist, Clifton
Samuel Patterson Lyle, Manhattan
William August Luebke, Wichita
Arthur Will McCreight, Wilsey
Herbert Sanford McDowell, Manhattan
Vern Deloss McKenney, Shubert, Neb.
Glen Dale McLain, Sun City
Fred James McNicol, Lost Springs
Roy Marshall, Manhattan
Floyd Martin, Gaza, Ia.
Clarence Matti, Cottonwood Falls
Wilson Charles Means, Kansas City, Mo.
Otis Daniel Mills, Cedar Vale
John Lesslie Minter, Abilene

FARMERS' SHORT COURSE—*continued.*

John Cleveland Mohney, Geneseo
Verne William Morlan, Rantoul
DeWitt Duncan Morris, Rosalia
*Walter Morris, Hoyt
Victor John Morton, Oberlin
Luke Mowbray, Conway
Walter Mowbray, Conway
Leslie Arbert Muck, Glen Elder
Raymond Chapman Naden, Winfield
Walter Ruben Nelson, Clifton
Walter Andrew Nicholson, Neale
Ernest Howard Niemeir, Cimarron
(Mrs.) Inez Nimmons, Salina
Wells Freeburg Nimmons, Salina
Ferdinand August Olson, Scandia
Joe Otey, Winfield
Hans Christ Paulsen, Sylvan Grove
Albert Hirschler Penner, Newton
Percy Vivian Peterson, Marquette
Robert Allen Potter, Hiawatha
Earl Harlan Prentice, Goodrich
Osborne Russell Randall, Linn
John Rehmer, Grinnell
Ernest Rempel, Hillsboro
Millard Raymond Rodgers, Rantoul
Alva John Salts, Mayetta
Kyle McKinley Schlaegel, Vermilion
Max Milton Schropp, Hoxie
Karl Fred Schwake, Newton
Eugene Saxton Scott, Burlington
William Patrick Sculley, Colony
Hartley Wesley Setchell, Morland
Charley Edward Shean, Bellefont
Jay Shideler, Topeka
George Finley Shull, Amy
Thomas Nicholas Singular, Clifton
Hance Bayel Skillin, Lebanon
Floyd Merle Smith, Hesston
Emil Henry Steuber, Sylvan Grove
Walter John Steven, Lawrence
Edwin Mark Stoneman, Stockton
Floyd Daniel Streator, Denton
William Valentine Stutz, Utica
Samuel Edward Sunley, Paola
John Teis, Bischofteintz, Austria
Berry Alexander Wall, Wichita
Claude Guss Wehrman, White Cloud
Victor Werner, Colby
Wilbur Jay Whiting, Amy
Bowman Minor Williams, Albuquerque, N. M.
Martin George Willich, Germantown
Glinn Everett Winsor, Peabody
William Herman Wolting, Sylvan Grove
Rolla Wray, Hiattville
Otto Jacob Wullschleger, Winifred
Hobert Yates, Healey
Anthony Yelck, Rexford
Will Redden Young, Leavenworth
Ruben Albert Zimmerman, Salina

COMMERCIAL CREAMERY SHORT COURSE

Carroll Hamilton Aines, Merriam
Ernest Tommie Barker, Correctionville,
George Thomas Beaver, Lawton, Okla.
Paul Bruner, Norton
Earl Bradley Cory, Belleville
Walter Crots, Woodsdale
Pearl Robert Davis, Manhattan
Fred Luther Frisch, Nickerson
Homer Stephen Gentry, Topeka
Seth Hawkins, Sterling
Carl Cecil Rudolph, Winfield
Kristian Sinding, Manhattan
Clio Orville Smith, Moline
George Leo Stanton, Hartford
Joseph Svencer, Kansas City
Vern Eldred Teeter, Hutchinson
Harry Ernest Vohringer, Hutchinson

SHOP WORK SHORT COURSE

Leo Jay Barnes, Paola
Joseph George Benyshek, Cuba
Henry George Bletscher, Bala
Riley Evert Coltharp, Bala
Donald Earl Dickinson, Eureka
Kenneth Shaw Dobbs, Wellington
Clarence Eugene Engelke, Tecumseh
William Stephen Grabill, Hesston
Fred Lincoln Huff, Chapman
Leonard Andrew Johnson, Vermilion
George Frederick Kreipe, Tecumseh
Albert Lehman, Alleman, Ia.
Ernest Clarence Linder, Loomis, Neb.
Ernest Jacob Mall, Clay Center
Perry George Means, Protection
Walter Henry Stoneman, Stockton
Harold Ray Sutton, Emporia
Lewis Loyd Thompson, Morland
Charles Manley Tinkler, Gypsum
Frederick Lorence Wiegand, Inman

TRACTION ENGINE SHORT COURSE

Lidolph Anderson, Clyde
Warren Thomas Avery, Wakefield
John Cyril Bahnmaier, Lecompton
Palmer Ball, Silver Lake
Otto Curt Balzer, Inman
Andrew Duchsel Beeler, Junction City
George Otto Beeler, Junction City
George Whitney Bell, Effingham
Leo Reven Blackman, McPherson
George Louis Blaser, Waterville
John Carl Boehner, Cawker City
Raymond Houston Branson, Claude, Tex.
Joseph Archer Breneman, Manhattan
Glenn Dawson Brown, Hutchinson
Richard Hodson Brown, Emporia
Ernest Edward Bryan, Pratt
Ed McKinley Burnett, Park
Ross Allene Byler, Hesston
Teddie Theodore Cade, Luray
Bryan Lee Canty, Buffalo
Philip Lambert Carlson, Caldwell
James Carmody, Downs
Thomas Joseph Carmody, Manhattan
Walter Joseph Cash, Windom
Ralph Champion, Larned
Kent Loyal Chesney, Natoma
Wilber Conrad, Portis
Frank Bryan Cope, Fowler
Archie McKinley Dean, Kinsley
Harry Jacob Deckert, Manhattan
Harold Jacob Deitz, Pratt
Edwin Delander, Kinsley

* Deceased.

TRACTION ENGINE SHORT COURSE—*continued.*

William Dixon, Girard, Colo.
Porter Mayer Dobbs, Burden
Fred Ray Downing, Robinson
Clarence Carlyle Drown, Seneca
Elmer Alexander Drown, Seneca
Clyde Cover Easter, Abilene
Robert Lee Eddingfield, Scott City
David Wayne Entrikin, Abilene
Charles Arthur Ewing, Conway Springs
Floyd Hostetter Fike, Ramona
Ernest Charles Frazier, Ingalls
Reid Harry Freese, Hutchinson
Leslie Myron Gage, Manhattan
Clarence Bud Gary, Abilene
Fred Rudolf Geib, Beloit
Perry William Glendening, Denison
Ralph William Glockle, Havana
John Rasmus Godfreson, Waterville
Robert McKinley Goodwin, Belleville
Carlis Dell Goyen, Cairo
Walter Dibble Grabill, Hesston
John Joseph Habiger, Spearville
Lester Hanawalt, Jewell
John Dewey Hardesty, Pratt
Carl Lind Harrington, St. Francis
Edwin Monroe Harris, Leavenworth
Arthur McCormick Hawkins, Sterling
Robert John Helberg, McPherson
John Alvis Herl, Antonino
Orel Lenord Hershiser, Norton
Ludwig William Hink, Dodge City
Boydie Enoch Hoke, Mound Valley
Thomas David Holt, Broughton
Cyle Horchem, Ransom
John Horrigan, Great Bend
Raeburn Howard, Burrton
Lcyal Dwight Hoyt, Richland
Guy Josserand, Copeland
Will Lawrence Karrigan, Clay Center
Andie William Katz, Manhattan
Thomas Cardiff Kearley, Great Bend
Victor Kimmell, Arkansas City
Otto Bryan Kinsinger, McPherson
David Krehbiel, Castleton
Ira Lambert, Smith Center
Clyde Marion Lasswell, Emmett
Carter Livingston, Galena
George Albert Lovendahl, Clyde
Frank Dillard Lynch, Ness City
Mason McDonald, Wakefield
Dan Joseph McGinty, Junction City
Hubert Aloysina McNamee, Junction City
Earl Edward Mackender, Broughton
Joseph Malir, jr., Wilson
Harry Eugene Martin, Great Bend
Oscar Neal Martin, Forest
John Milton Marzolf, Glen Elder
John Henry Meyer, Galva
Martin Herman Minge, Waterville
Jake Morris, Council Grove
Jacob Pence Mather, Grinnell
Merle Albert Moyer, Oak Hill
Curt Muller, Manhattan
Harold Berton Munson, Beeler
Joe Edward Nichols, Ensign
John Nitcher, Republic
John Mitchell Nolan, Junction City
Leonard Russell Oakley, Marysville
Gust Cerenius Olson, Marquette
Guy Edgar Olson, Colby
John Amos Ostlind, McPherson
Guy Everett Packard, Forest
Clarence Jay Parry, Clay Center
Raymond William Perkins, Kirwin
Chester Raymond Peterson, Marquette
Elmer Emil Peterson, Waterville
Fred Peterson, Waterville
John Frank Pishny, Cleburne
John Ellis Porter, Sterling
George Thomas Powers, Norton
Millard Lewis Reed, Winfield
Clarence Reed Rice, Delphos
Rudolph Walter Rickenberg, Sylvan Grove
Henry Loyd Roberts, Cawker City
Robert Robertson, Strong City
Harry James Roediger, Wakefield
Richard Martin Rogers, Basil
Lloyd Leland Roll, Wichita
Nicholas Albert Schartz, Ellinwood
Clarence Firman Schenck, Tonganoxie
Rudolf Phillip Schuppert, Arrington
Ed Schwartz, Pretty Prairie
Frank Antone Selig, Rozel
Fred Oliver Sexson, Ruleton
Charles Frank Shoemaker, Phillipsburg
Harm Louis Splitter, Lorraine
Sherman Stauffer, Manhattan
Clarence Benjamin Stensaas, Concordia
Andyrue Steppe, Wakefield
Samuel Romaine Stewart, Clay Center
Lee Roy Stolfus, Emporia
George Fred Surmeier, Grinnell
Theodore Libory Surmeier, Grinnell
Jay Rudesill Sutton, Emporia
James Harold Taylor, Belle Plaine
Ray Taylor, Parsons
William Harry Taylor, Belle Plaine
Hiram Cassada Temple, Gove
Otis Earl Thompson, Morland
Merle Barton Thompson, McCune
James Frederick Timmerman, Emporia
Jim Tole, Liberty
Elden William Torr, Beloit
Otto Frederic Uppendahl, Amy
Fred Van Nice, Richland
Chester Duncan Vaughan, Scott City
Ernest Mitchell Walker, Anthony
James Henry Walkinshaw, Quinter
Charley James Wallace, Wright
Leslie Charley Wallace, Jewell
B. Wahinger, Schoenchen
Jesse Emmett Weikel, Solomon
Oscar Wayne Williams, Jewell
Charles Owen Williamson, Manhattan
Fred Willis, Wakefield
Albert Lemont Wiltse, Garden City
John Clay Wise, Clay Center
Carl Herbert Wistrand, Lindsborg
Harry Palmer Witham, Manhattan
Clarence Lynn Woolsey, Randall
Milton John Worrell, Arkansas City
Worn McKeever Worrell, Arkansas City
James Orville Yarrow, Clay Center
Chauncey DeWitt Yoeman, Hutchinson
Emil Zahradnik, Wilson
Ernest Louis Zimmerman, Osborne

Summary of Attendance, 1915-1916.

	Agriculture		Agronomy		Animal husbandry		Dairy husbandry		Horticulture		Veterinary medicine		Mechanic arts		Agricultural engineering		Architecture		Civil and highway engineering		Electrical engineering		Mechanical engineering		Home economics	General science		Industrial journalism		Miscellaneous		Total		Grand total
	Men		Men		Men		Men		Men		Men		Men		Men		Men		Men		Men		Men		Women	Men	Women	Men	Women	Men	Women	Men	Women	
Graduate	13												4		1										7	37	15					54	22	76
Senior		59		49		13		14		14				1		9		9		27		8		158	19	15	4	2			226	175	401
Junior		27		37		13		5		8				2		6		11		20		14		133	17	5	5	2			165	140	305
Sophomore	167									15				2		5		14		36		19		158	18	11	4	5			280	174	454
Freshman	183									24				6		8		20		45		31		209	50	14	12	3			379	226	605
Special	35									26		*30												16	15	53					104	71	175
School of Agriculture, special																													202	86	202	86	288
School of Agriculture, first year																													97	37	97	37	134
School of Agriculture, second year																													27	16	27	16	43
School of Agriculture, third year																													13	6	13	6	19
Housekeepers'																								85								85	85
Farmers' Short Course, first year																													154	1	154	1	155
Farmers' Short Course, second year																													52		52		52
Commercial Creamery, Short Course																													17		17		17
Traction Engine, Short Course																													168		168		168
Shop Work, Short Course																													20		20		20
Summer School																													135	351	185	351	536
Total	398		86		86		26		19		87		34		11		28		54		128		72	766	156	113	25	12	935	497	2,143	1,390	3,533
Counted twice																													88	131	88	131	219
Net total	398		86		86		26		19		87		34		11		28		54		128		72	766	156	113	25	12	847	366	2,055	1,259	3,314

*Two women.

Students by States and Counties, 1915-1916.

STATES AND TERRITORIES.

Kansas	3,152	New Mexico	4
Arizona	1	New York	2
Arkansas	7	North Carolina	1
California	1	Ohio	1
Colorado	6	Oklahoma	14
Hawaii	2	Pennsylvania	3
Idaho	2	Philippine Islands	1
Illinois	3	South Carolina	1
Indiana	2	South Dakota	1
Iowa	11	Tennessee	1
Kentucky	1	Texas	22
Massachusetts	1	Washington	1
Minnesota	2	Wisconsin	3
Mississippi	1		
Missouri	39	Total	3,307
Nebraska	21		

FOREIGN COUNTRIES.

Austria	1	England	1
Brazil	1	India	1
China	2	Switzerland	
Denmark	1	Total	7

Grand total, 3,314.

KANSAS COUTIES.

Allen	21	Logan	3
Anderson	21	Lyon	43
Atchison	18	McPherson	56
Barber	23	Marion	25
Barton	22	Marshall	45
Bourbon	14	Meade	8
Brown	17	Miami	19
Butler	20	Mitchell	23
Chase	21	Montgomery	29
Chautauqua	6	Morris	24
Cherokee	7	Morton	3
Cheyenne	6	Nemaha	20
Clark	11	Neosho	16
Clay	53	Ness	16
Cloud	38	Norton	28
Coffey	21	Osage	26
Comanche	15	Osborne	24
Cowley	34	Ottawa	10
Crawford	21	Pawnee	24
Decatur	6	Phillips	27
Dickinson	50	Pottawatomie	53
Doniphan	5	Pratt	12
Douglas	29	Rawlins	2
Edwards	11	Reno	50
Elk	7	Republic	44
Ellis	5	Rice	37
Ellsworth	16	Riley	839
Finney	9	Rooks	12
Ford	20	Rush	9
Franklin	35	Russell	23
Geary	21	Saline	34
Gove	11	Scott	9
Graham	9	Sedgwick	92
Grant	4	Seward	11
Gray	9	Shawnee	107
Greeley	2	Sheridan	4
Greenwood	34	Sherman	5
Hamilton	2	Smith	22
Harper	39	Stafford	16
Harvey	58	Stanton	2
Hodgeman	3	Stevens	1
Jackson	44	Sumner	51
Jefferson	33	Thomas	17
Jewell	35	Trego	11
Johnson	22	Wabaunsee	26
Kearny	3	Wallace	11
Kingman	19	Washington	39
Kiowa	12	Wichita	4
Labette	32	Wilson	20
Lane	8	Woodson	11
Leavenworth	34	Wyandotte	49
Lincoln	27		
Linn	18	Total	3,152

Record of Attendance, 1863-1916.

College Year	Summer School	Home economics short course	Com'cial creamery short course	Dairy short course	Farmers' short course	Apprentice	Special	Preparatory	Subfreshman	School of Agriculture	Freshman	Sophomore	Junior	Senior	Graduate	Counted twice	Total	Graduated
1863-64	....	....	....	....	....	....	....	93	....	....	14	.....	....	....	....	....	107	....
1864-65	....	....	....	....	....	....	....	90	....	....	14	8	1	....	....	....	113	....
1866-67	....	....	....	....	....	....	....	154	....	....	11	7	1	5	....	....	178	....
1867-68	....	....	....	....	....	....	....	.....	....	....	.....	.....	....	....	....	....	168	....
1868-69	....	....	....	....	....	....	....	146	....	....	11	10	2	....	1	....	170	....
1870-71	....	....	....	....	....	....	....	164	....	....	13	7	5	5	....	....	194	5
1871-72	....	....	....	....	....	....	....	162	....	....	22	10	3	2	3	....	202	3
**1873	....	....	....	....	....	....	....	.....	....	....	.....	.....	....	....	....	....	*217	2
1873-74	....	....	....	....	....	....	....	.....	....	....	.....	.....	....	....	....	....	183	5
**1874	....	....	....	....	....	....	....	.....	....	....	.....	.....	....	....	....	....	*243	....
**1875	....	....	....	....	....	....	....	.....	....	....	.....	.....	....	....	....	....	237	2
**1876	....	....	....	....	....	....	....	.....	....	....	.....	.....	....	....	....	....	303	5
**1877	....	....	....	....	....	....	....	.....	....	....	.....	.....	....	....	....	....	228	9
1877-78	....	....	....	....	....	....	....	75	....	....	42	23	5	5	....	....	150	4
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	Shop Work,	48	144	511	....	411	269	149	133	24	88	1937	119
1907-08	....	188	....	26	173	short course.	42	134	528	....	450	357	202	148	26	82	2192	116
1908-09	....	168	....	18	197		42	134	521	....	491	381	243	171	28	86	2308	139
1909-10	....	152	4	111	124		87	89	453	....	456	417	286	170	26	70	2305	146
1910-11	31	142	9	26	285		94	Traction Engine S. C.	364	....	533	412	288	248	34	59	2407	204
1911-12	94	160	14	....	280		85		580	....	337	461	288	261	44	81	2523	230
1912-13	282	175	11	....	289		129		654	....	444	432	355	268	55	166	2928	232
1913-14	370	149	12	....	223		112		....	658	516	431	324	327	64	159	3027	289
1914-15	472	127	18	....	199	....	120		....	560	575	368	383	321	48	200	3089	228
1915-16	536	85	17	....	207	20	175	168	....	484	605	454	305	401	76	219	3314	....

* Estimated. ** Calendar year.

Home-study Service Courses

There were 3044 active students taking Home-study Service courses from July 1, 1915, to March 15, 1916. These students were classified as follows: Reading courses, 1899; extension courses, 528; correspondence courses, 617. The names and addresses of those taking reading courses are not given, but the students taking extension and credit courses follow:

EXTENSION COURSES

C. R. Adams, Mound City
Earle J. Adams, Marquette
S. C. Albrecht, Downs
Alva Alexander, Protection
A. G. Alexander, Harper
H. P. Alexander, Kipp
Mrs. Jennie Alexander, Protection
B. G. Allen, Lansing
Harmon Allen, Lansing
Rupert Cecil Allen, Ocheltree, Tex.
Roy N. Anderson, Overbrook
C. H. Arlington, Lansing
George Armstrong, Lansing
Grace B. Armstrong, Salina
John Asendorf, Cheney
Harry Asher, Lansing
Percy R. Atkins, Lebanon
A. N. Austin, Lansing
Reginald Van Ness Ayars, Leavenworth
Fred Bahre, Moundridge
J. E. Baker, Bendena
M. W. Baker, Russell
H. E. Dalow, Osborne
Lloyd T. Banks, Herndon
Jess Banta, Leavenworth
Silas E. Barber, Cherryvale
R. J. Barnett, San Antonio, Tex.
Oscar Barnhart, Overbrook
J. E. Bartholomew, Solomon
Floyd A. Bash, Highland
R. A. Bass, Lansing
Philip Behrend, Herington
Troy P. Bess, Hope
Myrtle Beuhler, Lucas
Marion Black, Overbrook
Moses Black, Meade
John Blackburn, Overbrook
James T. Blackledge, Garnett
John Block, Lansing
J. V. Bloom, Hiawatha
H. P. Blunt, Cawker City
James G. Blunt, Greeley
J. M. Bolton, Clyde
Arle Boltz, Amy
Mrs. Mark L. Borror, Fordland, Mo.
T. K. Bosworth, Severy
James Bowers, Lawrence
J. D. Bowles, Erie
D. H. M. Boyle, Belleville
Frank Brandt, Leavenworth
J. F. Braun, Leavenworth
J. K. Brelsford, Wichita
R. D. Britain, Fairview
A. D. Brokaw, Hiawatha
W. H. Brooks, Plevna
Carl Brown, Stockton
C. E. Brown, Larned
J. H. Brown, Gridley
Rosa Brown, Stockton
Will S. Brown, Beattie
R. Browning, Lansing
Oscar W. Brune, Ocheltree
Thomas W. Bruner, Oanica
H. Bryant, Leavenworth
R. F. Burlson, Leavenworth
William Burns, Leavenworth
Will V. Burns, Winfield
Noel A. Burt, Shallow Water
William Burress, Lansing
Fred R. Bush, Kirwin
Robert D. Bussey, Centralia
F. H. Butler, Leavenworth
Thomas Butler, Lansing
A. L. Cade, Manhattan
William Cady, Effingham
E. H. Calder, Atlanta
Raymond Callahan, Leavenworth
Malcom Cameron, Leavenworth
William D. Campbell, Kelso
Robert M. Campbell, Kelso
George G. Canfield, Summerfield
Wallace Carpenter, Winfield
Henry Casey, Norton
Lewis Caven, Le Roy
Edward Cerny, Leavenworth
L. C. Chaney, Lansing
Herbert R. Chase, Leavenworth
Amy A. Clark, Jewell
Chester Clark, Fairview
Harry Clark, Lansing
George H. Clarke, Whiting
H. V. Clarke, Vermilion
Loren Coberly, Leavenworth
O. L. Coleman, Oneida
Harlan Eugene Collett, El Dorado
Chas. Conant, Lansing
J. W. Cone, Mount Hope
R. V. Cook, Pittsburg
T. M. Cooper, Parsons
Charles Cordts, Overbrook
John W. Cordts, Overbrook
W. H. Course, Tribune
J. T. Crawford, Parsons
J. E. Crist, Friend
D. F. Cross, Langdon
W. L. Cummings, Leavenworth
W. R. Curry, Lansing
William Dale, Leavenworth
E. W. Dales, Eureka
Andrew Daly, Leavenworth
C. L. Daly, Strawn
Lock Davidson, Wichita
C. D. Davis, Louisville
James Davis, Lansing
William O. Davis, Burlingame
P. J. Day, Lansing
Victor Davy, Leavenworth
C. O. DeVore, Valley Center
G. A. DeVore, Wichita
David DeWald, Sharon Springs
I. H. Dial, Eskridge
R. Dilley, Leavenworth
John Doe, Lansing
F. H. Doll, Larned
John Dougan, Leavenworth
W. E. Dull, Garfield
J. J. Dunham, Bucklin
John Durand, Lansing
William Dutch, Leavenworth
Forrest L. Eagle, Nickerson
J. W. Eldred, Chase
Homer Elliott, Rose

EXTENSION COURSES—*continued.*

C. S. Embree, Banner
J. V. Essick, Eureka
J. W. Estep, Lansing
T. H. Evans, New Albany
Chester Fanchier, Independence
Mose Farthing, Leavenworth
C. A. Fellows, Norton
Fred Fisher, Overbrook
Jesse C. Fisher, Marion
H. J. Fitzgerald, Leavenworth
R. E. Fleming, Clifton
Harry Fletcher, Lansing
Harry A. Foster, Leavenworth
M. S. Frantz, Nickerson
C. S. Freark, Longton
W. O. Frerichs, Alta Vista
B. H. Fuller, Lansing
F. E. Gates, Topeka
E. E. Gale, Scandia
S. A. Gardner, Clinton
Emory F. Gasaway, Clearwater
Joseph J. Gentle, Leavenworth
T. E. George, Burr Oak
G. G. Ghormley, Edwardsville
William Gilpin, Lansing
Charles M. Good, Downs
Clara Goodrich, Stockton
A. L. Goudy, Athol
Carl A. Grant, McPherson
S. H. Gray, Alton
William H. Gray, Leavenworth
James Green, Lansing
Walter C. Green, Chapman
H. C. Gresham, Parker
Ira P. Griffin, Thayer
Charles D. Grinn, Leavenworth
Roy B. Guile, Topeka
G. M. Gurley, Topeka
Joe Guthrie, Lansing
William Z. Hadley, Alton
S. S. Hagemen, Galena
J. P. Haggard, Baldwin
Mary Halford, Topeka
Keet Hamilton, Argonia
Abram Hammatt, Topeka
T. D. Hamilton, Topeka
Louis Hanne, Overbrook
R. D. Hardcastle, Lansing
W. F. Harding, Fort Scott
Henry Hargin, Lansing
Mrs. John Harmon, Herington
C. W. Harper, Ellis
James Harris, Leavenworth
Samuel Harris, Soldier
Elizabeth Harrison, Ogallah
C. E. Hatfield, Lyndon
Arthur Hartwick, Leavenworth
Dorothy Hartzell, Peru
Lon Harvey, Lansing.
P. E. Hawkins, Greensburg
J. F. Hay, Mount Hope
Ely Heberling, Overbrook
G. O. Heide, Onaga
A. C. Heider, Leavenworth
Benjamin F. Henry, Lecompton
T. W. Henshaw, Council Grove
Alden Lee Hill, Scottsville
G. E. Hitchcock, Sylvan Grove
A. Hoch, Osborne
M. Hollingsworth, Lansing
James Hollister, Quincy
H. A. M. Holshouser, Liberal
M. R. Holt, Burlingame
T. Ernest Hoon, Beloit
N. S. Horn, Morrowville
B. H. Horton, Wayne
William Hosley, Leavenworth
L. O. Housel, Jamestown
Elsie Houser, Norwich
Oscar Houston, Leavenworth
Thomas W. Houston, Baldwin
W. J. Houston, Hewins
L. O. Hudson, Louisville
Reginald Hudson, Leavenworth
C. H. Huffman, White City
S. M. Hunt, Meade
C. L. Huntley, Norfolk, Neb.
N. M. Hutchinson, Ramona
J. E. Ingham, Topeka
J. F. Irwin, Lyons
J. L. Irwin, Homewood
Walter M. Irwin, Wichita
C. W. Jackson, Leavenworth
J M. Jackson, Iola
Mrs. Ida M. Jackson, Manhattan
B. E. Jacobs, Narka
D. Bryan Jacobus, Elgin
George Jeffries, Lawrence
E. M. Jenkins, Lansing
A. H. Johnson, Ottawa
Emil A. Johnson, Ellis
C. R. Jones, Wathena
H. B. Jones, Lansing
Henry Jones, Lansing
John Jones, Lansing
Robert Jones, Lansing
William E. Joyce, Atlanta
Herbert O. Judd, Garden City
Myrtle Jump, Anthony
W. P. Keast, Willis
L. M. Kellsher, Burlingame
J. D. Kelly, Oronoque
A. Kemp, Atlanta
H. J. Kennedy, Jewell City
William Kepler, Kansas City
K. M. Kerans, Alma
Mrs. C. N. Kerr, Americus
Alva King, Lansing
Stella Kinnamon, Hutchinson
C. D. Kirk, Conway Springs
Harry Kirk, Leavenworth
B. M. Kirkpatrick, Paradise
Charles Kirkpatrick, Burrton
E. H. Knapp, Americus
P. B. Knepp, Axtell
George Kovar, Rossville
H. E. Kramer, Leavenworth
W. W. Kratzer, Atwood
E. T. Lacey, Hepler
W. G. LaMont, Russell
Frank B. Lane, Atlanta
Carl E. Larson, Smolan
W. E. Lawrence, Lansing
G. C. Lee, Pratt
Frank Lewis, Lansing
Herbert Linden, De Soto
D. C. Lingle, Paradise
Benjamin Locker, Atlanta
Henry Long, Lansing
William Lowe, Leavenworth
Ray Lucas, Bellaire
George Lynch, Chanute
L. A. McBratney, Mankato
Irene McCave, Alta Vista
J. Ray McClay, Canon City, Colo.
A. W. McClellan, Lansing
Mrs. Wilma C. McCreary, Okla. City, Okla.
H. M. McDow, Salina
Edward R. McFarland, Fort Leavenworth
C. H. McGary, Leavenworth
C. T. McKee, Hays
W. B. McKinney, Fredonia
Lemley Macklin, Burns
Guy Macy, Longford
Sister Magdalene, Kansas City, Mo.
Gertrude E. Major, Enid, Okla.
R. J. Maltby, Mentor
Harry Martin, Utica

EXTENSION COURSES—*continued.*

S. D. Martin, Horace
W. L. Martin, Lenora
Walter Mason, Sabetha
H. G. Mathis, Clay Center
Wesley Mercer, Leavenworth
Ben Meyer, Manhattan
W. S. Meyers, Lansing
Chester A. Miles, Preston
Florence Miller, Sylvia
Herman P. Miller, Salina
Mrs. Nellie B. Miller, Omaha
Orley L. Miller, Osborne
Thomas Miller, Lansing
Blaine Monroe, Lansing
Arthur A. Moore, Seneca
J. Frank Moore, Stafford
J. S. Moore, St. John
Otho C. Moorman, Iola
Thomas R. Mordy, Medicine Lodge
D. L. Moffitt, Peabody
Earl Morgan, Webber
Henry Morris, Basil
Julia Mulloy, Lincoln
S. F. Murphy, Goddard
Kyle Murray, Richland
Orville Murray, Lansing
Bert E. Myers, Wellington
H. J. Myers, Clyde
W. S. Nash, Topeka
W. H. Nation, Burlingame
Mrs. Claude E. Neil, Topeka
Frank W. Nelson, Marion
William Nesbit, Lansing
J. J. Nevelle, Lansing
Joe E. Nichols, Fowler
Mrs. Capitola Nichols, Herington
Elsie Nielson, Atchison
Leonard Noll, Ness City
August A. Nordin, Scandia
R. W. Nott, Clay Center
Frank Oaks, Lansing
Clyde W. Odom, Fredonia
Hugh C. Orr, Highland
A. T. Osborne, Olathe
C. C. Overeem, Selden
David H. Owen, Topeka
James B. Owen, Leavenworth
J. C. Owen, McPherson
Bert Pacey, Miltonvale
Frank L. Page, Neal
George H. Palmer, Miltonvale
Merle B. Peebles, Latham
J. N. Pennington, Clements
Chester Pew, Nickerson
G. W. Pfeiffer, Kansas City
A. D. Phelps, Dover
T. R. Pickerell, Wichita
J. Pierce, Leavenworth
L. M. Platt, Russell
E. W. Plummer, Leavenworth
Crayton T. Powell, McPherson
Thomas Price, Belle Plaine
Elmer C. Prime, Arapahoe, Neb.
Frederick L. Provan, Halls Summit
Lem. L. Raley, Lansing
Homer S. Rand, Plainville
Clifton E. Rash, Lyons
William Ready, Lansing
Perfect Remirez, Lansing
Ben Reynolds, Lansing
R. W. Richards, Medicine Lodge
P. H. Richert, Goessel
J. Rieboldt, Lansing
S. F. Riepman, Olathe
Adolf Riessen, Hillsboro
John Riley, Atlanta
Franklin B. Rist, Vinland
Rose Roberts, Linwood
Nat Rodinguez, Lansing
Edward O. Rogers, McLouth
W. M. Rogers, Robinson
Forrest E. Rohl, Plevna
C. H. Ruff, Burdett
Claude Ruggles, Eureka
A. E. Rundquist, Enterprise
Walter Rupp, Canada
Henry Russell, Roswell, N. M.
R. C. Russell, Winfield
James Ryley, Lansing
J. A. Salyer, Lansing
J. T. Sapp, Troy
J. W. Sapp, Smith Center
O. E. Schaal, Blue Hill
H. A. Schapper, Lansing
C. A. Schlatterbeck, Mullinville
Anna Schmidt, Goessel
Elizabeth Schmidt, Goessel
L. S. Schwab, Cherokee
E. M. Scott, Garden City
William R. Scott, Sylvan Grove
C. A. Shank, Abilene
Lulu Shaw, Conway Springs
Russel Shaw, Lawrence
R. W. Shaw, Cherryvale
May Shell, Fellsburg
Benjamin Shepherd, Leavenworth
C. B. Sherlock, Lansing
A. P. Sherman, Howard
J. Shoemaker, Ashland
Clarence Short, Lansing
C. V. Shulenberger, Kincaid
J. E. Shunkle, Lansing
Robert C. Shupe, Winfield
Louis Simes, Lansing
W. B. Simmons, McPherson
L. Simpson, Leavenworth
Mrs. Effie C. Smeelk, Victoria, Canada
Clarence Smith, Lansing
Mrs. Fred Smith, Grinnell
Joseph Smith, Leavenworth
Minnie D. Smith, Abilene
M. L. Smith, Minneapolis
Robert Smith, Lansing
C. J. Solt, Barnes
George H. Somers, Leavenworth
J. M. Southwell, Leavenworth
George H. Powers, Leavenworth
Mrs. C. C. Spencer, Marysville
W. J. Spencer, St. John
Claude J. Spiers, Meade
Elmer Stanley, Lansing
W. H. Stanley, Auburn
Guy Stanton, Kendall
James Steine, Leavenworth
J. V. Stevens, Council Grove
Walter Stewart, Lansing
Mrs. E. M. Stites, Dillon
Robert C. Stone, Leavenworth
R. F. Strand, Leavenworth
Richard L. Stratton, Blue Rapids
F. C. Strebble, Alton
Mrs. Harry Stuckman, Kirwin
John Shuler, Sharon
Clara Sumner, Marion
W. P. Symns, Atchison
Sister Symphrosa, Kansas City, Mo.
Fred Tanner, Leavenworth
William B. Tanner, Atlanta, Ga.
Ruben Tappen, Marquette
Earl L. Taton, Overbrook
G. W. Taylor, Randall
R. E. Taylor, Lansing
William Terry, Lansing
John E. Thackery, Stillwater, Okla.
Asa Thomas, Lansing
Chas. Thomas, Leavenworth
Robert Thomas, Leavenworth
O. B. Thurston, Paola

EXTENSION COURSES—*continued.*

Kenneth Topping, Overbrook
David Townly, Lyons
Harry Trimmer, Gove
George F. Tripp, Wichita
Robert Turner, Lansing
Judson L. Underwood, Axtell
J. D. Unruh, Goessel
A. J. Urban, Bison
Ernest Vallis, Atlanta, Ga.
W. A. Van Grundy, Scandia
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